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ECE/TRANS/276 (Vol. I)

ECONOMIC COMMISSION FOR EUROPE

Committee on Inland Transport

European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)

including the Annexed Regulations, applicable as from 1 January 2019

Volume I

UNITED NATIONS
New York and Geneva, 2018

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UNITED NATIONS PUBLICATIONS

Sales No.: E.18.VIII.2
ISBN: 978-92-1-139164-0
(Complete set of 2 volumes)
e-ISBN: 978-92-1-045175-8

ISSN: 2411-8583
eISSN: 2411-8591

Volumes I and II not to be sold separately.

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United Nations Economic Commission for Europe (UNECE)

The United Nations Economic Commission for Europe (UNECE) is one of the five United Nations regional commissions, administered by the Economic and Social Council (ECOSOC). It was established in 1947 with the mandate to help rebuild post-war Europe, develop economic activity and strengthen economic relations among European countries, and between Europe and the rest of the world. During the Cold War, UNECE served as a unique forum for economic dialogue and cooperation between East and West. Despite the complexity of this period, significant achievements were made, with consensus reached on numerous harmonization and standardization agreements.

In the post-Cold War era, UNECE acquired not only many new member States, but also new functions. Since the early 1990s the organization has focused on analyses of the transition process, using its harmonization experience to facilitate the integration of central and eastern European countries into global markets.

UNECE is the forum where the countries of western, central and eastern Europe, Central Asia and North America – 56 countries in all – come together to forge the tools of their cooperation. That cooperation concerns economic cooperation and integration, statistics, environment, transport, trade, sustainable energy, forestry and timber, housing and land management and population. The Commission offers a regional framework for the elaboration and harmonization of conventions, norms and standards. The Commission's experts provide technical assistance to the countries of South-East Europe and the Commonwealth of Independent States. This assistance takes the form of advisory services, training seminars and workshops where countries can share their experiences and best practices.

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Transport in UNECE

The UNECE Sustainable Transport Division is the secretariat of the Inland Transport Committee (ITC) and the ECOSOC Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals. The ITC and its 17 working parties, as well as the ECOSOC Committee and its sub-committees are intergovernmental decision-making bodies that work to improve the daily lives of people and businesses around the world, in measurable ways and with concrete actions, to enhance traffic safety, environmental performance, energy efficiency and the competitiveness of the transport sector.

The ECOSOC Committee was set up in 1953 by the Secretary-General of the United Nations at the request of the Economic and Social Council to elaborate recommendations on the transport of dangerous goods. Its mandate was extended to the global (multi-sectoral) harmonization of systems of classification and labelling of chemicals in 1999. It is composed of experts from countries which possess the relevant expertise and experience in the international trade and transport of dangerous goods and chemicals. Its membership is restricted in order to reflect a proper geographical balance between all regions of the world and to ensure adequate participation of developing countries. Although the Committee is a subsidiary body of ECOSOC, the Secretary-General decided in 1963 that the secretariat services would be provided by the UNECE Transport Division.

ITC is a unique intergovernmental forum that was set up in 1947 to support the reconstruction of transport connections in post-war Europe. Over the years, it has specialized in facilitating the harmonized and sustainable development of inland modes of transport. The main results of this persevering and ongoing work are reflected, among other things, (i) in 58 United Nations conventions and many more technical regulations, which are updated on a regular basis and provide an international legal framework for the sustainable development of national and international road, rail, inland water and intermodal transport, including the transport of dangerous goods, as well as the construction and inspection of road motor vehicles; (ii) in the Trans-European North-south Motorway, Trans-European Railway and the Euro-Asia Transport Links projects, that facilitate multi-country coordination of transport infrastructure investment programmes; (iii) in the TIR system, which is a global customs transit facilitation solution; (iv) in the tool called For Future Inland Transport Systems (ForFITS), which can assist national and local governments to monitor carbon dioxide (CO2) emissions coming from inland transport modes and to select and design climate change mitigation policies, based on their impact and adapted to local conditions; (v) in transport statistics – methods and data – that are internationally agreed on; (vi) in studies and reports that help transport policy development by addressing timely issues, based on cutting-edge research and analysis. ITC also devotes special attention to Intelligent Transport Services (ITS), sustainable urban mobility and city logistics, as well as to increasing the resilience of transport networks and services in response to climate change adaptation and security challenges.

In addition, the UNECE Sustainable Transport and Environment Divisions, together with the World Health Organization (WHO) – Europe, co-service the Transport Health and Environment Pan-European Programme (THE PEP).

Finally, as of 2015, the UNECE Sustainable Transport Division is providing the secretariat services for the Secretary General's Special Envoy for Road Safety, Mr. Jean Todt.

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INTRODUCTION

The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) done at Geneva on 26 May 2000 under the auspices of the United Nations Economic Commission for Europe (UNECE) and the Central Commission for the Navigation of the Rhine (CCNR) entered into force on 28 February 2008.

The Agreement itself and the annexed Regulations, in their original version, were published in 2001 under the symbol ECE/TRANS/150. That publication also contains the Final Act of the Diplomatic Conference held in Geneva from 22 to 26 May 2000 during which the Agreement was adopted as well as the text of a Resolution adopted by the Conference.

At the time of the preparation of the present publication, the Agreement had eighteen Contracting Parties: Austria, Belgium, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Luxembourg, Netherlands, Poland, Republic of Moldova, Romania, Russian Federation, Serbia, Slovakia, Switzerland and Ukraine. Other member States of UNECE whose territory contains inland waterways, other than those forming a coastal route, may also become Contracting Parties to the Agreement by acceding to it, on condition that the inland waterways are part of the network of inland waterways of international importance as defined in the European Agreement on Main Inland Waterways of International Importance (AGN).

The Regulations annexed to the ADN contain provisions concerning dangerous substances and articles, provisions concerning their carriage in packages and in bulk on board inland navigation vessels or tank vessels, as well as provisions concerning the construction and operation of such vessels. They also address requirements and procedures for inspections, the issue of certificates of approval, recognition of classification societies, monitoring, and training and examination of experts.

With the exception of the provisions relating to the recognition of classification societies, which have been applicable since the entry into force of the Agreement, the annexed Regulations did not become applicable until twelve months after the entry into force of the Agreement, namely on 28 February 2009 (see Article 11 (1) of the Agreement).

Before the entry into force of the Agreement, updates of the annexed Regulations were carried out regularly by a Joint Meeting of Experts of the UNECE and CCNR. These updates were adopted by the Administrative Committee of the ADN at its first session which was held in Geneva on 19 June 2008 (see document ECE/ADN/2, paragraphs 13 to 16).

Subsequently, the secretariat has published consolidated versions under the symbol ECE/TRANS/203 (“ADN 2009”), ECE/TRANS/220 (“ADN 2011”), ECE/TRANS/231 (“ADN 2013”), ECE/TRANS/243 (“ADN 2015”) and ECE/TRANS/258 (“ADN 2017”).

At its twentieth session (Geneva, 26 January 2018), the ADN Administrative Committee requested the secretariat to publish a new consolidated edition of ADN ("ADN 2019") incorporating all agreed corrections and amendments to enter into force on 1 January 2019. The amendments and corrections can be found in the following documents: ECE/ADN/45, ECE/ADN/45/Corr.1, ECE/ADN/45/Add.1, ECE/ADN/45/Add.1/Corr.1, ECE/TRANS/WP.15/AC.2/64, annexes II and III and ECE/TRANS/WP.15/AC.2/68, annexes IV and V.

The annexed Regulations contained in the present publication are the consolidated version which takes account of these updates and which is applicable from 1 January 2019.

It should be noted that, according to Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods, as amended, member States of the European Union, have to, with the exclusion of the derogations provided for in Article 1, paragraph 3 of the Directive, apply these annexed Regulations as well as Article 3 (f) and (h) and Article 8, paragraphs 1 and 3 of the ADN to the national and international transport between member States of dangerous goods by inland waterways on their territory.

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All requests for information relating to the application of the ADN should be addressed to the relevant competent authority.

Additional information can be found on the website of the UNECE Sustainable Transport Division at the following address:

http://www.unece.org/trans/danger/publi/adn/adn_e.html

This site, updated on a continuous basis, contains links to the following information:

- ADN Agreement (excluding the annexed Regulations);
- Corrections to the ADN Agreement (excluding the annexed Regulations);
- Status of the Agreement;
- Depositary notifications;
- Country information (competent authorities, notifications);
- Multilateral agreements;
- Special authorizations;
- Equivalences and derogations;
- Classification societies;
- Accident reports;
- Catalogue of questions;
- Harmonized model checklists;
- Publication details (Corrigenda);
- ADN 2019 (files);
- Amendments to ADN 2017;
- ADN 2017 (files);
- Previous versions of ADN;
- Historical information.

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EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS (ADN)

THE CONTRACTING PARTIES,

DESIRING to establish by joint agreement uniform principles and rules, for the purposes of:

(a) increasing the safety of international carriage of dangerous goods by inland waterways;

(b) contributing effectively to the protection of the environment, by preventing any pollution resulting from accidents or incidents during such carriage; and

(c) facilitating transport operations and promoting international trade,

CONSIDERING that the best means of achieving this goal is to conclude an agreement to replace the "European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterways" annexed to resolution No. 223 of the Inland Transport Committee of the Economic Commission for Europe, as amended,

HAVE AGREED as follows:

CHAPTER I

GENERAL PROVISIONS

Article 1

Scope

1. This Agreement shall apply to the international carriage of dangerous goods by vessels on inland waterways.

2. This Agreement shall not apply to the carriage of dangerous goods by seagoing vessels on maritime waterways forming part of inland waterways.

3. This Agreement shall not apply to the carriage of dangerous goods by warships or auxiliary warships or to other vessels belonging to or operated by a State, provided such vessels are used by the State exclusively for governmental and non-commercial purposes. However, each Contracting Party shall, by taking appropriate measures which do not impair the operations or operational capacity of such vessels belonging to or operated by it, ensure that such vessels are operated in a manner compatible with this Agreement, where it is reasonable in practice to do so.

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Article 2

Regulations annexed to the Agreement

1. The Regulations annexed to this Agreement shall form an integral part thereof. Any reference to this Agreement implies at the same time a reference to the Regulations annexed thereto.

2. The annexed Regulations include:

   (a) Provisions concerning the international carriage of dangerous goods by inland waterways;

   (b) Requirements and procedures concerning inspections, the issue of certificates of approval, recognition of classification societies, derogations, special authorizations, monitoring, training and examination of experts;

   (c) General transitional provisions;

   (d) Supplementary transitional provisions applicable to specific inland waterways.

Article 3

Definitions

For the purposes of this Agreement:

(a) "*vessel*" means an inland waterway or seagoing vessel;

(b) "*dangerous goods*" means substances and articles the international carriage of which is prohibited by, or authorized only on certain conditions by, the annexed Regulations;

(c) "*international carriage of dangerous goods*" means any carriage of dangerous goods performed by a vessel on inland waterways on the territory of at least two Contracting Parties;

(d) "*inland waterways*" means the navigable inland waterways including maritime waterways on the territory of a Contracting Party open to the navigation of vessels under national law;

(e) "*maritime waterways*" means inland waterways linked to the sea, basically used for the traffic of seagoing vessels and designated as such under national law;

(f) "*recognized classification society*" means a classification society which is in conformity with the annexed Regulations and recognized, in accordance with the procedures laid down in these Regulations, by the competent authority of the Contracting Party where the certificate is issued;

(g) "*competent authority*" means the authority or the body designated or recognized as such in each Contracting Party and in each specific case in connection with these provisions;

(h) "*inspection body*" means a body nominated or recognized by the Contracting Party for the purpose of inspecting vessels according to the procedures laid down in the annexed Regulations.

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CHAPTER II

TECHNICAL PROVISIONS

Article 4

Prohibitions on carriage, conditions of carriage, monitoring

1. Subject to the provisions of Articles 7 and 8, dangerous goods barred from carriage by the annexed Regulations shall not be accepted for international carriage.

2. Without prejudice to the provisions of Article 6, the international carriage of other dangerous goods shall be authorized, subject to compliance with the conditions laid down in the annexed Regulations.

3. Observance of the prohibitions and the conditions referred to in paragraphs 1 and 2 shall be monitored by the Contracting Parties in accordance with the provisions laid down in the annexed Regulations.

Article 5

Exemptions

This Agreement shall not apply to the carriage of dangerous goods to the extent to which such carriage is exempted in accordance with the annexed Regulations. Exemptions may only be granted when the quantity of the goods exempted, or the nature of the transport operation exempted, or the packagings, ensure that transport is carried out safely.

Article 6

Sovereign right of States

Each Contracting Party shall retain the right to regulate or prohibit the entry of dangerous goods into its territory for reasons other than safety during carriage.

Article 7

Special regulations, derogations

1. The Contracting Parties shall retain the right to arrange, for a limited period established in the annexed Regulations, by special bilateral or multilateral agreements, and provided safety is not impaired:

   (a) that the dangerous goods which under this Agreement are barred from international carriage may, subject to certain conditions, be accepted for international carriage on their inland waterways; or

   (b) that dangerous goods which under this Agreement are accepted for international carriage only on specified conditions may alternatively be accepted for international carriage on their inland waterways under conditions different from those laid down in the annexed Regulations.

   The special bilateral or multilateral agreements referred to in this paragraph shall be communicated immediately to the Executive Secretary of the Economic Commission for Europe, who shall communicate them to the Contracting Parties which are not signatories to the said agreements.

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2. Each Contracting Party shall retain the right to issue special authorizations for the international carriage in tank vessels of dangerous substances the carriage of which in tank vessels is not permitted under the provisions concerning carriage in the annexed Regulations, subject to compliance with the procedures relating to special authorizations in the annexed Regulations.

3. The Contracting Parties shall retain the right to authorize, in the following cases, the international carriage of dangerous goods on board vessels which do not comply with conditions established in the annexed Regulations, provided that the procedure established in the annexed Regulations is complied with:

   (a) The use on a vessel of materials, installations or equipment or the application on a vessel of certain measures concerning construction or certain provisions other than those prescribed in the annexed Regulations;

   (b) Vessel with technical innovations derogating from the provisions of the annexed Regulations.

Article 8

Transitional provisions

1. Certificates of approval and other documents prepared in accordance with the requirements of the Regulations for the Carriage of Dangerous Goods in the Rhine (ADNR), the Regulations for the Carriage of Dangerous Goods on the Danube (ADN-D) or national regulations based on the European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterways as annexed to resolution No. 223 of the Inland Transport Committee of the Economic Commission for Europe or as amended, applicable at the date of application of the annexed Regulations foreseen in Article 11, paragraph 1, shall remain valid until their expiry date, under the same conditions as those prevailing up to the date of such application, including their recognition by other States. In addition, these certificates shall remain valid for a period of one year from the date of application of the annexed Regulations in the event that they would expire during that period. However, the period of validity shall in no case exceed five years beyond the date of application of the annexed Regulations.

2. Vessels which, at the date of application of the annexed Regulations foreseen in Article 11, paragraph 1, are approved for the carriage of dangerous goods on the territory of a Contracting Party and which conform to the requirements of the annexed Regulations, taking into account where necessary, their general transitional provisions, may obtain an ADN certificate of approval under the procedure laid down in the annexed Regulations.

3. In the case of vessels referred to in paragraph 2 to be used exclusively for carriage on inland waterways where ADNR was not applicable under domestic law prior to the date of application of the annexed Regulations foreseen in Article 11, paragraph 1, the supplementary transitional provisions applicable to specific inland waterways may be applied in addition to the general transitional provisions. Such vessels shall obtain an ADN certificate of approval limited to the inland waterways referred to above, or to a portion thereof.

4. If new provisions are added to the annexed Regulations, the Contracting Parties may include new general transitional provisions. These transitional provisions shall indicate the vessels in question and the period for which they are valid.

Article 9

Applicability of other regulations

The transport operations to which this Agreement applies shall remain subject to local, regional or international regulations applicable in general to the carriage of goods by inland waterways.

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CHAPTER III

FINAL PROVISIONS

Article 10

Contracting Parties

1. Member States of the Economic Commission for Europe whose territory contains inland waterways, other than those forming a coastal route, which form part of the network of inland waterways of international importance as defined in the European Agreement on Main Inland Waterways of International Importance (AGN) may become Contracting Parties to this Agreement:

   (a) by signing it definitively;

   (b) by depositing an instrument of ratification, acceptance or approval after signing it subject to ratification, acceptance or approval;

   (c) by depositing an instrument of accession.

2. The Agreement shall be open for signature until 31 May 2001 at the Office of the Executive Secretary of the Economic Commission for Europe, Geneva. Thereafter, it shall be open for accession.

3. The instruments of ratification, acceptance, approval or accession shall be deposited with the Secretary-General of the United Nations.

Article 11

Entry into force

1. This Agreement shall enter into force one month after the date on which the number of States mentioned in Article 10, paragraph 1, which have signed it definitively, or have deposited their instruments of ratification, acceptance, approval or accession has reached a total of seven.

   However, the annexed Regulations, except provisions concerning recognition of classification societies, shall not apply until twelve months after the entry into force of the Agreement.

2. For any State signing this Agreement definitively or ratifying, accepting, approving or acceding to it after seven of the States referred to in Article 10, paragraph 1, have signed it definitively or have deposited their instruments of ratification, acceptance, approval or accession, this Agreement shall enter into force one month after the said State has signed it definitively or has deposited its instrument of ratification, acceptance, approval or accession.

   The annexed Regulations shall become applicable on the same date. In the event that the term referred to in paragraph 1 relating to the application of the annexed Regulations has not expired, the annexed Regulations shall become applicable after expiry of the said term.

Article 12

Denunciation

1. Any Contracting Party may denounce this Agreement by so notifying in writing the Secretary-General of the United Nations.

2. Denunciation shall take effect twelve months after the date of receipt by the Secretary-General of the written notification of denunciation.

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Article 13

Termination

1. If, after the entry into force of this Agreement, the number of Contracting Parties is less than five during twelve consecutive months, this Agreement shall cease to have effect at the end of the said period of twelve months.

2. In the event of the conclusion of a world-wide agreement for the regulation of the multimodal transport of dangerous goods, any provision of this Agreement, with the exception of those pertaining exclusively to inland waterways, the construction and equipment of vessels, carriage in bulk or tankers which is contrary to any provision of the said world-wide agreement shall, from the date on which the latter enters into force, automatically cease to apply to relations between the Parties to this Agreement which become parties to the world-wide agreement, and shall automatically be replaced by the relevant provision of the said world-wide agreement.

Article 14

Declarations

1. Any State may, at the time of signing this Agreement definitively or of depositing its instrument of ratification, acceptance, approval or accession or at any time thereafter, declare by written notification addressed to the Secretary-General of the United Nations that this Agreement shall extend to all or any of the territories for the international relations of which it is responsible. The Agreement shall extend to the territory or territories named in the notification one month after it is received by the Secretary-General.

2. Any State which has made a declaration under paragraph 1 of this article extending this Agreement to any territory for whose international relations it is responsible may denounce the Agreement in respect of the said territory in accordance with the provisions of Article 12.

3. (a) In addition, any State may, at the time of signing this Agreement definitively or of depositing its instrument of ratification, acceptance, approval or accession or at any time thereafter, declare by written notification addressed to the Secretary-General of the United Nations that this Agreement shall not extend to certain inland waterways on its territory, provided that the waterways in question are not part of the network of inland waterways of international importance as defined in the AGN. If this declaration is made subsequent to the time when the State signs this Agreement definitively or when it deposits its instrument of ratification, acceptance, approval or accession, the Agreement shall cease to have effect on the inland waterways in question one month after this notification is received by the Secretary-General.

   (b) However, any State on whose territory there are inland waterways covered by AGN, and which are, at the date of adoption of this Agreement, subject to a mandatory regime under international law concerning the carriage of dangerous goods, may declare that the implementation of this Agreement on these waterways shall be subject to compliance with the procedures set out in the statutes of the said regime. Any declaration of this nature shall be made at the time of signing this Agreement definitively or of depositing its instrument of ratification, acceptance, approval or accession.

4. Any State which has made a declaration under paragraphs 3 (a) or 3 (b) of this article may subsequently declare by means of a written notification to the Secretary-General of the United Nations that this Agreement shall apply to all or part of its inland waterways covered by the declaration made under paragraphs 3 (a) or 3 (b). The Agreement shall apply to the inland waterways mentioned in the notification one month after it is received by the Secretary-General.

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Article 15

Disputes

1. Any dispute between two or more Contracting Parties concerning the interpretation or application of this Agreement shall so far as possible be settled by negotiation between the Parties in dispute.

2. Any dispute which is not settled by direct negotiation may be referred by the Contracting Parties in dispute to the Administrative Committee which shall consider it and make recommendations for its settlement.

3. Any dispute which is not settled in accordance with paragraphs 1 or 2 shall be submitted to arbitration if any one of the Contracting Parties in dispute so requests and shall be referred accordingly to one or more arbitrators selected by agreement between the Parties in dispute. If within three months from the date of the request for arbitration the Parties in dispute are unable to agree on the selection of an arbitrator or arbitrators, any of those Parties may request the Secretary-General of the United Nations to nominate a single arbitrator to whom the dispute shall be referred for decision.

4. The decision of the arbitrator or arbitrators appointed under paragraph 3 of this article shall be binding on the Contracting Parties in dispute.

Article 16

Reservations

1. Any State may, at the time of signing this Agreement definitively or of depositing its instrument of ratification, acceptance, approval or accession, declare that it does not consider itself bound by Article 15. Other Contracting Parties shall not be bound by Article 15 in respect of any Contracting Party which has entered such a reservation.

2. Any Contracting State having entered a reservation as provided for in paragraph 1 of this article may at any time withdraw such reservation by notifying in writing the Secretary-General of the United Nations.

3. Reservations other than those provided for in this Agreement are not permitted.

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Article 17

Administrative Committee

1. An Administrative Committee shall be established to consider the implementation of this Agreement, to consider any amendments proposed thereto and to consider measures to secure uniformity in the interpretation and application thereof.

2. The Contracting Parties shall be members of the Administrative Committee. The Committee may decide that the States referred to in Article 10, paragraph 1 of this Agreement which are not Contracting Parties, any other Member State of the Economic Commission for Europe or of the United Nations or representatives of international intergovernmental or non-governmental organizations may, for questions which interest them, attend the sessions of the Committee as observers.

3. The Secretary-General of the United Nations and the Secretary-General of the Central Commission for the Navigation of the Rhine shall provide the Administrative Committee with secretariat services.

4. The Administrative Committee shall, at the first session of the year, elect a Chairperson and a Vice-Chairperson.

5. The Executive Secretary of the Economic Commission for Europe shall convene the Administrative Committee annually, or at other intervals decided on by the Committee, and also at the request of at least five Contracting Parties.

6. A quorum consisting of not less than one half of the Contracting Parties shall be required for the purpose of taking decisions.

7. Proposals shall be put to the vote. Each Contracting Party represented at the session shall have one vote. The following rules shall apply:

   (a) Proposed amendments to the Agreement and decisions pertaining thereto shall be adopted in accordance with the provisions of Article 19, paragraph 2;

   (b) Proposed amendments to the annexed Regulations and decisions pertaining thereto shall be adopted in accordance with the provisions of Article 20, paragraph 4;

   (c) Proposals and decisions relating to the recommendation of agreed classification societies, or to the withdrawal of such recommendation, shall be adopted in accordance with the procedure of the provisions of Article 20, paragraph 4;

   (d) Any proposal or decision other than those referred to in paragraphs (a) to (c) above shall be adopted by a majority of the Administrative Committee members present and voting.

8. The Administrative Committee may set up such working groups as it may deem necessary to assist it in carrying out its duties.

9. In the absence of relevant provisions in this Agreement, the Rules of Procedure of the Economic Commission for Europe shall be applicable unless the Administrative Committee decides otherwise.

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Article 18

Safety Committee

A Safety Committee shall be established to consider all proposals for the amendment of the Regulations annexed to the Agreement, particularly as regards safety of navigation in relation to the construction, equipment and crews of vessels. The Safety Committee shall function within the framework of the activities of the bodies of the Economic Commission for Europe, of the Central Commission for the Navigation of the Rhine and of the Danube Commission which are competent in the transport of dangerous goods by inland waterways.

Article 19

Procedure for amending the Agreement, excluding the annexed Regulations

1. This Agreement, excluding its annexed Regulations, may be amended upon the proposal of a Contracting Party by the procedure specified in this article.

2. Any proposed amendment to this Agreement, excluding the annexed Regulations, shall be considered by the Administrative Committee. Any such amendment considered or prepared during the meeting of the Administrative Committee and adopted by it by a two-thirds majority of the members present and voting shall be communicated by the Secretary-General of the United Nations to the Contracting Parties for their acceptance.

3. Any proposed amendments communicated for acceptance in accordance with paragraph 2 shall come into force with respect to all Contracting Parties six months after the expiry of a period of twenty-four months following the date of communication of the proposed amendment if, during that period, no objection to the amendment in question has been communicated in writing to the Secretary-General of the United Nations by a Contracting Party.

Article 20

Procedure for amending the annexed Regulations

1. The annexed Regulations may be amended upon the proposal of a Contracting Party.

   The Secretary-General of the United Nations may also propose amendments with a view to bringing the annexed Regulations into line with other international agreements concerning the transport of dangerous goods and the United Nations Recommendations on the Transport of Dangerous Goods, as well as amendments proposed by a subsidiary body of the Economic Commission for Europe with competence in the area of the transport of dangerous goods.

2. Any proposed amendment to the annexed Regulations shall in principle be submitted to the Safety Committee, which shall submit the draft amendments it adopts to the Administrative Committee.

3. At the specific request of a Contracting Party, or if the secretariat of the Administrative Committee considers it appropriate, amendments may also be proposed directly to the Administrative Committee. They shall be examined at a first session and if they are deemed to be acceptable, they shall be reviewed at the following session of the Committee at the same time as any related proposal, unless otherwise decided by the Committee.

4. Decisions on proposed amendments and proposed draft amendments submitted to the Administrative Committee in accordance with paragraphs 2 and 3 shall be made by a majority of the members present and voting. However, a draft amendment shall not be deemed adopted if, immediately after the vote, five members present declare their objection to it. Adopted draft amendments shall be communicated by the Secretary-General of the United Nations to the Contracting Parties for acceptance.

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5. Any draft amendment to the annexed Regulations communicated for acceptance in accordance with paragraph 4 shall be deemed to be accepted unless, within three months from the date on which the Secretary-General circulates it, at least one-third of the Contracting Parties, or five of them if one-third exceeds that figure, have given the Secretary-General written notification of their objection to the proposed amendment. If the amendment is deemed to be accepted, it shall enter into force for all the Contracting Parties, on the expiry of a further period of three months, except in the following cases:

   (a) In cases where similar amendments to other international agreements governing the carriage of dangerous goods have already entered into force, or will enter into force at a different date, the Secretary-General may decide, upon written request by the Executive Secretary of the Economic Commission for Europe, that the amendment shall enter into force on the expiry of a different period so as to allow the simultaneous entry into force of these amendments with those to be made to such other agreements or, if not possible, the quickest entry into force of this amendment after the entry into force of such amendments to other agreements; such period shall not, however, be of less than one month's duration.

   (b) The Administrative Committee may specify, when adopting a draft amendment, for the purpose of entry into force of the amendment, should it be accepted, a period of more than three months' duration.

Article 21

Requests, communications and objections

The Secretary-General of the United Nations shall inform all Contracting Parties and all States referred to in Article 10, paragraph 1 of this Agreement of any request, communication or objection under Articles 19 and 20 above and of the date on which any amendment enters into force.

Article 22

Review conference

1. Notwithstanding the procedure provided for in Articles 19 and 20, any Contracting Party may, by notification in writing to the Secretary-General of the United Nations, request that a conference be convened for the purpose of reviewing this Agreement.

   A review conference to which all Contracting Parties and all States referred to in Article 10, paragraph 1, shall be invited, shall be convened by the Executive Secretary of the Economic Commission for Europe if, within a period of six months following the date of notification by the Secretary-General, not less than one fourth of the Contracting Parties notify him of their concurrence with the request.

2. Notwithstanding the procedure provided for in Articles 19 and 20, a review conference to which all Contracting Parties and all States referred to in Article 10, paragraph 1, shall be invited, shall also be convened by the Executive Secretary of the Economic Commission for Europe upon notification in writing by the Administrative Committee. The Administrative Committee shall make a request if agreed to by a majority of those present and voting in the Committee.

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3. If a conference is convened in pursuance of paragraphs 1 or 2 of this article, the Executive Secretary of the Economic Commission for Europe shall invite the Contracting Parties to submit, within a period of three months, the proposals which they wish the conference to consider.

4. The Executive Secretary of the Economic Commission for Europe shall circulate to all the Contracting Parties and to all the States referred to in Article 10, paragraph 1, the provisional agenda for the conference, together with the texts of such proposals, at least six months before the date on which the conference is to meet.

Article 23

Depositary

The Secretary-General of the United Nations shall be the depositary of this Agreement.

IN WITNESS WHEREOF the undersigned, being duly authorized thereto, have signed this Agreement.

DONE at Geneva, this twenty-sixth day of May two thousand, in a single copy, in the English, French, German and Russian languages for the text of the Agreement proper, and in the French language for the annexed Regulations, each text being equally authentic for the Agreement proper.

The Secretary-General of the United Nations is requested to prepare a translation of the annexed Regulations in the English and Russian languages.

The Secretary-General of the Central Commission for the Navigation of the Rhine is requested to prepare a translation of the annexed Regulations in the German language.

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ANNEXED REGULATIONS

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PART I

General provisions

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CHAPTER 1.1

SCOPE AND APPLICABILITY

1.1.1 Structure

The Regulations annexed to ADN are grouped into nine parts. Each part is subdivided into chapters and each chapter into sections and subsections (see table of contents). Within each part the number of the part is included with the numbers of the chapters, sections and subsections, for example Part 2, Chapter 2, section 1 is numbered "2.2.1".

1.1.2 Scope

1.1.2.1 For the purposes of Article 2 paragraph 2 (a) and Article 4 of ADN, the annexed Regulations specify:

(a) dangerous goods which are barred from international carriage;

(b) dangerous goods which are authorized for international carriage and the conditions attaching to them (including exemptions) particularly with regard to:

- classification of goods, including classification criteria and relevant test methods;
- use of packagings (including mixed packing);
- use of tanks (including filling);
- consignment procedures (including marking and labelling of packages and placarding and marking of vehicles and wagons embarked, the marking of vessels as well as documentation and information required);
- provisions concerning the construction, testing and approval of packagings and tanks;
- use of means of transport (including loading, mixed loading and unloading).

1.1.2.2 For the purposes of Article 5 of ADN, section 1.1.3 of this chapter specifies the cases in which the carriage of dangerous goods is partially or totally exempted from the conditions of carriage established by ADN.

1.1.2.3 For the purposes of Article 7 of ADN, Chapter 1.5 of this part specifies the rules concerning the derogations, special authorizations and equivalences for which that article provides.

1.1.2.4 For the purposes of Article 8 of ADN, Chapter 1.6 of this part specifies the transitional measures concerning the application of the Regulations annexed to ADN.

1.1.2.5 The provisions of ADN also apply to empty vessels or vessels which have been unloaded as long as the holds, cargo tanks or receptacles or tanks accepted on board are not free from dangerous substances or gases, except for the exemptions for which section 1.1.3 of these Regulations provides.

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1.1.3 Exemptions

1.1.3.1 *Exemptions related to the nature of the transport operation*

The provisions laid down in ADN do not apply to:

(a) the carriage of dangerous goods by private individuals where the goods in question are packaged for retail sale and are intended for their personal or domestic use or for their leisure or sporting activities provided that measures have been taken to prevent any leakage of contents in normal conditions of carriage. When these goods are flammable liquids carried in refillable receptacles filled by, or for, a private individual, the total quantity shall not exceed 60 litres per receptacle and 240 litres per cargo transport unit. Dangerous goods in IBCs, large packagings or tanks are not considered to be packaged for retail sale;

(b) *(Deleted)*

(c) the carriage undertaken by enterprises which is ancillary to their main activity, such as deliveries to or returns from building or civil engineering sites, or in relation to surveying, repairs and maintenance, in quantities of not more than 450 litres per packaging, including intermediate bulk containers (IBCs) and large packagings, and within the maximum quantities specified in 1.1.3.6. Measures shall be taken to prevent any leakage of contents in normal conditions of carriage. These exemptions do not apply to Class 7.

Carriage undertaken by such enterprises for their supply or external or internal distribution does not fall within the scope of this exemption;

(d) the carriage undertaken by the competent authorities for the emergency response or under their supervision, insofar as such carriage is necessary in relation to the emergency response, in particular carriage undertaken to recover dangerous goods involved in an incident or accident and move them to the nearest appropriate safe place;

(e) emergency transport under the supervision of the competent authorities intended to save human lives or protect the environment provided that all measures are taken to ensure that such transport is carried out in complete safety;

(f) the carriage of uncleaned empty static storage vessels which have contained gases of Class 2, groups A, O or F, substances of Class 3 or Class 9 belonging to packing group II or III or pesticides of Class 6.1 belonging to packing group II or III, subject to the following conditions:

All openings with the exception of pressure relief devices (when fitted) are hermetically closed;

Measures have been taken to prevent any leakage of contents in normal conditions of carriage; and

The load is fixed in cradles or crates or other handling devices or to the vehicle, container or vessel in such a way that they will not become loose or shift during normal conditions of carriage.

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This exemption does not apply to static storage vessels which have contained desensitized explosives or substances the carriage of which is prohibited by ADN.

NOTE: *For radioactive material see also 1.7.1.4.*

1.1.3.2 ***Exemptions related to the carriage of gases***

The provisions laid down in ADN do not apply to the carriage of:

(a) (*Reserved*)

(b) (*Reserved*)

(c) gases of Groups A and O (according to 2.2.2.1), if the pressure of the gas in the receptacle or tank at a temperature of 20 °C does not exceed 200 kPa (2 bar) and if the gas is not a liquefied or a refrigerated liquefied gas. This includes every kind of receptacle or tank, e.g. also parts of machinery and apparatus;

NOTE: *This exemption does not apply to lamps. For lamps see 1.1.3.10.*

(d) gases contained in the equipment used for the operation of the vessel (e.g. fire extinguishers), including spare parts;

(e) (*Reserved*)

(f) gases contained in foodstuffs (except UN 1950), including carbonated beverages;

(g) gases contained in balls intended for use in sports; and

(h) (*Deleted*)

1.1.3.3 ***Exemptions related to dangerous goods used for the propulsion of vessels, vehicles, wagons or non-road mobile machinery carried, for the operation of their special equipment, for their upkeep or for their safety***

The requirements of ADN do not apply to substances used

- for the propulsion of vessels, vehicles, wagons or non-road mobile machinery carried[1],
- for the upkeep of vessels,
- for the operation or upkeep of their permanently installed special equipment,
- for the operation or upkeep of their mobile special equipment used during carriage or intended to be used during carriage, or
- to ensure safety,

and which are carried on board in the packaging, receptacle or tanks intended for use for this purpose.

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[1] *For the definition of non-road mobile machinery see paragraph 2.7 of the Consolidated Resolution on the Construction of Vehicles (R.E.3) (United Nations document ECE/TRANS/WP.29/78/Rev.3) or Article 2 of Directive 97/68/EC of the European Parliament and of the Council of 16 December 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery (Official Journal of the European Communities No. L 059 of 27 February 1998).*

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1.1.3.4 ***Exemptions related to special provisions or to dangerous goods packed in limited or excepted quantities***

NOTE: *For radioactive material see also 1.7.1.4.*

1.1.3.4.1 Certain special provisions of Chapter 3.3 exempt partially or totally the carriage of specific dangerous goods from the requirements of ADN. The exemption applies when the special provision is referred to in Column (6) of Table A of Chapter 3.2 against the dangerous goods entry concerned.

1.1.3.4.2 Certain dangerous goods may be subject to exemptions provided that the conditions of Chapter 3.4 are met.

1.1.3.4.3 Certain dangerous goods may be subject to exemptions provided that the conditions of Chapter 3.5 are met.

1.1.3.5 ***Exemptions related to empty uncleaned packagings***

Empty uncleaned packagings (including IBCs and large packagings) which have contained substances of Classes 2, 3, 4.1, 5.1, 6.1, 8 and 9 are not subject to the conditions of ADN if adequate measures have been taken to nullify any hazards. Hazards are nullified if adequate measures have been taken to nullify all hazards of Classes 1 to 9.

1.1.3.6 ***Exemptions related to quantities carried on board vessels***

1.1.3.6.1 (a) In the event of the carriage of dangerous goods in packages, the provisions of ADN other than those of 1.1.3.6.2 are not applicable when the gross mass of all the dangerous goods carried does not exceed 3,000 kg.

This provision does not apply to the carriage of:

(i) substances and articles of Class 1;

(ii) substances of Class 2, groups T, F, TF, TC, TO, TFC or TOC, according to 2.2.2.1.3 and aerosols of groups C, CO, F, FC, T, TF, TC, TO, TFC and TOC according to 2.2.2.1.6;

(iii) substances of Classes 4.1 or 5.2. for which a danger label of model No. l is required in column (5) of Table A of Chapter 3.2;

(iv) substances of Class 6.2, Category A;

(v) substances of Class 7 other than UN Nos. 2908, 2909, 2910 and 2911;

(vi) substances assigned to Packing Group I;

(vii) substances carried in tanks;

(b) In the event of the carriage of dangerous goods in packages other than tanks, the provisions of ADN other than those of 1.1.3.6.2 are not applicable to the carriage of:

– substances of Class 2 of group F in accordance with 2.2.2.1.3 or aerosols of group F according to 2.2.2.1.6; or

– substances assigned to Packing Group I, except substances of Class 6.1;

when the gross mass of these goods does not exceed 300 kg.

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1.1.3.6.2 The carriage of exempted quantities according to 1.1.3.6.1 is, however, subject to the following conditions:

(a) The obligation to report in accordance with 1.8.5 remains applicable;

(b) Packages, except vehicles and containers (including swap bodies), shall comply with the requirements for packagings referred to in Parts 4 and 6 of ADR or RID; the provisions of Chapter 5.2 concerning marking and labelling are applicable;

(c) The following documents shall be on board:

– the transport documents (see 5.4.1.1); they shall concern all the dangerous goods carried on board;

– the stowage plan (see 7.1.4.11.1);

(d) The goods shall be stowed in the holds.

This provision does not apply to goods loaded in:

– closed containers;

– sheeted vehicles or sheeted wagons;

(e) Goods of different class shall be separated by a minimum horizontal distance of 3 m. They shall not be stowed on top of each other.

This provision does not apply to:

– closed containers;

– sheeted vehicles or sheeted wagons;

(f) For seagoing and inland navigation vessels, where the latter carry only containers, the above requirements under (d) and (e) shall be considered to have been met if the provisions of the IMDG Code regarding stowage and separation are met and if this particular is recorded in the transport document.

1.1.3.7 ***Exemptions related to the carriage of electric energy storage and production systems***

The provisions laid down in ADN do not apply to electric energy storage and production systems (e.g., lithium batteries, electric capacitors, asymmetric capacitors, metal hydride storage systems and fuel cells):

(a) installed in a means of transport, performing a transport operation and destined for its propulsion or for the operation of any of its equipment;

(b) contained in an equipment for the operation of this equipment used or intended for use during carriage (e.g. a laptop computer).

1.1.3.8 *(Reserved)*

1.1.3.9 ***Exemptions related to dangerous goods used as a coolant or conditioner during carriage***

When used in vehicles or containers for cooling or conditioning purposes, dangerous goods that are only asphyxiant (which dilute or replace the oxygen normally in the atmosphere) are only subject to the provisions of section 5.5.3.

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1.1.3.10 ***Exemptions related to the carriage of lamps containing dangerous goods***

The following lamps are not subject to ADN provided that they do not contain radioactive material and do not contain mercury in quantities above those specified in special provision 366 of Chapter 3.3:

(a) Lamps that are collected directly from individuals and households when carried to a collection or recycling facility;

NOTE: *This also includes lamps brought by individuals to a first collection point, and then carried to another collection point, intermediate processing or recycling facility.*

(b) Lamps each containing not more than 1 g of dangerous goods and packaged so that there is not more than 30 g of dangerous goods per package, provided that:

(i) the lamps are manufactured according to a certified quality management system;

NOTE: *ISO 9001 may be used for this purpose.*

and

(ii) each lamp is either individually packed in inner packagings, separated by dividers, or surrounded with cushioning material to protect the lamps and packed into strong outer packagings meeting the general provisions of 4.1.1.1 of ADR and capable of passing a 1.2 m drop test;

(c) Used, damaged or defective lamps each containing not more than 1 g of dangerous goods with not more than 30 g of dangerous goods per package when carried from a collection or recycling facility. The lamps shall be packed in strong outer packagings sufficient for preventing release of the contents under normal conditions of carriage meeting the general provisions of 4.1.1.1 of ADR and that are capable of passing a drop test of not less than 1.2 m;

(d) Lamps containing only gases of Groups A and O (according to 2.2.2.1) provided they are packaged so that the projectile effects of any rupture of the lamp will be contained within the package.

NOTE*: Lamps containing radioactive material are addressed in 2.2.7.2.2.2 (b).*

1.1.4 **Applicability of other regulations**

1.1.4.1 ***General***

The following requirements are applicable to packages:

(a) In the case of packagings (including large packagings and intermediate bulk containers (IBCs), the applicable requirements of one of the international regulations shall be met (see also Part 4 and Part 6);

(b) In the case of containers, tank-containers, portable tanks and multiple element gas containers (MEGCs), the applicable requirements of ADR, RID or the IMDG Code shall be met (see also Part 4 and Part 6);

(c) In the case of vehicles or wagons, the vehicles or wagons and their load shall meet the applicable requirements of ADR or of RID, as relevant.

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NOTE: *For the marking, labelling, placarding and orange plate marking, see also Chapters 5.2 and 5.3.*

1.1.4.2 ***Carriage in a transport chain including maritime, road, rail or air carriage***

1.1.4.2.1 Packages, containers, bulk-containers, portable tanks and tank-containers and MEGCs, which do not entirely meet the requirements for packing, mixed packing, marking, labelling of packages or placarding and orange plate marking, of ADN, but are in conformity with the requirements of the IMDG Code or the ICAO Technical Instructions shall be accepted for carriage in a transport chain including maritime or air carriage subject to the following conditions:

(a) If the packages are not marked and labelled in accordance with ADN, they shall bear marks and danger labels in accordance with the requirements of the IMDG Code or the ICAO Technical Instructions;

(b) The requirements of the IMDG Code or the ICAO Technical Instructions shall be applicable to mixed packing within a package;

(c) For carriage in a transport chain including maritime carriage, if the containers, bulk-containers, portable tanks, tank-containers or MEGCs are not marked and placarded in accordance with Chapter 5.3 of these Regulations, they shall be marked and placarded in accordance with Chapter 5.3 of the IMDG Code. In such case, only 5.3.2.1.1 of these Regulations is applicable to the marking of the vehicle itself. For empty, uncleaned portable tanks, tank-containers and MEGCs, this requirement shall apply up to and including the subsequent transfer to a cleaning station.

This derogation does not apply in the case of goods classified as dangerous goods in classes 1 to 9 of ADN and considered as non-dangerous goods according to the applicable requirements of the IMDG Code or the ICAO Technical Instructions.

1.1.4.2.2 When a maritime, road, rail or air transport operation follows or precedes carriage by inland waterway, the transport document used or to be used for the maritime, road, rail or air transport operation may be used in place of the transport document prescribed in 5.4.1 provided that the particulars it contains are in conformity with the applicable requirements of the IMDG Code, ADR, RID or the ICAO Technical Instructions, respectively except that, when additional information is required by ADN, it shall be added or entered at the appropriate place.

NOTE**:** *For carriage in accordance with 1.1.4.2.1, see also 5.4.1.1.7. For carriage in containers, see also 5.4.2.*

1.1.4.3 ***Use of IMO type portable tanks approved for maritime transport***

IMO type portable tanks (types 1, 2, 5 and 7) which do not meet the requirements of Chapters 6.7 or 6.8 of ADR, but which were built and approved before 1 January 2003 in accordance with the provisions of the IMDG Code (Amdt. 29-98) may continue to be used provided that they meet the applicable periodic inspection and test provisions of the IMDG Code[2]. In addition, they shall meet the provisions corresponding to the instructions set out in columns (10) and (11) of Table A in Chapter 3.2 and the provisions of Chapter 4.2 of ADR. See also 4.2.0.1 of the IMDG Code.

1.1.4.4 and 1.1.4.5 *(Reserved)*

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[2] *The International Maritime Organization (IMO) has issued "Revised guidance on the continued use of existing IMO type portable tanks and road tank vehicles for the transport of dangerous goods" as circular CCC.1/Circ.3. The text of this guidance can be found on the IMO website at: www.imo.org.*

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1.1.4.6 ***Other regulations applicable to carriage by inland waterway***

1.1.4.6.1 In accordance with article 9 of ADN, transport operations shall remain subject to the local, regional or international requirements generally applicable to the carriage of goods by inland waterway.

1.1.4.6.2 Where the requirements of these Regulations are in contradiction with the requirements referred to in 1.1.4.6.1, the requirements referred to in 1.1.4.6.1 shall not apply.

1.1.5 Application of standards

Where the application of a standard is required and there is any conflict between the standard and the provisions of ADN, the provisions of ADN take precedence. The requirements of the standard that do not conflict with ADN shall be applied as specified, including the requirements of any other standard, or part of a standard, referenced within that standard as normative.

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CHAPTER 1.2

DEFINITIONS AND UNITS OF MEASUREMENT

1.2.1 Definitions

NOTE: *This section contains all general or specific definitions.*

For the purposes of these regulations:

A

Accommodation means spaces intended for the use of persons normally living on board, including galleys, food stores, lavatories, washrooms, bathrooms, laundries, halls, alleyways, etc., but excluding the wheelhouse;

ADR means the European Agreement concerning the International Carriage of Dangerous Goods by Road;

Aerosol, see *Aerosol dispenser*;

Aerosol dispenser means an article consisting of any non-refillable receptacle meeting the requirements of 6.2.6 of ADR made of metal, glass or plastics, and containing a gas, compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state;

Animal material means animal carcasses, animal body parts, foodstuffs or feedstuffs derived from animals*;*

Approval

Multilateral approval, for the carriage of radioactive material, means approval by the relevant competent authority of the country of origin of the design or shipment, as applicable, and by the competent authority of each country through or into which the consignment is to be carried;

Unilateral approval, for the carriage of radioactive material, means an approval of a design which is required to be given by the competent authority of the country of origin of the design only. If the country of origin is not a Contracting Party to ADN, the approval shall require validation by the competent authority of a Contracting Party to ADN (see 6.4.22.8 of ADR);

ASTM means the American Society for Testing and Materials (ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959, United States of America);

Auto-ignition temperature (EN 13237:2011) means the lowest temperature determined under prescribed test conditions of a hot surface on which a flammable substance in the form of a gas/air or vapour/air mixture ignites.

B

Bag means a flexible packaging made of paper, plastics film, textiles, woven material or other suitable material;

Battery-vehicle means a vehicle containing elements which are linked to each other by a manifold and permanently fixed to this vehicle. The following elements are considered to be

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elements of a battery-vehicle: cylinders, tubes, bundles of cylinders (also known as frames), pressure drums as well as tanks destined for the carriage of gases as defined in 2.2.2.1.1 with a capacity of more than 450 litres;

Battery-wagon means a wagon containing elements which are linked to each other by a manifold and permanently fixed to a wagon. The following elements are considered to be elements of a battery wagon: cylinders, tubes, bundles of cylinders (also known as frames), pressure drums as well as tanks intended for gases of Class 2 with a capacity greater than 450 litres;

Bilge water means oily water from the engine room bilges, the peak, the cofferdams and the double-hull spaces;

Biological/technical name means a name currently used in scientific and technical handbooks, journals and texts. Trade names shall not be used for this purpose;

Body (for all categories of IBC other than composite IBCs) means the receptacle proper, including openings and closures, but does not include service equipment;

Boil-off means the vapour produced above the surface of a boiling cargo due to evaporation. It is caused by heat ingress or a drop in pressure;

Box means a packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fibreboard, plastics or other suitable material. Small holes for purposes of ease of handling or opening or to meet classification requirements, are permitted as long as they do not compromise the integrity of the packaging during carriage;

Breathing apparatus (ambient air-dependent filter apparatus) means an apparatus which protects the person wearing it when working in a dangerous atmosphere by means of a suitable filter. For such apparatuses, see for example European standard EN 136:1998. For the filters used, see for example European standard EN 14387:2004 + A1:2008;

Breathing apparatus (self-contained) means an apparatus which supplies the person wearing it when working in a dangerous atmosphere with breathing air by means of pressurized air carried with him or by means of an external supply via a tube. For such apparatuses, see for example European standard EN 137:2006 or EN 138:1994;

Bulk container means a containment system (including any liner or coating) intended for the carriage of solid substances which is in direct contact with the containment system. Packagings, intermediate bulk containers (IBCs), large packagings and tanks are not included.

A bulk container is:

- of a permanent character and accordingly strong enough to be suitable for repeated use;
- specially designed to facilitate the carriage of goods by one or more means of transport without intermediate reloading;
- fitted with devices permitting its ready handling;
- of a capacity of not less than 1.0 m^3.

Examples of bulk containers are containers, offshore bulk containers, skips, bulk bins, swap bodies, trough-shaped containers, roller containers, load compartments of vehicles or wagons;

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NOTE: *This definition only applies to bulk containers meeting the requirements of chapter 6.11 of ADR.*

Closed bulk container means a totally closed bulk container having a rigid roof, sidewalls, end walls and floor (including hopper-type bottoms). The term includes bulk containers with an opening roof, side or end wall that can be closed during carriage. Closed bulk containers may be equipped with openings to allow for the exchange of vapours and gases with air and which prevent under normal conditions of carriage the release of solid contents as well as the penetration of rain and splash water;

Flexible bulk container means a flexible container with a capacity not exceeding 15 m^3 and includes liners and attached handling devices and service equipment;

Sheeted bulk container means an open top bulk container with rigid bottom (including hopper-type bottom), side and end walls and a non-rigid covering;

Bulkhead means a metal wall, generally vertical, inside the vessel and which is bounded by the bottom, the side plating, a deck, the hatchway covers or by another bulkhead;

Bulkhead (watertight) means

– In a dry cargo vessel: a bulkhead constructed so that it can withstand water pressure with a head of 1.00 metre above the deck but at least to the top of the hatchway coaming;

– In a tank vessel: a bulkhead constructed to withstand a water pressure of 1.00 metre above the deck;

Bundle of cylinders (frame) means an assembly of cylinders that are fastened together and are interconnected by a manifold and carried as a unit. The total water capacity shall not exceed 3,000 litres except that bundles intended for the carriage of toxic gases of Class 2 (groups starting with letter T according to 2.2.2.1.3) shall be limited to 1,000 litres water capacity.

C

Capacity of shell or shell compartment, for tanks, means the total inner volume of the shell or shell compartment expressed in litres or cubic metres. When it is impossible to completely fill the shell or the shell compartment because of its shape or construction, this reduced capacity shall be used for the determination of the degree of filling and for the marking of the tank;

Cargo area means the whole of the following spaces on board tank vessels:

Space below deck:

The space between two vertical planes perpendicular to the centre-line plane of the vessel, which comprises cargo tanks, hold spaces, cofferdams, double-hull spaces and double bottoms; these planes normally coincide with the outer cofferdam bulkheads or hold end bulkheads.

Space above deck: the space which is bounded:

– Athwart, by ships vertical planes corresponding to the side plating;

– Fore and aft, by vertical planes at the height of the outer cofferdam bulkheads/hold end bulkheads;

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– Upwards, by a horizontal plane 2.50 m above deck.

The boundary planes fore and aft are referred to as the ‘boundary planes of the cargo area’;

Cargo piping, see *Piping for loading and unloading*;

Cargo pump-room means a service space where the cargo pumps and stripping pumps are installed together with their operational equipment;

Cargo residues means liquid cargo which cannot be pumped out of the cargo tanks or piping by means of the stripping system;

Cargo tank means a tank which is permanently attached to the vessel and intended for the carriage of dangerous goods.

Cargo tank design:

(a) *Pressure cargo tank* means a cargo tank independent of the vessel’s hull, built according to dedicated recognised standards for a working pressure ≥ 400 kPa;

(b) *Closed cargo tank* means a cargo tank connected to the outside atmosphere through a device preventing unacceptable internal overpressure or underpressure;

(c) *Open cargo tank with flame arrester* means a cargo tank connected to the outside atmosphere through a device fitted with a flame arrester;

(d) *Open cargo tank* means a cargo tank in open connection with the outside atmosphere.

Cargo tank type:

(a) *Independent cargo tank* means a cargo tank which is permanently built in, but which is independent of the vessel’s structure;

(b) *Integral cargo tank* means a cargo tank which is constituted by the vessel’s structure itself and bounded by the outer hull or by walls separate from the outer hull;

(c) *Cargo tank with walls distinct from the outer hull* means an integral cargo tank of which the bottom and side walls do not form the outer hull of the vessel or an independent cargo tank.

Cargo tank (discharged) means a cargo tank which after unloading may contain some residual cargo.

Cargo tank (empty) means a cargo tank which after unloading contains no residual cargo but may not be gas free.

Cargo tank (gas free) means a cargo tank which after unloading does not contain any residual cargo or any measurable concentration of dangerous gases and vapours.

Cargo transport unit means a vehicle, a wagon, a container, a tank-container, a portable tank or an MEGC;

Carriage means the change of place of dangerous goods, including stops made necessary by transport conditions and including any period spent by the dangerous goods in vessels, vehicles, wagons, tanks and containers made necessary by traffic conditions before, during and after the change of place.

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This definition also covers the intermediate temporary storage of dangerous goods in order to change the mode or means of transport (transshipment). This shall apply provided that transport documents showing the place of dispatch and the place of reception are presented on request and provided that packages and tanks are not opened during intermediate storage, except to be checked by the competent authorities;

Carriage in bulk means the carriage of an unpackaged solid which can be discharged;

NOTE: *Within the meaning of ADN, the carriage in bulk referred to in ADR or RID is considered as carriage in packages.*

Carrier means the enterprise which carries out the transport operation with or without a transport contract;

CDNI means Convention on the Collection, Storage and Reception of Waste Generated during Navigation on the Rhine and Other Inland Waterways;

CEVNI means the UNECE European Code for Inland Waterways;

CGA means the Compressed Gas Association (CGA, 14501 George Carter Way, Suite 103, Chantilly, VA 20151, United States of America);

CIM means the Uniform Rules Concerning the Contract of International Carriage of Goods by Rail (Appendix B to the Convention concerning International Carriage by Rail (COTIF)), as amended;

Classification society (recognized) means a classification society which is recognized by the competent authorities in accordance with Chapter 1.15;

Classification of explosion hazardous areas (see Directive 1999/92/CE[1])

Zone 0: areas in which dangerous explosive atmospheres of gases, vapours or sprays exist permanently or during long periods;

Zone 1: areas in which dangerous explosive atmospheres of gases, vapours or sprays are likely to occur occasionally;

Zone 2: areas in which dangerous explosive atmospheres of gases, vapours or sprays are likely to occur rarely and if so for short periods only;

See also *Classification of zones*

Classification of zones: this classification (see diagram) applies to tank vessels when the list of substances on the vessel according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2.

Zone 0 comprises:

– Inside all cargo tanks, tanks for residual products, receptacles for residual products and receptacles for slops, and pipings containing cargoes or cargo vapours, including their equipment, as well as pumps and compressors.

[1] *Official Journal of the European Communities No. L 23 of 28 January 2000, p.57.*

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Zone 1 comprises:

– All spaces located below deck in the cargo area not part of zone 0.

– Closed spaces on deck within the cargo area.

– The deck in the cargo area over the entire width of the vessel to the outer cofferdam bulkheads.

– Up to a distance of at least 1.60 m to the “boundary planes of the cargo area”, the height above the deck is 2.50 m, but at least 1.50 m above the highest piping carrying cargoes or cargo vapours.

  Adjacent (fore and aft) to the outermost cargo tank bulkheads, the height is 0.25 m above deck.

  If the ship is built with hold spaces or a cofferdam/part of a cofferdam is arranged as a service space, the adjacent height (fore and aft) to the “boundary plane of the cargo area” is 1.00 m above deck (see diagram).

– Every opening in zone 0 except the high velocity vent valves/safety valves of pressurized cargo tanks shall be surrounded by a cylindrical zone 1 having at least a width of 2.50 m. With openings of which the diameter is less than 0.026 m (1”), the distance to the outer cofferdam bulkhead may be reduced to 0.50 m, provided it is ensured that such an opening is not opened to the atmosphere within this distance.

– A cylindrical area surrounding the high velocity vent valve/safety valve of pressurized cargo tanks with a radius of 3.00 m up to a height of 4.00 m above the opening of the high velocity vent valve/safety valve of pressurized cargo tanks.

– Around ventilation inlets of service spaces fitted with a ventilation system located in the cargo area, a zone included in a portion of a sphere with a radius of 1.00 m.

Zone 2 comprises:

– On the deck in the cargo area, a zone extending 1.00 m upwards and sidewards longitudinally from zone 1.

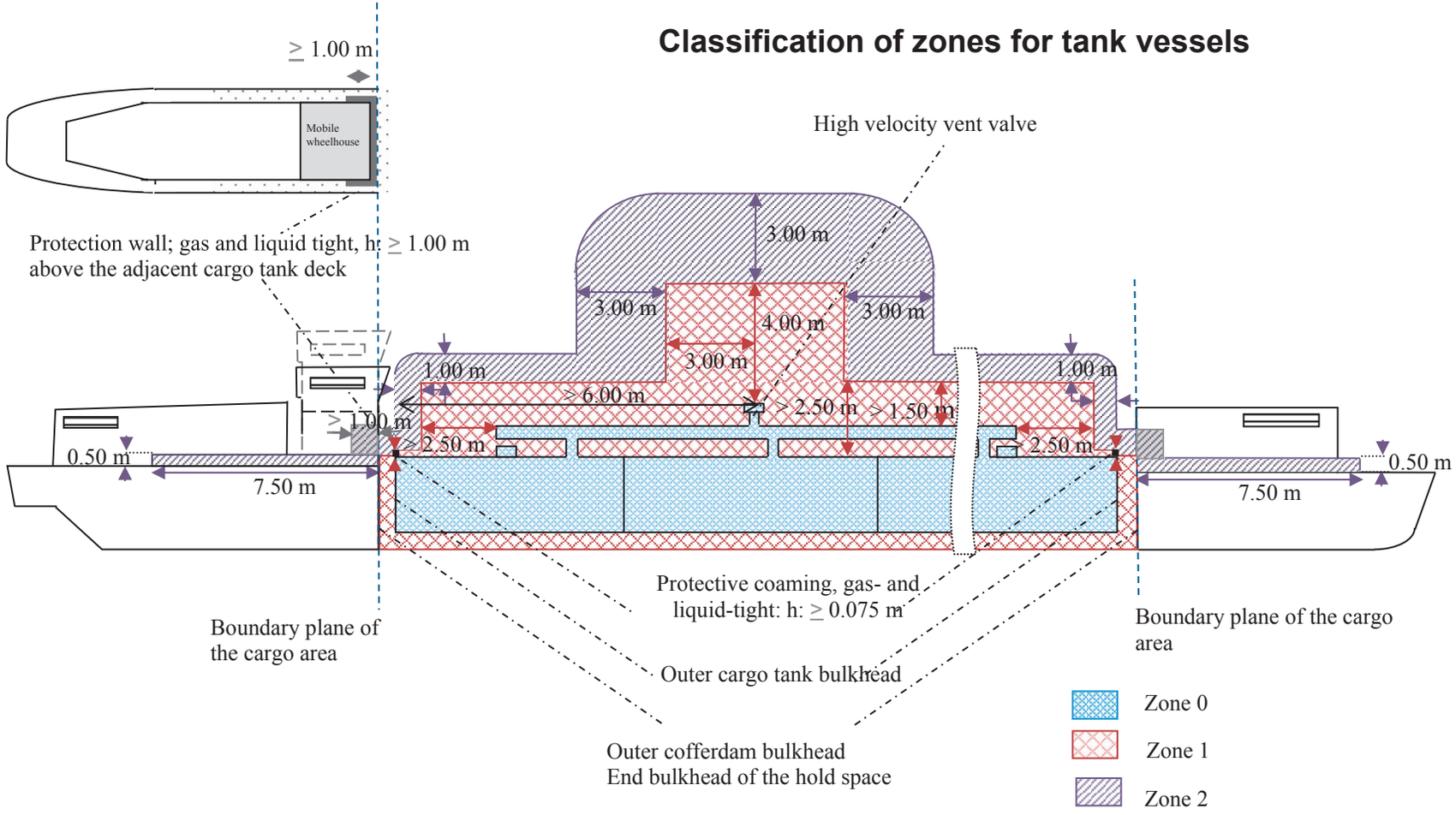
– On the fore deck and the aft deck, an area 7.50 m in length across the entire width of the vessel and adjacent to the “boundary plane of the cargo area”. Between the lateral side of the vessel and the protection wall, the length and height of this area equals the dimensions of the lateral side of the protection wall. Elsewhere, the height in zone 2 is 0.50 m.

  This area is not part of zone 2 if the protection wall extends from one side of the vessel to the other and there are no openings.

– An area of 3.00 m extending around zone 1 encompassing the high velocity vent valves/safety valves of pressure cargo tanks.

– Around the ventilation inlets of service spaces fitted with a ventilation system located in the cargo area, a zone included in a hemispherical shell with a radius of 1.00 m extending around zone 1;

Classification of zones for tank vessels



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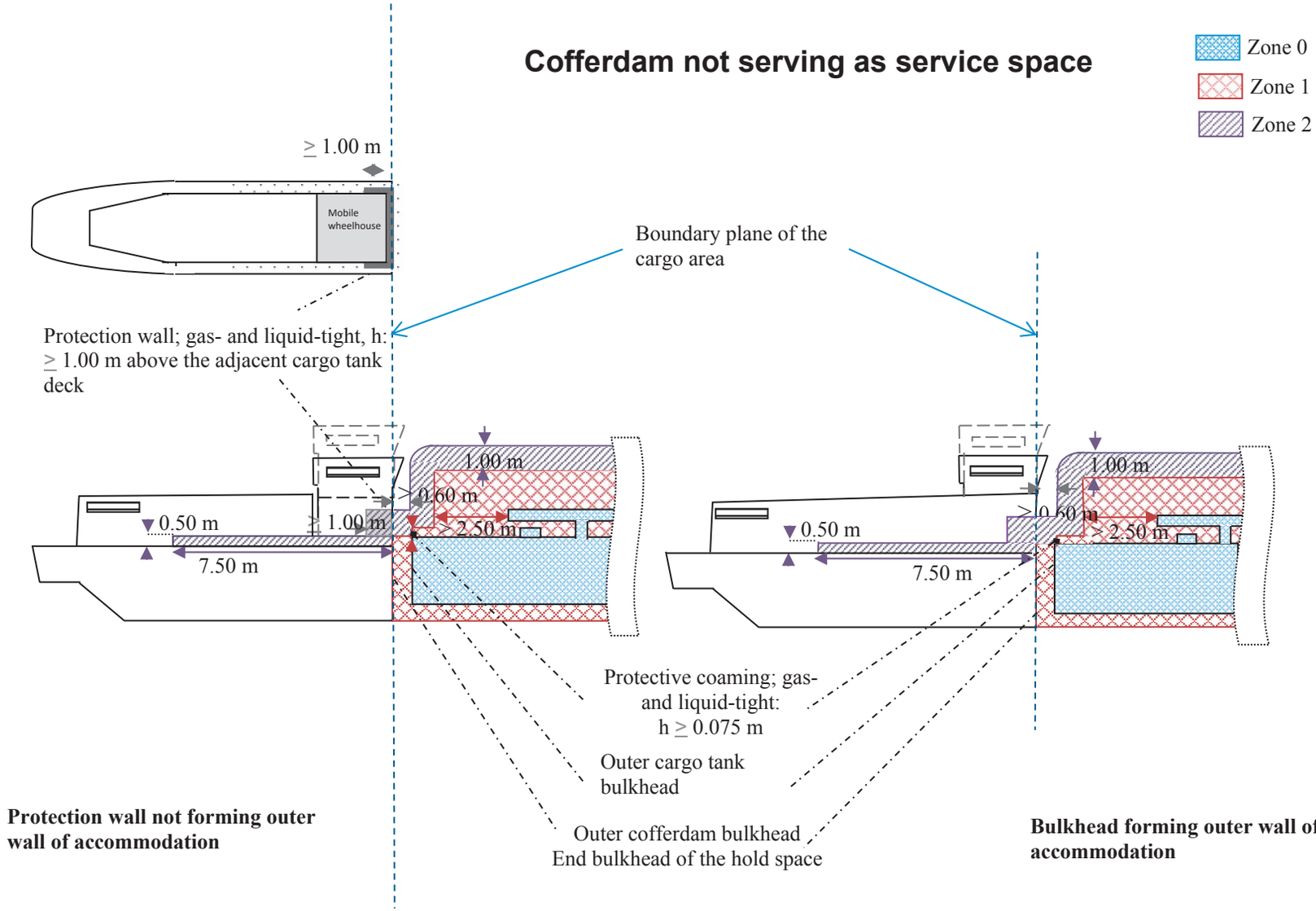

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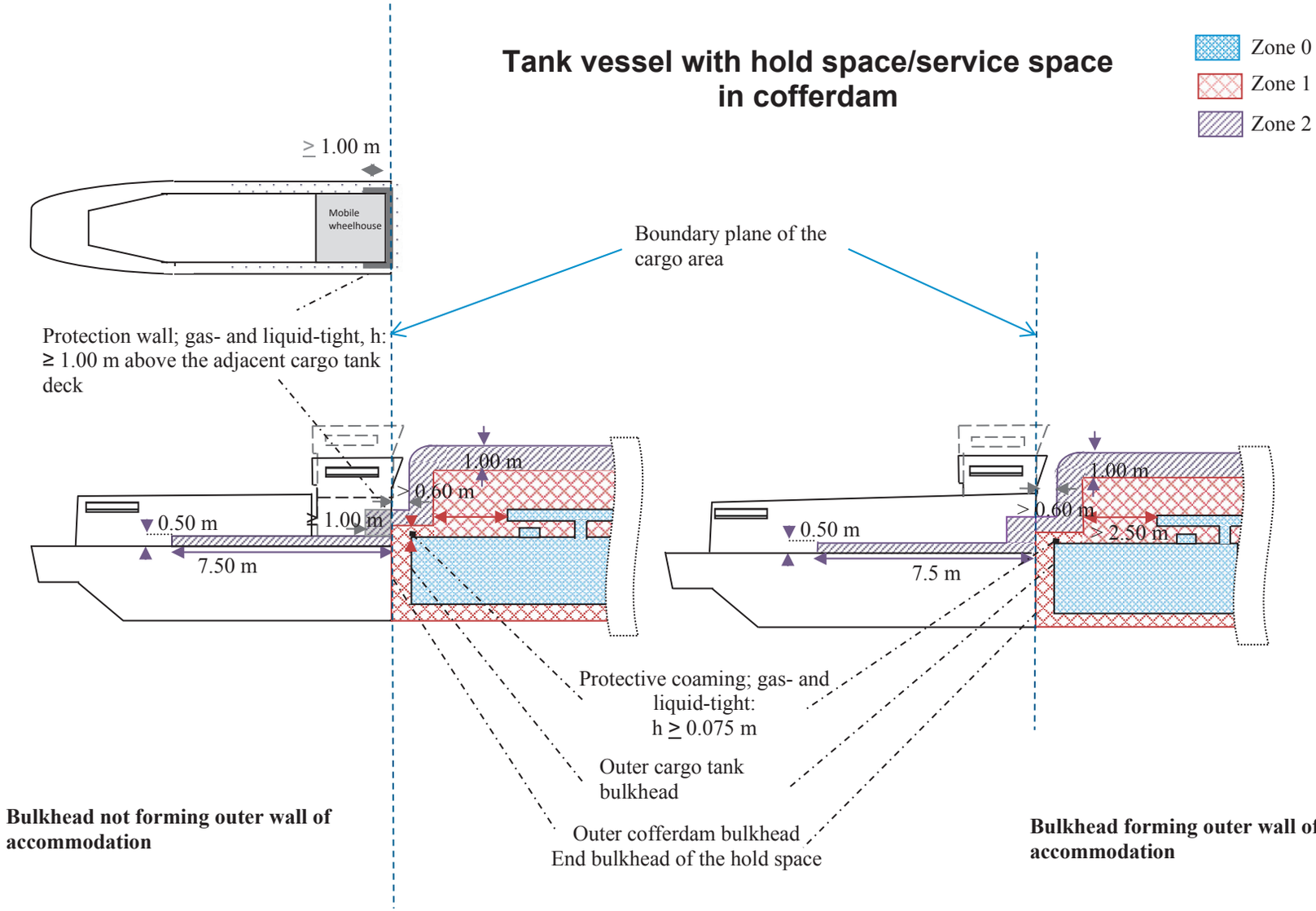

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Closed bulk container, see *Bulk container;*

Closed container, see *Container;*

Closed-type sampling device means a device penetrating through the boundary of the cargo tank or through the piping for loading and unloading but constituting a part of a closed system designed so that during sampling no gas or liquid may escape from the cargo tank. The device shall be of a type approved by the competent authority for this purpose;

Closed vehicle means a vehicle having a body capable of being closed;

Closed wagon means a wagon with sides and a fixed or movable roof.

Closure means a device which closes an opening in a receptacle;

CMNI means the Convention on the Contract for the Carriage of Goods by Inland Waterway (Budapest, 22 June 2001).

CMR means the Convention on the Contract for the International Carriage of Goods by Road (Geneva, 19 May 1956), as amended;

Cofferdam means an athwartship compartment which is bounded by watertight bulkheads and which can be inspected. The cofferdam shall extend over the whole area of the end bulkheads of the cargo tanks. The bulkhead not facing the cargo area (outer cofferdam bulkhead) shall extend from one side of the vessel to the other and from the bottom to the deck in one frame plane;

Collective entry means an entry for a defined group of substances or articles (see 2.1.1.2, B, C and D);

Combination packaging means a combination of packagings for carriage purposes, consisting of one or more inner packagings secured in an outer packaging in accordance with 4.1.1.5 of ADR;

NOTE: *The term "inner packaging" used for combination packagings shall not be confused with the term "inner receptacle" used for composite packagings.*

Competent authority means the authority or authorities or any other body or bodies designated as such in each State and in each specific case in accordance with domestic law;

Compliance assurance (radioactive material) means a systematic programme of measures applied by a competent authority which is aimed at ensuring that the requirements of ADN are met in practice;

Composite IBC with plastics inner receptacle means an IBC comprising structural equipment in the form of a rigid outer casing encasing a plastics inner receptacle together with any service or other structural equipment. It is so constructed that the inner receptacle and outer casing once assembled form, and are used as, an integrated single unit to be filled, stored, transported or emptied as such;

NOTE: *Plastics material, when used in connection with inner receptacles for composite IBCs, is taken to include other polymeric materials such as rubber.*

Composite packaging means a packaging consisting of an outer packaging and an inner receptacle so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled it remains thereafter an integrated single unit; it is filled, stored, carried and emptied as such;

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NOTE: *The term "inner receptacle" used for composite packagings shall not be confused with the term "inner packaging" used for combination packagings. For example, the inner of a 6HA1 composite packaging (plastics material) is such an inner receptacle since it is normally not designed to perform a containment function without its outer packaging and is not therefore an inner packaging.*

Where a material is mentioned in brackets after the term "composite packaging", it refers to the inner receptacle.

Compressed natural gas (CNG) means a compressed gas composed of natural gas with a high methane content assigned to UN No. 1971;

Confinement system, for the carriage of radioactive material, means the assembly of fissile material and packaging components specified by the designer and agreed to by the competent authority as intended to preserve criticality safety;

Connection for a sampling device means a connection allowing the installation of a closed-type or partly closed-type sampling device. The connection shall be fitted with a lockable mechanism resistant to the internal pressure of the cargo tank. The connection shall be of a type approved by the competent authority for the intended use;

Consignee means the consignee according to the contract for carriage. If the consignee designates a third party in accordance with the provisions applicable to the contract for carriage, this person shall be deemed to be the consignee within the meaning of ADN. If the transport operation takes place without a contract for carriage, the enterprise which takes charge of the dangerous goods on arrival shall be deemed to be the consignee;

Consignment means any package or packages, or load of dangerous goods, presented by a consignor for carriage;

Consignor means the enterprise which consigns dangerous goods either on its own behalf or for a third party. If the transport operation is carried out under a contract for carriage, consignor means the consignor according to the contract for carriage. In the case of a tank vessel, when the cargo tanks are empty or have just been unloaded, the master is considered to be the consignor for the purpose of the transport document;

Containment system, for the carriage of radioactive material, means the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during carriage;

Container means an article of transport equipment (lift van or other similar structure):

– of a permanent character and accordingly strong enough to be suitable for repeated use;

– specially designed to facilitate the carriage of goods, by one or more means of transport, without breakage of load;

– fitted with devices permitting its ready stowage and handling, particularly when being transloaded from one means of transport to another;

– so designed as to be easy to fill and empty;

– having an internal volume of not less than 1 m^3, except for containers for the carriage of radioactive material.

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In addition:

Closed container means a totally enclosed container having a rigid roof, rigid side walls, rigid end walls and a floor. The term includes containers with an opening roof where the roof can be closed during transport;

Large container means:

(a) a container which does not meet the definition of a small container;

(b) in the meaning of the CSC, a container of a size such that the area enclosed by the four outer bottom corners is either

(i) at least 14 m^2 (150 square feet) or

(ii) at least 7 m^2 (75 square feet) if fitted with top corner fittings;

Open container means an open top container or a platform based container;

Sheeted container means an open container equipped with a sheet to protect the goods loaded;

Small container means a container which has an internal volume of not more than 3 m^3;

A swap body is a container which, in accordance with European Standard EN 283 (1991 edition) has the following characteristics:

– from the point of view of mechanical strength, it is only built for carriage on a wagon or a vehicle on land or by roll-on roll-off ship;

– it cannot be stacked;

– it can be removed from vehicles by means of equipment on board the vehicle and on its own supports, and can be reloaded;

NOTE: *The term "container" does not cover conventional packagings, IBCs, tank-containers, vehicles or wagons. Nevertheless, a container may be used as a packaging for the carriage of radioactive material.*

Control temperature means the maximum temperature at which an organic peroxide, the self-reactive substance or the polymerizing substance can be safely carried;

Conveyance means, with respect to the carriage by inland waterway, any vessel, hold or defined deck area of any vessel; for carriage by road or by rail, it means a vehicle or a wagon;

Crate means an outer packaging with incomplete surfaces;

Criticality safety index (CSI) assigned to a package, overpack or container containing fissile material, for the carriage of radioactive material, means a number which is used to provide control over the accumulation of packages, overpacks or containers containing fissile material;

Critical temperature means the temperature above which the substance cannot exist in the liquid state;

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Cryogenic receptacle means a transportable thermally insulated receptacle for refrigerated liquefied gases of a water capacity of not more than 1,000 litres (see also *Open cryogenic receptacle*);

CSC means the International Convention for Safe Containers (Geneva, 1972) as amended and published by the International Maritime Organization (IMO), London;

Cylinder means a transportable pressure receptacle of a water capacity not exceeding 150 litres (see also *Bundle of cylinders (frame)*);

D

Damage control plan means the plan indicating the boundaries of the watertight compartments serving as the basis for the stability calculations, in the event of a leak, the trimming arrangements for the correction of any list due to flooding and the means of closure which are to be kept closed when the vessel is under way;

Dangerous goods means those substances and articles the carriage of which is prohibited by ADN, or authorized only under the conditions prescribed therein;

Dangerous reaction means:

(a) combustion or evolution of considerable heat;

(b) evolution of flammable, asphyxiate, oxidizing or toxic gases;

(c) the formation of corrosive substances;

(d) the formation of unstable substances; or

(e) dangerous rise in pressure (for tanks and cargo tanks only);

Deflagration means an explosion which propagates at subsonic speed (see EN 13237:2011);

Degassing means an operation with the aim of lowering the concentration of dangerous gases and vapours in empty or unloaded cargo tanks by emitting them to the atmosphere or to reception facilities;

Demountable tank means a tank, other than a fixed tank, a portable tank, a tank-container or an element of a battery-vehicle or a MEGC which has a capacity of more than 450 litres, is not designed for the carriage of goods without breakage of load, and normally can only be handled when it is empty; or a tank designed to fit the special apparatus of a wagon but which can only be removed from it after dismantling the means of attachment;

Design, for the carriage of radioactive material, means the description of fissile material excepted under 2.2.7.2.3.5 (f), special form radioactive material, low dispersible radioactive material, package or packaging which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation;

Design life, for composite cylinders and tubes, means the maximum life (in number of years) for which the cylinder or tube is designed and approved in accordance with the applicable standard;

Design pressure means the pressure on the basis of which the cargo tank or the residual cargo tank has been designed and built;

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Detonation means an explosion which propagates at supersonic speed and is characterized by a shock-wave (see EN 13237:2011);

Device for the safe depressurization of cargo tanks means a manually operated or remote-operated device which is mounted in such a way as to allow the cargo tanks to be depressurized in safety. When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2, the device shall be deflagration safe and capable of withstanding steady burning for the most critical substance in the vessel substance list. The deflagration safety shall be tested according to international standard ISO 16852:2016[2] and evidence of compliance with the applicable requirements (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied. The deflagration safety may be ensured by an integrated flame arrester plate stack capable of withstanding steady burning or a flame arrester capable of withstanding steady burning (protection against deflagrations);

Diameter (for shells of tanks) means the internal diameter of the shell;

Drum means a flat-ended or convex-ended cylindrical packaging made out of metal, fibreboard, plastics, plywood or other suitable materials. This definition also includes packagings of other shapes, e.g. round, taper-necked packagings or pail-shaped packagings. *Wooden barrels* and *jerricans* are not covered by this definition.

E

EC Directive means provisions decided by the competent institutions of the European Community and which are binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods;

Emergency temperature means the temperature at which emergency procedures shall be implemented in the event of loss of temperature control;

Electrical apparatus protected against water jets means an electrical apparatus so designed that water, projected by a nozzle on the enclosure from any direction, has no damaging effects. The test conditions are specified in the IEC publication 60529, minimum degree of protection IP55;

EN (standard) means a European standard published by the European Committee for Standardization (CEN) (CEN – Avenue Marnix 17, B-1000 Brussels);

Enterprise means any natural person, any legal person, whether profit-making or not, any association or group of persons without legal personality, whether profit-making or not, or any official body, whether it has legal personality itself or is dependent upon an authority that has such personality;

Equipment (see Directive 2014/34/EU[3]) means electrical or non-electrical machines, apparatus, fixed or mobile devices, control components and instrumentation thereof and detection or prevention systems which, separately or jointly, are intended for the generation, transfer, storage, measurement, control and conversion of energy and/or the processing of material and which are capable of causing an explosion through their own potential sources of ignition.

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2 *Identical to EN ISO 16852:2016*

3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

4 *http://iecex.com/rules.*

5 *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

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Equipment and articles which are assigned a UN number and transported as cargo are not included;

Equipment category (see Directive 2014/34/EU[3]) means the classification of equipment to be used within explosion hazardous areas determining the requisite level of protection to be ensured.

Equipment category 1 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously, for long periods or frequently.

Equipment in this category must ensure the requisite level of protection, even in the event of rare incidents relating to equipment, and is characterized by means of protection such that:

– Either, in the event of failure of one means of protection, at least one independent second means provides the requisite level of protection; or

– Or the requisite level of protection is assured in the event of two faults occurring independently of each other.

Equipment of category 1 according to Directive 2014/34/EU[3] is marked as II 1 G. Such equipment corresponds to EPL[6] 'Ga' according to IEC 60079-0.

Equipment of category 1 is suitable for use in zones 0, 1 and 2.

Equipment category 2 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and of ensuring a high level of protection.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are likely to occur occasionally.

The means of protection relating to equipment in this category ensure the requisite level of protection, even in the event of frequently occurring disturbances or equipment faults which normally have to be taken into account.

Equipment of category 2 according to Directive 2014/34/EU[3] is marked as II 2 G. Such equipment corresponds to EPL[6] 'Gb' according to IEC 60079-0.

Equipment category 2 is suitable for use in zones 1 and 2.

Equipment category 3 comprises equipment designed to be capable of functioning in conformity with the operating parameters established by the manufacturer and ensuring a normal level of protection.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.

Equipment in this category ensures the requisite level of protection during normal operation.

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3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

6 *The letters EPL mean: Equipment Protection Level.*

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Equipment of category 3 according to Directive 2014/34/EU[3] is marked as II 3 G. Such equipment corresponds to EPL[6] 'Gc' according to IEC 60079-0.

Equipment of category 3 is suitable for use in zone 2.

Equipment intended for use in explosion hazardous areas means electrical and non-electrical equipment where measures are taken to prevent the equipment's own ignition sources becoming effective. Such equipment shall comply with the requirements for use within the respective zone. It shall be tested according to the type of protection and evidence of compliance with the applicable requirements (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied;

Equipment protection level (EPL[6] (see IEC 60079-0)) means the level of protection assigned to equipment based on its likelihood of becoming a source of ignition.

EPL 'Ga':

Equipment with a 'very high' level of protection. Such equipment corresponds to equipment category 1 according to Directive 2014/34/EU.[3]

Equipment with the 'Ga' level of protection is suitable for use in zones 0, 1 and 2.

EPL 'Gb':

Equipment with a 'high' level of protection. Such equipment corresponds to equipment category 2 according to Directive 2014/34/EU.[3]

Equipment with the 'Gb' level of protection is suitable for use in zones 1 and 2.

EPL 'Gc':

Equipment with an 'enhanced' level of protection. Such equipment corresponds to equipment category 3 according to Directive 2014/34/EU.[3]

Equipment with the 'Gc' level of protection is suitable for use in zone 2;

Escape boat means a specially designed directly accessible boat designed to withstand all identified hazards of the cargo and to evacuate the people in danger;

Escape device (suitable) means a respiratory protection device, designed to cover the wearer's mouth, nose and eyes, which can be easily put on and which serves to escape from a danger area. For such devices, see for example European standard EN 13794:2002, EN 402: 2003, EN 403: 2004 or EN 1146:2005;

Escape route means a safe route from danger towards safety or to another means of evacuation;

Evacuation boat means a manned and specially equipped boat called in for rescuing people in danger or evacuating them within the minimum safe period of time provided by a safe haven or a safe area;

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3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

6 *The letters EPL mean: Equipment Protection Level.*

4 *http://iecex.com/rules.*

5 *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

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Exclusive use, for the carriage of radioactive material, means the sole use, by a single consignor, of a conveyance or of a large container, in respect of which all initial, intermediate and final loading and unloading and shipment are carried out in accordance with the directions of the consignor or consignee where so required by ADN;

Explosion means a sudden reaction of oxidation or decomposition with an increase in temperature or in pressure or both simultaneously (see EN 13237:2011);

Explosion group means a grouping of flammable gases and vapours according to their maximum experimental safe gaps (standard gap width, determined in accordance with specified conditions) and minimum ignition currents, and of electrical apparatus intended to be used in a potentially explosive atmosphere (see EN IEC 60079-0:2012);

Explosion hazardous areas means areas in which an explosive atmosphere may occur of such a scale that special protection measures are necessary to ensure the safety and health of the persons affected (see Directive 1999/92/CE[1]). Explosion hazardous areas are classified into zones by frequency of occurrence and duration of the presence of an explosive atmosphere.

See also *Classification of explosion hazardous areas*, *Explosion protection, Classification of zones* - for tank vessels and *Protected area* - for dry cargo vessels;

Explosion protection means all of the requirements which have to be met and means which have to be taken to avoid damage caused by explosions.

This includes:

Organizational measures such as, for example:

(a) Determining explosion hazardous areas (classification of zones): in which an explosive atmosphere consisting of a mixture with air of flammable gases, vapours or sprays is likely to occur:

(i) continuously or for long periods or frequently (zone 0);

(ii) occasionally in normal operation (zone 1); or

(iii) exceptionally or only briefly (zone 2);

(see Directive 1999/92/CE[1]).

(b) Prevention of ignition sources (use of low-sparking hand-tools, no smoking, use of personal protective equipment including dissipative shoes, non-isolating gloves, etc.);

(c) Drafting of working instructions.

And technical requirements such as, for example:

(a) Use of installations and equipment proven to be appropriate for use in the different explosion hazardous areas;

(b) Use of self-contained protection systems;

(c) Monitoring of potentially explosive atmospheres by the use of gas detection systems and gas detectors;

[1] *Official Journal of the European Communities No. L 23 of 28 January 2000, p.57.*

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Explosion range means the range of the concentration of a flammable substance or mixture of substances in air, within which an explosion can occur, respectively the range of the concentration of a flammable substance or mixture of substances in mixture with air/inert gas, within which an explosion can occur, determined under specified test conditions;

Explosive atmosphere means a mixture of air with gases, vapours or mists flammable in atmospheric conditions, in which the combustion process spreads after ignition to the entire unconsumed mixture (see EN 13237:2011);

F

Fibreboard IBC means a fibreboard body with or without separate top and bottom caps, if necessary an inner liner (but no inner packagings), and appropriate service and structural equipment;

Filler means any enterprise

(a) which fills dangerous goods into a tank (tank-vehicle, tank wagon, demountable tank, portable tank or tank-container) or into a battery-vehicle, battery-wagon or MEGC; or

(b) which fills dangerous goods into a cargo tank; or

(c) which fills dangerous goods into a vessel, a vehicle, a wagon, a large container or small container for carriage in bulk;

Filling pressure means the maximum pressure actually built up in the tank when it is being filled under pressure; (see also *Calculation pressure*, *Discharge pressure*, *Maximum working pressure (gauge pressure)* and *Test pressure*);

Filling ratio means the ratio of the mass of gas to the mass of water at 15° C that would fill completely a pressure receptacle fitted ready for use (capacity);

Filling ratio (cargo tank): Where a filling ratio is given for a cargo tank, it refers to the percentage of the volume of the cargo tank which may be filled with liquid during loading;

Fixed tank means a tank having a capacity of more than 1,000 litres which is permanently attached to a vehicle (which then becomes a tank-vehicle) or to a wagon (which then becomes a tank-wagon) or is an integral part of the frame of such vehicle or wagon;

Flame arrester means a device mounted in the vent of part of an installation or in the interconnecting piping of a system of installations, the purpose of which is to permit flow but prevent the propagation of a flame front. The flame arrester shall be tested according to the international standard ISO 16852:2016[2] and evidence of compliance with the applicable requirements (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied;

Flame arrester plate stack means the part of the flame arrester the main purpose of which is to prevent the passage of a flame front;

Flame arrester housing means the part of a flame arrester the main purpose of which is to form a suitable casing for the flame arrester plate stack and ensure a mechanical connection with other systems;

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2 *Identical to EN ISO 16852:2016.*

3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

4 *http://iecex.com/rules.*

5 *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

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Flammable component (for aerosols) means flammable liquids, flammable solids or flammable gases and gas mixtures as defined in Notes 1 to 3 of sub-section 31.1.3 of Part III of the Manual of Tests and Criteria. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion shall be determined by one of the following methods ASTM D 240, ISO/FDIS 13943: 1999 (E/F) 86.1 to 86.3 or NFPA 30B;

Flash-point (Fp) means the lowest temperature of a liquid at which its vapours form a flammable mixture with air;

Flexible bulk container, see *Bulk container,*

Flexible IBC means a body constituted of film, woven fabric or any other flexible material or combinations thereof, and if necessary, an inner coating or liner, together with any appropriate service equipment and handling devices;

Frame (Class 2), see *Bundle of cylinders*;

Fuel cell means an electrochemical device that converts the chemical energy of a fuel to electrical energy, heat and reaction products;

Fuel cell engine means a device used to power equipment and which consists of a fuel cell and its fuel supply, whether integrated with or separate from the fuel cell, and includes all appurtenances necessary to fulfil its function;

Full load means any load originating from one consignor for which the use of a vehicle, of a wagon or of a large container is exclusively reserved and all operations for the loading and unloading of which are carried out in conformity with the instructions of the consignor or of the consignee;

NOTE: *The corresponding term for radioactive material is "exclusive use".*

G

Gas (for the purposes of Class 2) means a substance which:

(a) at 50° C has a vapour pressure greater than 300 kPa (3 bar); or

(b) is completely gaseous at 20° C under standard pressure of 101.3 kPa;

Otherwise, *Gases* means gases or vapours;

Gas cartridge, see *Small receptacle containing gas*;

Gas detection system means a steady state monitoring system with direct-measuring sensors capable of detecting in time significant concentrations of flammable gases at concentrations below their (LEL) and capable of activating the alarms when a limiting value is exceeded. It has to be calibrated at least for n-Hexane. The threshold level of the sensors shall be set at not more than 10% of the LEL of n-Hexane.

It shall be certified according to IEC/EN[7] 60079-29-1:2016 and, with electronically driven systems, also according to EN 50271:2010. If it is used in explosion hazardous areas, it shall also comply with the requirements for use in the zone concerned and evidence of such

[7] *IEC/EN means: This standard is available as an IEC standard and as a European standard.*

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compliance (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied;;

Gas detector means a portable device allowing measurement of any significant concentration of flammable gases below the LEL and which clearly indicates the concentration of such gases. Gas detectors may be designed for measuring flammable gases only, but also for measuring both flammable gases and oxygen. This device shall be so designed that measurements are possible without the necessity of entering the spaces to be checked.

The maximum detection level of the sensors is 5% of the LEL of the most critical substance in the vessel substance list for tank vessels or the cargo for dry cargo vessels. The flammable gas detector shall be certified according to IEC/EN[7] 60079-29-1:2016. If it is used in explosion hazardous areas, it shall also comply with the requirements for use in the zone concerned and evidence of such compliance (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied;

GESAMP means the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection. IMO publication: "The Revised GESAMP Hazard Evaluation Procedure for Chemical Substances Carried by Ships", GESAMP Reports and Studies No. 64, IMO, London, 2002.

In applying the GESAMP model for the purposes of the present Regulations, the reference temperature for the relative density, vapour pressure and water solubility is 20°C. The reference relative density to be used to differentiate between floating substances ("floater") and substances that sink ("sinker") is 1,000 (corresponding to the water density in inland waterways of 1000 kg/m^3);

GHS means the seventh revised edition of the Globally Harmonized System of Classification and Labelling of Chemicals, published by the United Nations as document ST/SG/AC.10/30/Rev.7;

H

Handling device (for flexible IBCs) means any sling, loop, eye or frame attached to the body of the IBC or formed from the continuation of the IBC body material;

Hermetically closed tank means a tank that:

– is not equipped with safety valves, bursting discs, other similar safety devices or vacuum valves; or

– is equipped with safety valves preceded by a bursting disc according to 6.8.2.2.10 of ADR, but is not equipped with vacuum valves.

A tank intended for the carriage of liquid substances with a calculation pressure of at least 4 bar or intended for the carriage of solid substances (powdery or granular) regardless of its calculation pressure is also considered hermetically closed if:

– it is equipped with safety valves preceded by a bursting disc according to 6.8.2.2.10 of ADR and vacuum valves, in accordance with the requirements of 6.8.2.2.3 of ADR; or,

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3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

4 *http://iecex.com/rules.*

5 *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

7 *IEC/EN means: This standard is available as an IEC standard and as a European standard.*

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– it is not equipped with safety valves, bursting discs or other similar safety devices, but is equipped with vacuum valves, in accordance with the requirements of 6.8.2.2.3 of ADR;

Highest class may be assigned to a vessel when:

– the hull, inclusive of rudder and steering gear and equipment of anchors and chains, complies with the rules and regulations of a recognized classification society and has been built and tested under its supervision;

– the propulsion plant, together with the essential auxiliary engines, mechanical and electrical installations, have been made and tested in conformity with the rules and regulations of this classification society, and the installation has been carried out under its supervision, and the complete plant was tested to its satisfaction on completion;

High-velocity vent valve means a pressure relief valve designed to have nominal flow velocities which exceed the flame velocity of the explosive mixture, thus preventing flame transmission. When the vessel substance list according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2, this pressure relief device shall be tested in accordance with international standard ISO 16852:2016[2] and evidence of compliance with the applicable requirements (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied;

Hold means a part of the vessel which, whether covered by hatchway covers or not, is bounded fore and aft by bulkheads and which is intended to carry goods in packages or in bulk. The upper boundary of the hold is the upper edge of the hatchway coaming. Cargo extending above the hatchway coaming shall be considered as loaded on deck;

Hold (discharged) means a hold which after unloading may contain some dry cargo remains;

Hold (empty) means a hold which after unloading contains no dry cargo remains (swept clean);

Hold space means an enclosed part of the vessel which is bounded fore and aft by watertight bulkheads and which is intended only to carry cargo tanks independent of the vessel's hull.

Holding time means the time that will elapse from the establishment of the initial filling condition until the pressure has risen due to heat influx to the lowest set pressure of the pressure limiting devices (s) of tanks intended for the carriage of refrigerated liquefied gases;

NOTE: *For portable tanks, see 6.7.4.1 of ADR.*

Hose assemblies means hoses, which are integrated or welded on both sides into hose fittings; hose fittings shall be integrated so that it is only possible to loosen them with a tool.

Hose fittings means couplings and connection elements of hoses.

Hoses means flexible tubular semi-finished products of elastomers, thermoplastics or stainless steel composed of one or several coatings and liners.

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2 *Identical to EN ISO 16852:2016*

3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

4 *http://iecex.com/rules.*

5 *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

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I

IAEA means the International Atomic Energy Agency (IAEA), (IAEA, P.O. Box 100 – A-1400 Vienna);

IBC see *Intermediate bulk container*;

IBC Code means the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk, published by the International Maritime Organization (IMO);

ICAO means the International Civil Aviation Organization (ICAO, 999 University Street, Montreal, Quebec H3C 5H7, Canada);

ICAO Technical Instructions means the Technical Instructions for the Safe Transport of Dangerous Goods by Air, which complement Annex 18 to the Chicago Convention on International Civil Aviation (Chicago 1944) published by the International Civil Aviation Organization (ICAO) in Montreal;

Identification number means the number for identifying a substance to which no UN number has been assigned or which cannot be classified under a collective entry with a UN number.

These numbers have four figures beginning with 9;

IEC means the International Electrotechnical Commission;

IMDG Code means the International Maritime Dangerous Goods Code, for the implementation of Chapter VII, Part A, of the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), published by the International Maritime Organization (IMO), London;

IMO means the International Maritime Organization (IMO, 4 Albert Embankment, London SE1 7SR, United Kingdom);

IMSBC Code means the International Maritime Solid Bulk Cargoes Code of the International Maritime Organization (IMO);

Inner packaging means a packaging for which an outer packaging is required for carriage;

Inner receptacle means a receptacle which requires an outer packaging in order to perform its containment function;

Inspection body means an independent monitoring and verification body certified by the competent authority;

Instruction means transmitting know-how or teaching how to do something or how to act. This transmission or teaching may be dispensed internally by the personnel;

Intermediate bulk container (IBC) means a rigid, or flexible portable packaging, other than those specified in Chapter 6.1 of ADR, that:

(a) has a capacity of:

(i) not more than 3 m^3 for solids and liquids of packing groups II and III;

(ii) not more than 1.5 m^3 for solids of packing group I when packed in flexible, rigid plastics, composite, fibreboard and wooden IBCs;

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(iii) not more than 3 m^3 for solids of packing group I when packed in metal IBCs;

(iv) not more than 3 m^3 for radioactive material of Class 7;

(b) is designed for mechanical handling;

(c) is resistant to the stresses produced in handling and transport as determined by the tests specified in Chapter 6.5 of ADR;

(see also *Composite IBC with plastics inner receptacle*, *Fibreboard IBC*, *Flexible IBC*, *Metal IBC*, *Rigid plastics IBC* and *Wooden IBC*)

NOTE 1: *Portable tanks or tank-containers that meet the requirements of Chapter 6.7 or 6.8 of ADR respectively are not considered to be intermediate bulk containers (IBCs).*

NOTE 2: *Intermediate bulk containers (IBCs) which meet the requirements of Chapter 6.5 of ADR are not considered to be containers for the purposes of ADN.*

Intermediate packaging means a packaging placed between inner packagings or articles and an outer packaging;

International regulations means ADR, ICAO-TI, IMDG Code, IMSBC Code or RID.

ISO (standard) means an international standard published by the International Organization for Standardization (ISO) (ISO, 1, rue de Varembé, CH-1204, Geneva 20);

J

Jerrican means a metal or plastics packaging of rectangular or polygonal cross-section with one or more orifices.

L

Large container, see *Container;*

Large packaging means a packaging consisting of an outer packaging which contains articles or inner packagings and which:

(a) is designed for mechanical handling;

(b) exceeds 400 kg net mass or 450 litres capacity but has a volume of not more than 3 m^3;

Remanufactured large packaging means a metal or rigid plastics large packaging that:

(a) Is produced as a UN type from a non-UN type; or

(b) Is converted from one UN design type to another UN design type.

Remanufactured large packagings are subject to the same requirements of ADR that apply to new large packagings of the same type (see also design type definition in 6.6.5.1.2 of ADR);

Reused large packaging means a large packaging to be refilled which has been examined and found free of defects affecting the ability to withstand the performance tests; the term includes those which are refilled with the same or similar compatible contents and are carried within distribution chains controlled by the consignor of the product;

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Large salvage packaging means a special packaging which

(a) is designed for mechanical handling; and

(b) exceeds 400 kg net mass or 450 litres capacity but has a volume of not more than 3 m^3;

into which damaged, defective, leaking or non-conforming dangerous goods packages, or dangerous goods that have spilled or leaked are placed for purposes of carriage for recovery or disposal;

LEL: see *Lower explosion limit;*

Life boat (i.e. ship's boat) means an onboard boat in transport, rescue, salvage and work duties;

Light-gauge metal packaging means a packaging of circular, elliptical, rectangular or polygonal cross-section (also conical) and taper-necked and pail-shaped packaging made of metal, having a wall thickness of less than 0.5 mm (e.g. tinplate), flat or convex bottomed and with one or more orifices, which is not covered by the definitions for drums or jerricans;

Limited explosion risk electrical apparatus means an electrical apparatus which, during normal operation, does not cause sparks or exhibits surface temperatures which are above 200 °C, including e.g.:

– three-phase squirrel cage rotor motors;

– brushless generators with contactless excitation;

– fuses with an enclosed fuse element;

– contactless electronic apparatus;

or means an electrical apparatus with at least an enclosure protected against water jets (protection rating IP55 or higher) which during normal operation does not exhibit surface temperatures above 200 °C;

Liner means a tube or bag inserted into a packaging, including large packagings or IBCs, but not forming an integral part of it, including the closures of its openings;

Liquefied natural gas (LNG) means a refrigerated liquefied gas composed of natural gas with a high methane content assigned to UN No. 1972;

Liquefied petroleum gas (LPG) means a low pressure liquefied gas composed of one or more light hydrocarbons which are assigned to UN 1011, UN 1075, UN 1965, UN 1969 or UN 1978 only and which consists mainly of propane, propene, butane, butane isomers, butene with traces of other hydrocarbon gases.

NOTE 1*: Flammable gases assigned to other UN numbers shall not be regarded as LPG.*

NOTE 2*: For UN No. 1075 see NOTE 2 under 2F, UN No. 1965, in the table for liquefied gases in 2.2.2.3*.

Liquid means a substance which at 50° C has a vapour pressure of not more than 300 kPa (3 bar) which is not completely gaseous at 20° C and 101.3 kPa, and which:

(a) has a melting point or initial melting point of 20° C or less at a pressure of 101.3 kPa, or

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(b) is liquid according to the ASTM D 4359-90 test method or

(c) is not pasty according to the criteria applicable to the test for determining fluidity (penetrometer test) described in 2.3.4;

***NOTE**: "Carriage in the liquid state" for the purpose of tank requirements means:*

– Carriage of liquids according to the above definition, or

– Solids handed over for carriage in the molten state;

Loader means any enterprise which:

(a) Loads packaged dangerous goods, small containers or portable tanks into or onto a conveyance or a container; or

(b) Loads a container, bulk-container, MEGC, tank-container or portable tank onto a conveyance; or

(c) Loads a vehicle or a wagon into or onto a vessel;

Loading means all actions carried out by the loader, in accordance with the definition of loader;

Loading instrument: A loading instrument consists of a computer (hardware) and a programme (software) and offers the possibility of ensuring that in every ballast or loading case:

– the permissible values concerning longitudinal strength as well as the maximum permissible draught are not exceeded; and

– the stability of the vessel complies with the requirements applicable to the vessel. For this purpose intact stability and damage stability shall be calculated.

Lower explosion limit (LEL) means the lowest concentration of the explosion range at which an explosion can occur;

M

Management system, for the carriage of radioactive material, means a set of interrelated or interacting elements (system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner;

Manual of Tests and Criteria means the sixth revised edition of the Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, published by the United Nations (ST/SG/AC.10/11/Rev.6 and Amend.1);

Mass density shall be expressed in kg/m^3. In the event of repetition, the number alone shall be used;

Mass of package means gross mass of the package unless otherwise stated. The mass of containers, tanks, vehicles and wagons used for the carriage of goods is not included in the gross mass;

Master means a person as defined in Article 1.02 of the European Code for Inland Waterways (CEVNI);

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Maximum capacity means the maximum inner volume of receptacles or packagings including intermediate bulk containers (IBCs) and large packagings expressed in cubic metres or litres;

Maximum net mass means the maximum net mass of contents in a single packaging or maximum combined mass of inner packagings and the contents thereof expressed in kilograms;

Maximum normal operating pressure, for the carriage of radioactive material, means the maximum pressure above atmospheric pressure at mean sea-level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions in the absence of venting, external cooling by an ancillary system, or operational controls during carriage;

Maximum permissible gross mass, means

(a) (for IBCs) the mass of the IBC and any service or structural equipment together with the maximum net mass;

(b) (for tanks) the tare of the tank and the heaviest load authorized for carriage;

NOTE: *For portable tanks, see Chapter 6.7 of ADR.*

Maximum working pressure means the maximum pressure occurring in a cargo tank or a residual cargo tank during operation. This pressure equals the opening pressure of high velocity vent valves or pressure relief valves;

Means of evacuation means any means that can be used by people to move from danger to safety as follows:

Dangers that have to be taken into account are:

- For class 3, packing group III, UN 1202, second and third entry and for classes 4.1, 8 and 9 on tank vessels: leakage at the manifold;

- For other substances of class 3 and class 2 and for flammable substances of class 8 on tank vessels: fire in the area of the manifold on the deck and burning liquid on the water;

- For class 5.1 on tank vessels: oxidizing substances in combination with flammable liquids may cause an explosion;

- For class 6.1 on tank vessels: toxic gases around the manifold and in the direction of the wind;

- For dangerous goods on dry cargo vessels: dangers emanating from the goods in the cargo holds;

MEGC, see *Multiple-element gas container*;

MEMU, see *Mobile explosives manufacturing unit;*

Metal hydride storage system means a single complete hydrogen storage system, including a receptacle, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the carriage of hydrogen only;

Metal IBC means a metal body together with appropriate service and structural equipment;

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Mobile explosives manufacturing unit (MEMU) means a unit, or a vehicle mounted with a unit, for manufacturing and charging explosives from dangerous goods that are not explosives. The unit consists of various tanks and bulk containers and process equipment as well as pumps and related equipment. The MEMU may have special compartments for packaged explosives;

NOTE: *Even though the definition of MEMU includes the expression "manufacturing and charging explosives" the requirements for MEMUs apply only to carriage and not to manufacturing and charging of explosives.*

Multiple-element gas container (MEGC) means a unit containing elements which are linked to each other by a manifold and mounted on a frame. The following elements are considered to be elements of a multiple-element gas container: cylinders, tubes, pressure drums or bundles of cylinders as well as tanks for the carriage of gases as defined in 2.2.2.1.1 having a capacity of more than 450 litres.

NOTE: *For UN MEGCs, see Chapter 6.7 of ADR.*

N

Naked light means a source of light using a flame which is not enclosed in a flameproof enclosure.

Net explosive mass (NEM) means the total mass of the explosive substances, without the packagings, casings, etc. *(Net explosive quantity (NEQ)*, *net explosive contents (NEC)*, *net explosive weight (NEW)* or *net mass of explosive contents* are often used to convey the same meaning.);

Neutron radiation detector means a device that detects neutron radiation. In such a device, a gas may be contained in a hermetically sealed electron tube transducer that converts neutron radiation into a measureable electric signal;

N.O.S. entry (not otherwise specified entry) means a collective entry to which substances, mixtures, solutions or articles may be assigned if they:

(a) are not mentioned by name in Table A of Chapter 3.2, and

(b) exhibit chemical, physical and/or dangerous properties corresponding to the Class, classification code, packing group and the name and description of the n.o.s. entry;

Not readily flammable means a material which is not in itself readily flammable or whose outer surface at least is not readily flammable and limits the propagation of a fire to an appropriate degree.

In order to determine flammability, the IMO procedure, Resolution A.653(16), or any equivalent requirements of a Contracting State are recognized;

O

Offshore bulk container means a bulk container specially designed for repeated use for carriage to, from and between offshore facilities. An offshore bulk container is designed and constructed in accordance with the guidelines for the approval of offshore containers handled in open seas specified by the International Maritime Organization (IMO) in document MSC/Circ.860;

Oil separator vessel means an open type N tank-vessel with a dead weight of up to 300 tonnes, constructed and fitted to accept and carry oily and greasy wastes from the

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operation of vessels. Vessels without cargo tanks are considered to be subject to Chapters 9.1 or 9.2;

Oily and greasy wastes from the operation of the vessel means used oils, bilge water and other oily or greasy wastes, such as used grease, used filters, used rags, and receptacles and packagings for such wastes;

Open container, see *Container;*

Open cryogenic receptacle means a transportable thermally insulated receptacle for refrigerated liquefied gases maintained at atmospheric pressure by continuous venting of the refrigerated liquefied gas;

Open vehicle means a vehicle the platform of which has no superstructure or is merely provided with side boards and a tailboard;

Open wagon means a wagon with or without side boards and a tailboard, the loading surfaces of which are open.

Opening pressure means the pressure referred to in column (10) of Table C of Chapter 3.2 at which the pressure relief valves/high-velocity vent valves open. For pressure tanks the opening pressure of the safety valve shall be established in accordance with the requirements of the competent authority or a recognized classification society;

OTIF means Intergovernmental Organisation for International Carriage by Rail (OTIF, Gryphenhübeliweg 30, CH-3006 Bern);

Outer packaging means the outer protection of the composite or combination packaging together with any absorbent materials, cushioning and any other components necessary to contain and protect inner receptacles or inner packagings;

Over-moulded cylinder means a cylinder intended for the carriage of LPG with a water capacity not exceeding 13 l made of a coated welded steel inner cylinder with an over-moulded protective case made from cellular plastic, which is non-removable and bonded to the outer surface of the steel cylinder wall;

Overpack means an enclosure used (by a single consignor in the case of radioactive material) to contain one or more packages, consolidated into a single unit easier to handle and stow during carriage;

Examples of overpacks:

(a) a loading tray such as a pallet, on which several packages are placed or stacked and secured by a plastics strip, shrink or stretch wrapping or other appropriate means; or

(b) an outer protective packaging such as a box or a crate;

Oxygen measuring system means a steady-state monitoring device capable of detecting in time any significant reduction of oxygen content of the air and capable of activating the alarms in case the oxygen concentration reaches 19.5% by volume.

This device shall be tested according to the European standard IEC/EN[7] 50104:2010. If it is used in explosion hazardous areas, it shall also comply with the requirements for use in the zone concerned and evidence of such compliance (e.g., conformity assessment procedure

[7] *IEC/EN means: This standard is available as an IEC standard and as a European standard.*

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according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied.

An oxygen measuring system may also be designed as part of a combination measuring system for measuring both flammable gases and oxygen;

Oxygen meter means a portable device allowing measuring of any significant reduction of the oxygen content of the air. An oxygen meter may either be a device for measuring oxygen only or part of a combination device for measuring both flammable gases and oxygen. This device shall be so designed that measurements are possible without the necessity of entering the spaces to be checked. It shall be tested according to IEC/EN[7] 50104:2010. If it is used in explosion hazardous areas, it shall also comply with the requirements for use in the zone concerned and evidence of such compliance (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied.

P

Package means the complete product of the packing operation, consisting of the packaging or large packaging or IBC and its contents prepared for dispatch. Except for the carriage of radioactive material, the term includes receptacles for gases as defined in this section as well as articles which, because of their size, mass or configuration may be carried unpackaged or carried in cradles, crates or handling devices.

The term does not apply to goods which are carried in bulk in the holds of vessels, nor to substances carried in tanks in tank vessels.

On board vessels, the term also includes vehicles, wagons, containers (including swap bodies), tank-containers, portable tanks, battery-vehicles, battery-wagons, tank vehicles, tank wagons and multiple element gas containers (MECGs).

NOTE: *For radioactive material, see 2.2.7.2, 4.1.9.1.1 and Chapter 6.4 of ADR.*

Packaging means one or more receptacles and any other components or materials necessary for the receptacles to perform their containment and other safety functions (see also *Combination packaging*, *Composite packaging*, *Inner packaging*, *Intermediate bulk container (IBC)*, *Intermediate packaging*, *Large packaging*, *Light-gauge metal packaging*, *Outer packaging*, *Reconditioned packaging*, *Remanufactured packaging*, *Reused packaging*, *Salvage packaging* and *Sift-proof packaging)*;

Packer means any enterprise which puts dangerous goods into packagings, including large packagings and intermediate bulk containers (IBCs) and, where necessary, prepares packages for carriage;

Packing group means a group to which, for packing purposes, certain substances may be assigned in accordance with their degree of danger. The packing groups have the following meanings which are explained more fully in Part 2:

Packing group I : Substances presenting high danger;

Packing group II : Substances presenting medium danger; and

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3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

4 *http://iecex.com/rules.*

5 *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

7 *IEC/EN means: This standard is available as an IEC standard and as a European standard.*

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Packing group III : Substances presenting low danger;

NOTE: *Certain articles containing dangerous goods are assigned to a packing group.*

Partly closed-type sampling device means a device penetrating through the boundary of the cargo tank or through the piping for loading and unloading such that during sampling only a small quantity of gaseous or liquid cargo can escape into the open air. As long as the device is not used it shall be closed completely. The device shall be of a type approved by the competent authority for this purpose;

Piping for loading and unloading (cargo piping) means all piping which may contain liquid or gaseous cargo, including pipes, hose assemblies, connected pumps, filters and closure devices.

Portable tank means a multimodal tank having, when used for the carriage of gases as defined in 2.2.2.1.1, a capacity of more than 450 litres in accordance with the definitions in Chapter 6.7 of ADR or the IMDG Code and indicated by a portable tank instruction (T-Code) in Column (10) of Table A of Chapter 3.2 of ADR;

Portable tank operator, see *Tank-container/portable tank operator*;

Possibility of cargo heating means a cargo heating installation in the cargo tanks using a heat insulator. The heat insulator may be heated by means of a boiler on board the tank vessel (cargo heating system in accordance with 9.3.2.42 or 9.3.3.42) or from shore;

Pressure drum means a welded, transportable pressure receptacle of a water capacity exceeding 150 litres and of not more than 1,000 litres (e.g. cylindrical receptacles equipped with rolling hoops, spheres on skids);

Pressure relief device means an automatically activated safety valve the purpose of which is to protect the cargo tank against unacceptable excess internal pressure;

Pressure receptacle means a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal hydride storage systems, bundles of cylinders and salvage pressure receptacles;

Pressures means for tanks, all kinds of pressures (e.g. working pressure, opening pressure of the high velocity vent valves, test pressure) shall be expressed as gauge pressures in kPa (bar); the vapour pressure of substances, however, shall be expressed as an absolute pressure in kPa (bar);

Pressurized gas cartridge, see *Aerosol dispenser*;

Protected area means the whole of the following spaces on board of dry cargo vessels:

(a) the hold or holds (when anti-explosion protection is required, zone 1);

(b) the space situated above the deck (when anti-explosion protection is required, zone 2), bounded:

  (i) athwartships, by vertical planes corresponding to the side plating;

  (ii) fore and aft, by vertical planes corresponding to the end bulkheads of the hold; and

  (iii) upwards, by a horizontal plane 2.00 m above the upper level of the load, but at least by a horizontal plane 3.00 m above the deck.

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Protected IBC (for metal IBCs) means an IBC provided with additional protection against impact, the protection taking the form of, for example, a multi-layer (sandwich) or double-wall construction, or a frame with a metal lattice-work casing.

Protection wall, gas- and liquid-tight means a gas- and liquid-tight wall on deck at the height of the boundary plane of the cargo area preventing gases from entering areas outside the cargo area;

Protective coaming, liquid-tight means a liquid-tight coaming on deck at the height of the outer cargo tank bulkhead (see zoning diagram), but at a maximum distance of 0.60 m to the outer cofferdam bulkhead or hold end bulkheads, which prevents liquid from entering the fore and aft parts of the vessel. The connection between the protective coamings and the spill coaming shall be liquid tight;

Protective gloves means gloves which protect the wearer's hands during work in a danger area. The choice of appropriate gloves shall correspond to the dangers likely to arise (see for example European standards EN 374-1:2016, EN 374-2:2015 or EN 374-4:2013). In the case of dangers caused by electrostatic charging/discharging, they shall meet the requirements of standard EN 16350:2015;

Protective goggles, protective masks means goggles or face protection which protects the wearer's eyes or face during work in a danger area. The choice of appropriate goggles or masks shall correspond to the dangers likely to arise. For protective goggles or masks, see for example European standard EN 166:2001;

Protective shoes (or protective boots) means shoes or boots which protect the wearer's feet during work in a danger area. The choice of appropriate protective shoes or boots shall correspond to the dangers likely to arise, especially those caused by electrostatic charging/discharging, and meet the requirements of international standard ISO 20345:2012 or ISO 20346:2014;

Protective lining (for tanks) means a lining or coating protecting the metallic tank material against the substances to be carried;".

NOTE: *This definition does not apply to a lining or coating used only to protect the substance to be carried.*

Protective suit means a suit which protects the wearer's body during work in a danger area. The choice of appropriate suit shall correspond to the dangers likely to arise. For protective suits, see for example, ISO 13688:2013. In case of dangers caused by electrostatic charging/discharging, see also European standard EN 1149-5:2008.

Q

Quality assurance means a systematic programme of controls and inspections applied by any organization or body which is aimed at providing confidence that the safety prescriptions in ADN are met in practice.

R

Radiation detection system means an apparatus that contains radiation detectors as components*;*

Radiation level, for the carriage of radioactive material, means the corresponding dose rate expressed in millisieverts per hour or microsieverts per hour;

Radioactive contents, for the carriage of radioactive material, mean the radioactive material together with any contaminated or activated solids, liquids, and gases within the packaging;

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Reception facility means a stationary or mobile facility for receiving gases and vapours during degassing of empty or unloaded cargo tanks and piping for loading and unloading;

Receptacle (Class 1) includes boxes, cylinders, cans, drums, jars and tubes, including any means of closure used in the inner or intermediate packaging;

Receptacle means a containment vessel for receiving and holding substances or articles, including any means of closing. This definition does not apply to shells (see also *Cryogenic receptacle*, *Inner receptacle*, *Rigid inner receptacle* and *Gas cartridge*);

Receptacle for residual products means an intermediate bulk container or tank-container or portable tank intended to collect residual cargo, washing water, cargo residues or slops which are suitable for pumping. The receptacle shall be approved according to ADR, RID or the IMDG Code and authorized for the substance concerned. The maximum permissible capacity of an intermediate bulk container is 3 m^3, and that of a tank-container or portable tank is 12 m^3;

Receptacle for slops means a fire resistant receptacle capable of being closed with a lid intended to collect slops which are unsuitable for pumping. The receptacle shall be approved according to ADR, RID or the IMDG Code and authorized for the substance concerned. The maximum permissible capacity is 450 *l*. It should be easy to handle and marked "SLOP" (character height: 0.10 m);

Recycled plastics material means material recovered from used industrial packagings that has been cleaned and prepared for processing into new packagings;

Reel (Class 1) means a device made of plastics, wood, fibreboard, metal or other suitable material comprising a central spindle with, or without, side walls at each end of the spindle. Articles and substances can be wound on to the spindle and may be retained by side walls;

Relative density (or specific density) describes the ratio of the density of a substance to the density of pure water at 3.98 °C (1000 kg/m^3) and is dimensionless;

Remanufactured large packaging see *Large packaging*;

Rescue winch means a device for hoisting persons from spaces such as cargo tanks, cofferdams and double-hull spaces. The device shall be operable by one person;

Residual cargo means liquid cargo remaining in the cargo tank or cargo piping after unloading without the use of the stripping system;

Reused large packaging see *Large packaging*;

RID means Regulations concerning the International Carriage of Dangerous Goods by Rail, Appendix C of COTIF (Convention concerning International Carriage by Rail);

Rigid inner receptacle (for composite IBCs) means a receptacle which retains its general shape when empty without its closures in place and without benefit of the outer casing. Any inner receptacle that is not rigid is considered to be flexible;

Rigid plastics IBC means a rigid plastics body, which may have structural equipment together with appropriate service equipment;

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S

Safe area means a designated, recognisable area outside the cargo area which can be readily accessed by all persons on board. The safe area provides protection against the identified hazards of the cargo by a water spray system for at least 60 minutes. The safe area can be evacuated during an incident. A safe area is not acceptable when the identified danger is explosion;

Safe haven means a designated, recognisable, readily accessible module (fixed or floating) capable of protecting all persons on board against the identified hazards of the cargo for at least sixty minutes during which communication to the emergency and rescue services is possible. A safe haven can be integrated into the wheelhouse or into the accommodation. A safe haven can be evacuated during an incident. A safe haven on board is not acceptable when the identified danger is explosion. A safe haven on board and a floating safe haven outside the ship are certified by a recognized classification society. A safe haven on land is constructed according to local law;

Safety adviser means a person who, in an undertaking the activities of which include the carriage, or the related packing, loading, filling or unloading, of dangerous goods by inland waterways, is responsible for helping to prevent the risks inherent in the carriage of dangerous goods;

Safety valve means a spring-loaded device which is activated automatically by pressure the purpose of which is to protect the cargo tank against unacceptable excess internal pressure or negative internal pressure (see also, *High velocity vent valve, Pressure-relief device* and *Vacuum valve*);

SADT see *Self-accelerating decomposition temperature*;

Salvage packaging means a special packaging into which damaged, defective, leaking or non-conforming dangerous goods packages, or dangerous goods that have spilled or leaked are placed for purposes of carriage for recovery or disposal;

Salvage pressure receptacle means a pressure receptacle with a water capacity not exceeding 3 000 litres into which are placed damaged, defective, leaking or non-conforming pressure receptacle(s) for the purpose of carriage e.g. for recovery or disposal;

Sampling opening means a closable opening of a cargo tank with a diameter of not more than 0.30 m. When the vessel substance list according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2, it shall be deflagration safe, capable of withstanding steady burning for the most critical substance in the vessel substance list and so designed that the opening period will be as short as possible and that it cannot remain open without external intervention.

The deflagration safety shall be tested according to international standard ISO 16852:2016[2] and evidence of compliance with the applicable requirements (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied. The deflagration safety may be ensured by an integrated flame arrester plate stack capable of withstanding steady burning or a flame arrester capable of withstanding steady burning (protection against deflagrations);

SAPT see *Self-accelerating polymerization temperature;*

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2 *Identical to EN ISO 16852:2016*

3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

4 *http://iecex.com/rules.*

5 *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

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Self-accelerating decomposition temperature (SADT) means the lowest temperature at which self-accelerating decomposition may occur with the substance in the packaging as used during carriage. Provisions for determining the SADT and the effects of heating under confinement are contained in Part II of the *Manual of Tests and Criteria*;

Self-accelerating polymerization temperature (SAPT) means the lowest temperature at which polymerization may occur with a substance in the packaging, IBC or tank as offered for carriage. The SAPT shall be determined in accordance with the test procedures established for the self-accelerating decomposition temperature for self-reactive substances in accordance with Part II, section 28 of the Manual of Tests and Criteria;

Self-contained protection systems means all devices which are intended to halt incipient explosions immediately and/or to limit the effective range of an explosion and which are separately made available on the market for use as self-contained systems. This includes flame arresters, high velocity vent valves, deflagration safe vacuum valves and devices for the safe depressurization of cargo tanks capable of withstanding a deflagration (see also *Flame arrester, High velocity vent valve, Vacuum valve, Devices for the safe depressurization of cargo tanks* and *Deflagration*);

Service life, for composite cylinders and tubes, means the number of years the cylinder or tube is permitted to be in service;

Service space means a space which is accessible during the operation of the vessel and which is neither part of the accommodation nor of the cargo tanks, with the exception of the forepeak and after peak, provided no machinery has been installed in these latter spaces;

Settled pressure means the pressure of the contents of a pressure receptacle in thermal and diffusive equilibrium;

Sheeted bulk container, see *Bulk container;*

Sheeted container, see Container;

Sheeted vehicle means an open vehicle provided with a sheet to protect the load;

Sheeted wagon means an open wagon provided with a sheet to protect the load;

Sift-proof packaging means a packaging impermeable to dry contents, including fine solid material produced during carriage;

Slops means a mixture of cargo residues and washing water, rust or sludge which is either suitable or not suitable for pumping;

Small container, see *Container;*

Small receptacle containing gas (gas cartridge) means a non-refillable receptacle having a water capacity not exceeding 1000 ml for receptacles made of metal and not exceeding 500 ml for receptacles made of synthetic material or glass, containing, under pressure, a gas or a mixture of gases. It may be fitted with a valve;

SOLAS means the International Convention for the Safety of Life at Sea, 1974, as amended;

Solid means:

(a) a substance with a melting point or initial melting point of more than 20 °C at a pressure of 101.3 kPa; or

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(b) a substance which is not liquid according to the ASTM D 4359-90 test method or which is pasty according to the criteria applicable to the test for determining fluidity (penetrometer test) described in 2.3.4;

Spill coaming means a coaming on deck of the vessel parallel to the side plating with closable openings, to prevent spillage of liquids overboard. The connection to the protective coamings, if installed, shall be liquid tight;

STCW means the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended.

Steady burning means combustion stabilized for an indeterminate period (see ISO 16852:2016[2]);

Stripping system (efficient) means a system according to Annex II of CDNI for complete draining, if possible, of the cargo tanks and stripping the cargo piping except for the cargo residues;

Supply installation (bunkering system) means an installation for the supply of vessels with liquid fuels;

Supply vessel means an open type N tank vessel with a dead weight of up to 300 tonnes, constructed and fitted for the carriage and delivery to other vessels of products intended for the operation of vessels;

Swap-body, see *Container*.

T

Tank means a shell, including its service and structural equipment. When used alone, the term tank means a tank-container, portable tank, demountable tank, fixed tank or tank wagon as defined in this section, including tanks forming elements of battery-vehicles, battery wagons or MEGCs (see also *Demountable tank, Fixed tank, Portable tank and Multiple-element gas container);*

***NOTE**: For portable tanks, see 6.7.4.1 of ADR.*

Tank-container means an article of transport equipment meeting the definition of a container, and comprising a shell and items of equipment, including the equipment to facilitate movement of the tank-container without significant change of attitude, used for the carriage of gases, liquid, powdery or granular substances and, when used for the carriage of gases as defined in 2.2.2.1.1 having a capacity of more than 0.45 m^3 (450 litres);

***NOTE**: IBCs which meet the requirements of Chapter 6.5 of ADR are not considered to be tank-containers.*

Tank-container/portable tank operator means any enterprise in whose name the tank-container/portable tank is registered;

Tank for residual products means a permanently built-in tank intended to collect residual cargo, washing water, cargo residues or slops which are suitable for pumping;

Tank record means a file containing all the important technical information concerning a tank, a battery-vehicle, a battery wagon or an MEGC, such as certificates referred to in 6.8.2.3, 6.8.2.4 and 6.8.3.4 of ADR;

[2] *Identical to EN ISO 16852:2016*

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Tank swap body is considered to be a tank-container;

Tank-vehicle means a vehicle built to carry liquids, gases or powdery or granular substances and comprising one or more fixed tanks. In addition to the vehicle proper, or the units of running gear used in its stead, a tank-vehicle comprises one or more shells, their items of equipment and the fittings for attaching them to the vehicle or to the running-gear units;

Tank vessel means a vessel intended for the carriage of substances in cargo tanks;

Tank wagon means a wagon intended for the carriage of liquids, gases, powdery or granular substances, comprising a superstructure, consisting of one or more tanks and their equipment and an underframe fitted with its own items of equipment (running gear, suspension, buffing, traction, braking gear and inscriptions).

***NOTE**: Tank wagon also includes wagons with demountable tanks*.

Technical name means a recognized chemical name, or a recognized biological name where relevant, or another name currently used in scientific and technical handbooks, journals and texts (see 3.1.2.8.1.1);

Temperature class means a grouping of flammable gases and vapours of flammable liquids according to their ignition temperature; and of the electrical apparatus intended to be used in the corresponding potentially explosive atmosphere according to their maximum surface temperature (*see EN 13237:2011*);

Test pressure means the pressure at which a cargo tank, a residual cargo tank, a cofferdam or the loading and unloading piping shall be tested prior to being brought into service for the first time and subsequently regularly within prescribed times;

Through or into, for the carriage of radioactive material, means through or into the countries in which a consignment is carried but specifically excludes countries "over" which a consignment is carried by air provided that there are no scheduled stops in those countries;

Toximeter means a (trans)portable device allowing measuring of any significant concentration of toxic gases and vapours. The device has to comply with standard EN 45544-1:2015, EN 45544-2:2015, EN 45544-3:2015 and EN 45544-4:2016 or with standard ISO 17621:2015.

If this device is used in explosion hazardous areas it shall be in addition suitable to be used in the respective zone and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] or to ECE/TRADE/391[5] or at least equivalent).

This device shall be so designed that such measurements are possible without the necessity of entering the spaces to be checked.

Training means teaching instruction, courses or apprenticeships dispensed by an organizer approved by the competent authority;

Transport index (TI) assigned to a package, overpack or container, or to unpackaged LSA-I or SCO-I, for the carriage of radioactive material, means a number which is used to provide control over radiation exposure;

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[3] *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

[4] *http://iecex.com/rules.*

[5] *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

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Transport unit means a motor vehicle without an attached trailer, or a combination consisting of a motor vehicle and an attached trailer;

Tray (Class 1) means a sheet of metal, plastics, fibreboard or other suitable material which is placed in the inner, intermediate or outer packaging and achieves a close-fit in such packaging. The surface of the tray may be shaped so that packagings or articles can be inserted, held secure and separated from each other;

Tube means a transportable pressure receptacle of seamless or composite construction having a water capacity exceeding 150 litres and of not more than 3,000 litres;

Types of protection

Electrical equipment (see IEC 60079-0:2014 or at least equivalent);

EEx (d): flameproof enclosure (IEC 60079-1:2014 or at least equivalent);

EEx (e): increased safety (IEC 60079-7:2016 or at least equivalent);

EEx (ia) and EEx (ib): intrinsic safety (IEC 60079-11:2012 or at least equivalent);

EEx (m): encapsulation (IEC 60079-18:2014 or at least equivalent);

EEx (p): pressurized apparatus (IEC 60079-2:2015 or at least equivalent);

EEx (q): powder filling (IEC 60079-5:2015 or at least equivalent);

Non-electrical equipment (see ISO 80079-36:2016 or at least equivalent);

EEx (fr): flow restricting enclosure (EN 13463-2:2005 or at least equivalent);

EEx (d): flameproof enclosure (EN 13463-3:2005 or at least equivalent);

EEx (c): constructional safety (ISO 80079-37:2016 or at least equivalent);

EEx (b): control of ignition source (EN 13463-6:2005 or at least equivalent);

EEx (k): liquid immersion: (EN 13463-8:2003 or at least equivalent);

Type of vessel

Type G : means a tank vessel intended for the carriage of gases. Carriage may be under pressure or under refrigeration.

Type C : means a tank vessel intended for the carriage of liquids. The vessel shall be of the flush-deck/double-hull type with double-hull spaces, double bottoms, but without trunk. The cargo tanks may be formed by the vessel's inner hull or may be installed in the hold spaces as independent tanks.

Type N: means a tank vessel intended for the carriage of liquids.

Closed Type N: a tank vessel intended for the carriage of liquids in closed cargo tanks.

Open type N: a tank vessel intended for the carriage of liquids in open cargo tanks.

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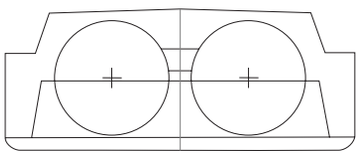
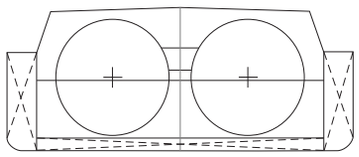
Open Type N: with flame arrester :a tank vessel intended for the carriage of liquids in open cargo tanks whose openings to the atmosphere are equipped with a flame arrester capable of withstanding steady burning.

Sketches (as example)

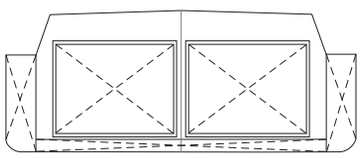
Type G :



Type G Cargo tank design 1,
Type of cargo tank 1
(also by flush-deck)

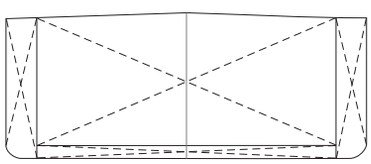


Type G Cargo tank design 1,
Type of cargo tank 1
(also by flush-deck)

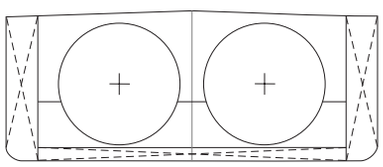


Type G Cargo tank design 2,
Type of cargo tank 1
(also by flush-deck)

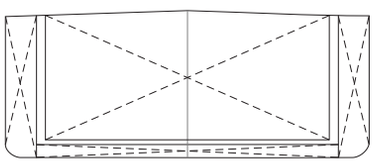
Type C :



Type C Cargo tank design 2,
Type of cargo tank 2

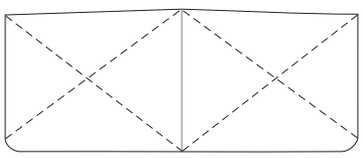


Type C Cargo tank design 1,
Type of cargo tank 1

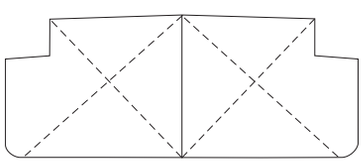


Type C Cargo tank design 2
Type of cargo tank 1

Type N :



Type N Cargo tank design 2, 3 or 4
Type of cargo tank 2



Type N Cargo tank design 2, 3 or 4
Type of cargo tank 2

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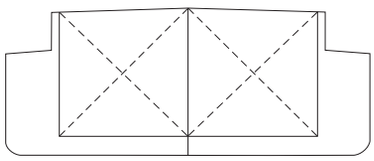
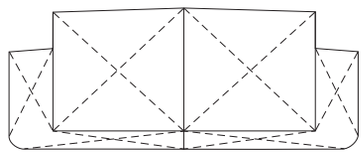
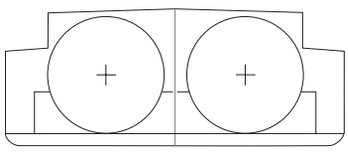


Type N Cargo tank design 2, 3 or 4
Type of cargo tanks 1
(also by flush-deck)



Type N Cargo tank design 2, 3 or 4
Type of cargo tank 3
(also by flush-deck)



Type N Cargo tank design 2, 3 or 4
Type of cargo tank 1
(also by flush-deck)

U

UEL: see *Upper explosion limit;*

UIC means the International Union of Railways (UIC, 16 rue Jean Rey, F-75015 Paris, France);

Ullage opening means a closable opening of the residual cargo tanks with a diameter of maximum 0.10 m. The ullage opening shall be designed in such a way that it is possible to determine the degree of filling by the use of gauging rods;

Undertaking, see *Enterprise*;

UNECE means the United Nations Economic Commission for Europe (UNECE, Palais des Nations, 8-14 avenue de la Paix, CH-1211 Geneva 10, Switzerland);

Unloader means any enterprise which:

(a) Removes a container, bulk-container, MEGC, tank-container or portable tank from a conveyance; or

(b) Unloads packaged dangerous goods, small containers or portable tanks out of or from a conveyance or a container; or

(c) Discharges dangerous goods from a cargo tank, tank-vehicle, demountable tank, portable tank or tank-container; or from a battery-wagon, battery-vehicle, MEMU or MEGC; or from a conveyance for carriage in bulk, a large container or small container for carriage in bulk or a bulk container;

(d) Removes a vehicle or a wagon from a vessel;

Unloading means all actions carried out by the unloader, in accordance with the definition of unloader;

UN Model Regulations means the Model Regulations annexed to the twentieth revised edition of the Recommendations on the Transport of Dangerous Goods published by the United Nations (ST/SG/AC.10/1/Rev.20);

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UN number means the four-figure identification number of the substance or article taken from the United Nations Model Regulations;

UN Regulation means a regulation annexed to the Agreement concerning the adoption of uniform technical prescriptions for wheeled vehicles equipment and parts which can be fitted and or used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions (1958 Agreement, as amended);

Upper explosion limit (UEL) means the highest concentration of the explosion range at which an explosion can occur;

V

Vacuum design pressure means the vacuum pressure on the basis of which the cargo tank or the residual cargo tank has been designed and built;

Vacuum-operated waste tank means a fixed or demountable tank primarily used for the carriage of dangerous wastes, with special constructional features and/or equipment to facilitate the filling and discharging of wastes as specified in Chapter 6.10 of ADR. A tank which fully complies with the requirements of Chapter 6.7 or 6.8 of ADR is not considered to be a vacuum-operated waste tank;

Vacuum valve means an automatically activated safety valve the purpose of which is to protect the cargo tank against unacceptable negative internal pressure. When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2, it shall be deflagration safe against atmospheric explosions of the most critical substance in the list of substances. The deflagration safety shall be tested according to international standard ISO 16852:2016[2] and evidence of compliance with the applicable requirements (e.g., conformity assessment procedure according to Directive 2014/34/EU,[3] the IECEx System,[4] ECE/TRADE/391[5] or at least equivalent) shall be supplied. The deflagration safety may be ensured by an integrated flame arrester plate stack or a flame arrester (protection against deflagrations);

Vapour return piping (on shore) means a pipe of the shore facility which is connected during loading or unloading to the vessel's venting piping. This pipe is designed so as to protect the vessel against detonations or the passage of flames from the shore side;

Vehicle means any vehicle covered by the definition of the term vehicle in the ADR (see *Battery-vehicle, Closed vehicle, Open vehicle, Sheeted vehicle* and *Tank-vehicle)*;

Venting piping (on board) means a pipe of the vessel's installation connecting one or more cargo tanks to the vapour return piping during loading or unloading. This pipe is fitted with safety valves protecting the cargo tank(s) against unacceptable internal overpressure or vacuums;

Vessel means an inland navigation vessel or a seagoing vessel.

Vessel record means a file containing all the important technical information concerning a vessel or a barge such as construction plans and documents about the equipment;

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2 *Identical to EN ISO 16852:2016*

3 *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

4 *http://iecex.com/rules.*

5 *A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.*

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W

Wagon means a rail vehicle without its own means of propulsion that runs on its own wheels on railway tracks and is used for the carriage of goods (see also *battery-wagon, closed wagon, open wagon, sheeted wagon and tank wagon*);

Wastes means substances, solutions, mixtures or articles for which no direct use is envisaged but which are transported for reprocessing, dumping, elimination by incineration or other methods of disposal;

Water film means a deluge of water for protection against brittle fracture;

Water spray system means an on-board installation that, by means of a uniform distribution of water, is capable of protecting all the vertical external surfaces of the ship's hull fore and aft, all vertical surfaces of superstructures and deckhouses and deck surfaces above the superstructures, engine rooms and spaces in which combustible materials may be stored. The capacity of the water spray system for the area to be protected should be at least 10 l/m^2 per minute. The water spray system shall be designed for full-year use. The spray system should be operable from the wheelhouse and the safe area;

Watertight means a structural component or device so fitted as to prevent any ingress of water;

Weathertight means a structural component or device so fitted that in normal conditions it allows only a negligible quantity of water to penetrate;

Wooden barrel means a packaging made of natural wood, of round cross-section, having convex walls, consisting of staves and heads and fitted with hoops;

Wooden IBC means a rigid or collapsible wooden body, together with an inner liner (but no inner packaging) and appropriate service and structural equipment;

Working pressure means the settled pressure of a compressed gas at a reference temperature of 15º C in a full pressure receptacle.

***NOTE**: For tanks, see Maximum working pressure*.

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1.2.2 Units of measurement

1.2.2.1 The following units of measurement [a] are applicable in ADN:

Measurement of	SI Unit[b]	Acceptable alternative unit	Relationship between units
Length	m (metre)	-	-
Area	m^2 (square metre)	-	-
Volume	m^3 (cubic metre)	l [c] (litre)	1 *l* = 10^{-3} m^3
Time	s (second)	min. (minute)	1 min. = 60 s
		h (hour)	1 h = 3 600 s
		d (day)	1 d = 86 400 s
Mass	kg (kilogram)	g (gramme)	1g = 10^{-3} kg
		t (ton)	1 t = 10^3 kg
Mass density	kg/m^3	kg/l	1 kg/l = 10^3 kg/m^3
Temperature	K (kelvin)	°C (degree Celsius)	0° C = 273.15 K
Temperature difference	K (kelvin)	°C (degree Celsius)	1° C = 1 K
Force	N (newton)	-	1 N = 1 $kg.m/s^2$
Pressure	Pa (pascal)		1 Pa = 1 N/m^2
		bar (bar)	1 bar = 10^5 Pa
Stress	N/m^2	N/mm^2	1 N/mm^2 = 1 MPa
Work		kWh (kilowatt hours)	1 kWh = 3.6 MJ
Energy	J (joule)		1 J = 1 N.m = 1 W.s
Quantity of heat		eV (electronvolt)	1 eV = 0.1602 H 10^{-18}J
Power	W (watt)	-	1 W = 1 J/s = 1 N.m/s
Kinematic viscosity	m^2/s	mm^2/s	1 mm^2/s = 10^{-6} m^2/s
Dynamic viscosity	Pa.s	mPa.s	1 mPa.s = 10^{-3} Pa.s
Activity	Bq (becquerel)		
Dose equivalent	Sv (sievert)		

[a] *The following round figures are applicable for the conversion of the units hitherto used into SI Units.*

Force

1 kg = 9.807 N
1 N = 0.102 kg

Stress

1 kg/mm^2 = 9.807 N/mm^2
1 N/mm^2 = 0.102 kg/mm^2

Pressure

1 Pa = 1 N/m^2 = 10^{-5} bar = 1.02 H 10^{-5} kg/cm^2 = 0.75 H 10^{-2} torr
1 bar = 10^5 Pa = 1.02 kg/cm^2 = 750 torr
1 kg/cm^2 = 9.807 H 10^4 Pa = 0.9807 bar = 736 torr
1 torr = 1.33 H 10^2 Pa = 1.33 H 10^{-3} bar = 1.36 H 10^{-3} kg/cm^2

Energy, Work, Quantity of heat

1 J = 1 N.m = 0.278 H 10^{-6} kWh = 0.102 kgm = 0.239 H 10^{-3} kcal
1 kWh = 3.6 H 10^6 J = 367 H 10^3 kgm = 860 kcal
1 kgm = 9.807 J = 2.72 H 10^{-6} kWh = 2.34 H 10^{-3} kcal
1 kcal = 4.19 H 10^3 J = 1.16 H 10^{-3} kWh = 427 kgm

Power

1 W = 0.102 kgm/s = 0.86 kcal/h
1 kgm/s = 9.807 W = 8.43 kcal/h
1 kcal/h = 1.16 W = 0.119 kgm/s

Kinematic viscosity

1 m^2/s = 10^4 St (Stokes)
1 St = 10^{-4} m^2/s

Dynamic viscosity

1 Pa.s = 1 $N.s/m^2$ = 10 P (poise) = 0.102 $kg.s/m^2$
1 P = 0.1 Pa.s = 0.1 $N.s/m^2$ = 1.02 H 10^{-2} $kg.s/m^2$
1 $kg.s/m^2$ = 9.807 Pa.s = 9.807 $N.s/m^2$ = 98.07 P

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[b] *The International System of Units (SI) is the result of decisions taken at the General Conference on Weights and Measures (Address: Pavillon de Breteuil, Parc de St-Cloud, F-92 310 Sèvres).*

[c] *The abbreviation "L" for litre may also be used in place of the abbreviation "l" when a typewriter cannot distinguish between figure "1" and letter "l".*

The decimal multiples and sub-multiples of a unit may be formed by prefixes or symbols, having the following meanings, placed before the name or symbol of the unit:

Factor			Prefix	Symbol
1 000 000 000 000 000 000	$= 10^{18}$	quintillion	exa	E
1 000 000 000 000 000	$= 10^{15}$	quadrillion	peta	P
1 000 000 000 000	$= 10^{12}$	trillion	tera	T
1 000 000 000	$= 10^{9}$	billion	giga	G
1 000 000	$= 10^{6}$	million	mega	M
1 000	$= 10^{3}$	thousand	kilo	k
100	$= 10^{2}$	hundred	hecto	h
10	$= 10^{1}$	ten	deca	da
0.1	$= 10^{-1}$	tenth	deci	d
0.01	$= 10^{-2}$	hundredth	centi	c
0.001	$= 10^{-3}$	thousandth	milli	m
0.000 001	$= 10^{-6}$	millionth	micro	µ
0.000 000 001	$= 10^{-9}$	billionth	nano	n
0.000 000 000 001	$= 10^{-12}$	trillionth	pico	p
0.000 000 000 000 001	$= 10^{-15}$	quadrillionth	femto	f
0.000 000 000 000 000 001	$= 10^{-18}$	quintillionth	atto	a

NOTE: *10^{9} = 1 billion is United Nations usage in English. By analogy, so is 10^{-9} = 1 billionth.*

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1.2.2.2 Unless expressly stated otherwise, the sign "%" in ADN represents:

(a) In the case of mixtures of solids or of liquids, and also in the case of solutions and of solids wetted by a liquid, a percentage mass based on the total mass of the mixture, the solution or the wetted solid;

(b) In the case of mixtures of compressed gases, when filled by pressure, the proportion of the volume indicated as a percentage of the total volume of the gaseous mixture, or, when filled by mass, the proportion of the mass indicated as a percentage of the total mass of the mixture;

(c) In the case of mixtures of liquefied gases and dissolved gases, the proportion of the mass indicated as a percentage of the total mass of the mixture.

1.2.2.3 Pressures of all kinds relating to receptacles (such as test pressure, internal pressure, safety valve opening pressure) are always indicated in gauge pressure (pressure in excess of atmospheric pressure); however, the vapour pressure of substances is always expressed in absolute pressure.

1.2.2.4 Where ADN specifies a degree of filling for receptacles, this is always related to a reference temperature of the substances of 15 °C, unless some other temperature is indicated.

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CHAPTER 1.3

TRAINING OF PERSONS INVOLVED IN THE CARRIAGE OF DANGEROUS GOODS

1.3.1 Scope and applicability

Persons employed by the participants referred to in Chapter 1.4, whose duties concern the carriage of dangerous goods, shall be trained in the requirements governing the carriage of such goods appropriate to their responsibilities and duties. Employees shall be trained in accordance with 1.3.2 before assuming responsibilities and shall only perform functions, for which required training has not yet been provided, under the direct supervision of a trained person. Training requirements specific to security of dangerous goods in Chapter 1.10 shall also be addressed.

NOTE 1: *With regard to the training for the safety adviser, see 1.8.3 instead of this section.*

NOTE 2: *With regard to expert training, see Chapter 8.2 instead of this section.*

NOTE 3: *For training with regard to Class 7, see also 1.7.2.5.*

1.3.2 Nature of the training

The training shall take the following form, appropriate to the responsibility and duties of the individual concerned.

1.3.2.1 *General awareness training*

Personnel shall be familiar with the general requirements of the provisions for the carriage of dangerous goods.

1.3.2.2 *Function-specific training*

1.3.2.2.1 Personnel shall be trained, commensurate directly with their duties and responsibilities in the requirements of the regulations concerning the carriage of dangerous goods. Where the carriage of dangerous goods involves a multimodal transport operation, the personnel shall be aware of the requirements concerning other transport modes.

1.3.2.2.2 The crew shall be familiarized with the handling of fire-extinguishing systems and fire-extinguishers.

1.3.2.2.3 The crew shall be familiarized with the handling of the special equipment referred to in 8.1.5.

1.3.2.2.4 Persons wearing self-contained breathing apparatus shall be physically able to bear the additional constraints.

They shall:

– in the case of devices operating with pressurized air, be trained in their handling and maintenance;

– in the case of devices supplied with pressurized air through a hose, be instructed in their handling and maintenance. The instruction shall be supplemented by practical exercises.

1.3.2.2.5 The master shall bring the instructions in writing referred to in 5.4.3 to the attention of the other persons on board to ensure that they are capable of applying them.

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1.3.2.3 ***Safety training***

Commensurate with the degree of risk of injury or exposure arising from an incident involving the carriage of dangerous goods, including loading and unloading, personnel shall be trained in the hazards and dangers presented by dangerous goods.

The training provided shall aim to make personnel aware of the safe handling and emergency response procedures.

1.3.2.4 The training shall be periodically supplemented with refresher training to take account of changes in regulations.

1.3.2.5 ***Working instructions concerning explosion protection***

The safety training referred to in 1.3.2.3 shall be supplemented by working instructions concerning explosion protection.

1.3.3 **Documentation**

Records of training received according to this Chapter shall be kept by the employer and made available to the employee or competent authority, upon request. Records shall be kept by the employer for a period of time established by the competent authority. Records of training shall be verified upon commencing a new employment.

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CHAPTER 1.4

SAFETY OBLIGATIONS OF THE PARTICIPANTS

1.4.1 General safety measures

1.4.1.1 The participants in the carriage of dangerous goods shall take appropriate measures according to the nature and the extent of foreseeable dangers, so as to avoid damage or injury and, if necessary, to minimize their effects. They shall, in all events, comply with the requirements of ADN in their respective fields.

1.4.1.2 When there is an immediate risk that public safety may be jeopardized, the participants shall immediately notify the emergency services and shall make available to them the information they require to take action.

1.4.1.3 ADN may specify certain of the obligations falling to the various participants.

If a Contracting Party considers that no lessening of safety is involved, it may in its domestic legislation transfer the obligations falling to a specific participant to one or several other participants, provided that the obligations of 1.4.2 and 1.4.3 are met. These derogations shall be communicated by the Contracting Party to the secretariat of the United Nations Economic Commission for Europe which will bring them to the attention of the Contracting Parties.

The requirements of 1.2.1, 1.4.2 and 1.4.3 concerning the definitions of participants and their respective obligations shall not affect the provisions of domestic law concerning the legal consequences (criminal nature, liability, etc.) stemming from the fact that the participant in question is e.g. a legal entity, a self-employed worker, an employer or an employee.

1.4.2 Obligations of the main participants

NOTE 1: *Several participants to which safety obligations are assigned in this section may be one and the same enterprise. Also, the activities and the corresponding safety obligations of a participant can be assumed by several enterprises.*

NOTE 2: *For radioactive material see also 1.7.6.*

1.4.2.1 *Consignor*

1.4.2.1.1 The consignor of dangerous goods is required to hand over for carriage only consignments which conform to the requirements of ADN. In the context of 1.4.1, he shall in particular:

(a) ascertain that the dangerous goods are classified and authorized for carriage in accordance with ADN;

(b) furnish the carrier with information and data in a traceable form and, if necessary, the required transport documents and accompanying documents (authorizations, approvals, notifications, certificates, etc.), taking into account in particular the requirements of Chapter 5.4 and of the tables in Part 3;

(c) use only packagings, large packagings, intermediate bulk containers (IBCs) and tanks (tank-vehicles, demountable tanks, battery-vehicles, MEGCs, portable tanks, tank-containers, tank wagons and battery wagons) approved for and suited to the carriage of the substances concerned and bearing the marks prescribed by one of the international Regulations, and use only approved vessels or tank-vessels suitable for the carriage of the goods in question;

(d) comply with the requirements on the means of dispatch and on forwarding restrictions;

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(e) ensure that even empty uncleaned and non-degassed tanks (tank-vehicles, demountable tanks, battery-vehicles, MEGCs, portable tanks, tank-containers, tank wagons and tank vehicles) or empty uncleaned vehicles and bulk containers are placarded, marked and labelled in accordance with Chapter 5.3 and that empty uncleaned tanks are closed and present the same degree of leakproofness as if they were full.

1.4.2.1.2 If the consignor uses the services of other participants (packer, loader, filler, etc.), he shall take appropriate measures to ensure that the consignment meets the requirements of ADN. He may, however, in the case of 1.4.2.1.1 (a), (b), (c) and (e), rely on the information and data made available to him by other participants.

1.4.2.1.3 When the consignor acts on behalf of a third party, the latter shall inform the consignor in writing that dangerous goods are involved and make available to him all the information and documents he needs to perform his obligations.

1.4.2.2 ***Carrier***

1.4.2.2.1 In the context of 1.4.1, where appropriate, the carrier shall in particular:

(a) ascertain that the dangerous goods to be carried are authorized for carriage in accordance with ADN;

(b) ascertain that all information prescribed in ADN related to the dangerous goods to be carried has been provided by the consignor before carriage, that the prescribed documentation is on board the vessel or if electronic data processing (EDP) or electronic data interchange (EDI) techniques are used instead of paper documentation, that data is available during transport in a manner at least equivalent to that of paper documentation;

(c) ascertain visually that the vessels and loads have no obvious defects, leakages or cracks, missing equipment, etc.;

(d) ascertain that a second means of evacuation in the event of an emergency from the vessel side is available, when the landside installation is not equipped with a second necessary means of evacuation;

NOTE: *Before loading and unloading, the carrier shall consult the administration of the landside installation on the availability of means of evacuation.*

(e) verify that the vessels are not overloaded;

(f) ensure that, within the explosion hazardous areas on board the vessel, only electrical and non-electrical installations and equipment that meet the requirements for use in the relevant zone are used;

(g) provide the master with the required instructions in writing and ascertain that the prescribed equipment is on board the vessel;

(h) ascertain that the marking requirements for the vessel have been met;

(i) ascertain that during loading, carriage, unloading and any other handling of the dangerous goods in the holds or cargo tanks, special requirements are complied with;

(j) ascertain that the vessel substance list in accordance with 1.16.1.2.5 complies with Table C of chapter 3.2 including the modifications made to it;

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(k) complete his section of the checklist referred to in 7.2.3.7.2.2 prior to the degassing of empty or unloaded cargo tanks and piping for loading and unloading of a tank vessel to a reception facility;

(l) complete his section of the checklist referred to in 7.2.4.10 prior to the loading and unloading of the cargo tanks of a tank vessel.

Where appropriate, this shall be done on the basis of the transport documents and accompanying documents, by a visual inspection of the vessel or the containers and, where appropriate, the load.

1.4.2.2.2 The carrier may, however, in the case of 1.4.2.2.1 (a) and (b), rely on information and data made available to him by other participants. In the case of 1.4.2.2.1 (c) he may rely on what is certified in the "container/vehicle packing certificate" provided in accordance with 5.4.2.

1.4.2.2.3 If the carrier observes an infringement of the requirements of ADN, in accordance with 1.4.2.2.1, he shall not forward the consignment until the matter has been rectified.

1.4.2.2.4 *(Reserved)*

1.4.2.2.5 (*Reserved*)

1.4.2.3 *Consignee*

1.4.2.3.1 The consignee has the obligation not to defer acceptance of the goods without compelling reasons and to verify, before, during or after unloading, that the requirements of ADN concerning him have been complied with.

In the context of 1.4.1, he shall in particular:

(a) (*Deleted*)

(b) carry out in the cases provided for by ADN the prescribed cleaning and decontamination of the vessels;

(c) (*Deleted*)

(d) (*Deleted*)

(e) (*Deleted*)

(f) (*Deleted*)

(g) (*Deleted*)

(h) (*Deleted*)

1.4.2.3.2 (*Deleted*)

1.4.2.3.3 (*Deleted*)

1.4.3 Obligations of the other participants

A non-exhaustive list of the other participants and their respective obligations is given below. The obligations of the other participants flow from section 1.4.1 above insofar as they know or should have known that their duties are performed as part of a transport operation subject to ADN.

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1.4.3.1 ***Loader***

1.4.3.1.1 In the context of 1.4.1, the loader has the following obligations in particular:

(a) He shall hand the dangerous goods over to the carrier only if they are authorized for carriage in accordance with ADN;

(b) He shall, when handing over for carriage packed dangerous goods or uncleaned empty packagings, check whether the packaging is damaged. He shall not hand over a package the packaging of which is damaged, especially if it is not leakproof, and there are leakages or the possibility of leakages of the dangerous substance, until the damage has been repaired; this obligation also applies to empty uncleaned packagings;

(c) He shall comply with the special requirements concerning loading and handling;

(d) He shall, after loading dangerous goods into a container comply with the requirements concerning placarding, marking and orange-coloured plates conforming to Chapter 5.3;

(e) He shall, when loading packages, comply with the prohibitions on mixed loading taking into account dangerous goods already in the vessel, vehicle, wagon or large container and requirements concerning the separation of foodstuffs, other articles of consumption or animal feedstuffs;

(f) He shall ascertain that the landside installation is equipped with one or two means of evacuation from the vessel in the event of an emergency;

(g) (*Reserved*)

1.4.3.1.2 The loader may, however, in the case of 1.4.3.1.1 (a), (d) and (e), rely on information and data made available to him by other participants.

1.4.3.2 ***Packer***

In the context of 1.4.1, the packer shall comply with in particular:

(a) the requirements concerning packing conditions, or mixed packing conditions; and

(b) when he prepares packages for carriage, the requirements concerning marking and labelling of the packages.

1.4.3.3 ***Filler***

In the context of 1.4.1, the filler has the following obligations in particular:

Obligations concerning the filling of tanks (tank-vehicles, battery-vehicles, demountable tanks, portable tanks, tank-containers, MEGCs, tank wagons and battery wagons):

(a) He shall ascertain prior to the filling of tanks that both they and their equipment are technically in a satisfactory condition;

(b) He shall ascertain that the date of the next test for tanks has not expired;

(c) He shall only fill tanks with the dangerous goods authorized for carriage in those tanks;

(d) He shall, in filling the tank, comply with the requirements concerning dangerous goods in adjoining compartments;

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(e) He shall, during the filling of the tank, observe the maximum permissible degree of filling or the maximum permissible mass of contents per litre of capacity for the substance being filled;

(f) He shall, after filling the tank, ensure that all closures are in a closed position and that there is no leakage;

(g) He shall ensure that no dangerous residue of the filling substance adheres to the outside of the tanks filled by him;

(h) He shall, in preparing the dangerous goods for carriage, ensure that the placards, marks, orange-coloured plates and labels are affixed in accordance with Chapter 5.3.

Obligations concerning the bulk loading of dangerous solids in vehicles, wagons or containers:

(i) He shall ascertain, prior to loading, that the vehicles, wagons and containers, and if necessary their equipment, are technically in a satisfactory condition and that the carriage in bulk of the dangerous goods in question is authorized in these vehicles, wagons or containers;

(j) He shall ensure after loading that the orange plates and placards or labels prescribed are affixed in accordance with the requirements of Chapter 5.3 applicable to such vehicles, wagons or containers;

(k) He shall, when filling vehicles, wagons or containers with dangerous goods in bulk, ascertain that the relevant provisions of Chapter 7.3 of RID or ADR are complied with.

Obligations concerning the filling of cargo tanks:

(l) (*Reserved*)

(m) He shall complete his section of the checklist referred to in 7.2.4.10 prior to the loading of the cargo tanks of a tank vessel;

(n) He shall only fill cargo tanks with the dangerous goods accepted in such tanks;

(o) He shall, when necessary, issue a heating instruction in the case of the carriage of substances whose melting point is 0 °C or higher;

(p) He shall ascertain that during loading the trigger for the automatic device for the prevention of overfilling switches off the electric line established and supplied by the on-shore installation and that he can take steps against overfilling;

(q) He shall ascertain that the landside installation is equipped with one or two means of evacuation from the vessel in the event of an emergency;

(r) He shall ascertain that, when prescribed in 7.2.4.25.5 and when explosion protection is necessary according to column (17) of Table C of Chapter 3.2, there is a flame-arrester in the vapour return piping to protect the vessel against detonations and flame-fronts from the landward side;

(s) He shall ascertain that the loading flows conform to the loading and unloading instructions referred to in 9.3.2.25.9 or 9.3.3.25.9 and that the pressure at the connecting-point of the vapour return piping and the venting piping is not greater than the opening pressure of the pressure relief valve/high velocity vent valve;

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(t) He shall ascertain that the joints provided by him for the connecting flange of the ship/shore connections of the loading and unloading piping consist of a material which is not susceptible to be damaged by the cargo or causes a decomposition of the cargo nor forms harmful or dangerous components with it;

(u) He shall ascertain that during the entire duration of loading a permanent and appropriate supervision is assured.

Obligations concerning the bulk loading of dangerous solids in vessels:

(v) When special provision 803 applies, shall guarantee and document, using an appropriate procedure, that the maximum permissible temperature of the cargo is not exceeded and shall provide instructions to the master in a traceable form;

(w) He shall only load the vessel with dangerous goods the bulk carriage of which is authorized in that vessel;

(x) He shall ascertain that the landside installation is equipped with one or two means of evacuation from the vessel in the event of an emergency.

1.4.3.4 ***Tank-container/portable tank operator***

In the context of 1.4.1, the tank-container/portable tank operator shall in particular:

(a) ensure compliance with the requirements for construction, equipment, tests and marking;

(b) ensure that the maintenance of shells and their equipment is carried out in such a way as to ensure that, under normal operating conditions, the tank-container/portable tank satisfies the requirements of ADR, RID or the IMDG Code until the next inspection;

(c) have an exceptional check made when the safety of the shell or its equipment is liable to be impaired by a repair, an alteration or an accident.

1.4.3.5 and 1.4.3.6 *(Reserved)*

1.4.3.7 ***Unloader***

1.4.3.7.1 In the context of 1.4.1, the unloader shall in particular:

(a) Ascertain that the correct goods are unloaded by comparing the relevant information on the transport document with the information on the package, container, tank, MEMU, MEGC or conveyance;

(b) Before and during unloading, check whether the packagings, the tank, the conveyance or container have been damaged to an extent which would endanger the unloading operation. If this is the case, ascertain that unloading is not carried out until appropriate measures have been taken;

(c) Comply with all relevant requirements concerning unloading and handling;

(d) Immediately following the unloading of the tank, conveyance or container:

(i) Ensure the removal of any dangerous residues which have adhered to the outside of the tank, conveyance or container during the process of unloading; and

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(ii) By unloading of packages, ensure the closure of valves and inspection openings;

(e) Ensure that the prescribed cleaning and decontamination of the conveyances or containers is carried out;

(f) Ensure that the containers, vehicles and wagons, once completely unloaded, cleaned and decontaminated, no longer display the placards, marks and orange-coloured plates that had been displayed in accordance with Chapter 5.3;

(g) Ascertain that the landside installation is equipped with one or two means of evacuation from the vessel in the event of an emergency;

Additional obligations concerning the unloading of cargo tanks:

(h) Complete his section of the checklist referred to in 7.2.4.10 prior to the unloading of the cargo tanks of a tank vessel;

(i) Ascertain that, when a connection to the venting piping is required and when explosion protection is required according to column (17) of Table C of Chapter 3.2, there is a flame arrester in the vapour return pipe to protect the vessel against detonations and flame-fronts from the landward side;

(j) Ascertain that the unloading flows conform to the instructions on loading and unloading flows referred to in 9.3.2.25.9 or 9.3.3.25.9 and that the pressure at the connecting-point of the vapour return piping and the venting piping or the gas return pipe does not exceed the opening pressure of the pressure relief valve/high velocity vent valve;

(k) Ascertain that the gaskets provided by him for the connecting flange of the ship/shore connections of the loading and unloading piping consist of a material which will not be damaged by the cargo nor causes a decomposition of the cargo nor forms harmful or dangerous components with it;

(l) Ascertain that during the entire duration of unloading a permanent and appropriate supervision is assured;

(m) Ascertain that, during unloading by means of the on-board pump, it is possible for the shore facility to switch it off;

1.4.3.7.2 If the unloader makes use of the services of other participants (cleaner, decontamination facility, etc.) or of the pumps of the vessel he shall take appropriate measures to ensure that the requirements of ADN have been complied with.

1.4.3.8 ***Reception facility operator***

1.4.3.8.1 In the context of 1.4.1, the reception facility operator shall in particular:

(a) Complete his section of the checklist referred to in 7.2.3.7.2.2 prior to the degassing of empty or unloaded cargo tanks and piping for loading and unloading of a tank vessel;

(b) Ascertain that, when prescribed in 7.2.3.7.2.3, there is a flame arrester in the piping of the reception facility which is connected to the degassing vessel, to protect the vessel against detonations and passage of flames from the side of the reception facility.

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CHAPTER 1.5

SPECIAL RULES, DEROGATIONS

1.5.1 Bilateral and multilateral agreements

1.5.1.1 In accordance with Article 7, paragraph 1 of ADN, the competent authorities of the Contracting Parties may agree directly among themselves to authorize certain transport operations in their territories by temporary derogation from the requirements of ADN, provided that safety is not compromised thereby. The authority which has taken the initiative with respect to the temporary derogation shall notify such derogations to the Secretariat of the United Nations Economic Commission for Europe which shall bring them to the attention of the Contracting Parties.

NOTE: *"Special arrangement" in accordance with 1.7.4 is not considered to be a temporary derogation in accordance with this section.*

1.5.1.2 The period of validity of the temporary derogation shall not be more than five years from the date of its entry into force. The temporary derogation shall automatically cease as from the date of the entry into force of a relevant amendment to these annexed Regulations.

1.5.1.3 Transport operations on the basis of these agreements shall constitute transport operations in the sense of ADN.

1.5.2 Special authorizations concerning transport in tank vessels

1.5.2.1 *Special authorizations*

1.5.2.1.1 In accordance with paragraph 2 of Article 7 of ADN, the competent authority shall have the right to issue special authorizations to a carrier or a consignor for the international carriage in tank vessels of dangerous substances, including mixtures, the carriage of which in tank vessels is not authorized under these Regulations, in accordance with the procedure set out below.

1.5.2.1.2 The special authorization shall be valid, due account being taken of the restrictions specified therein, for the Contracting Parties and on whose territory the transport operation will take place, for not more than two years unless it is repealed at an earlier date. With the approval of the competent authorities of these Contracting Parties, the special authorization may be renewed for a period of not more than one year.

1.5.2.1.3 The special authorization shall include a statement concerning its repeal at an earlier date and shall conform to the model contained in subsection 3.2.4.1.

1.5.2.2 *Procedure*

1.5.2.2.1 The carrier or the consignor shall apply to the competent authority of a Contracting Party on whose territory the transport operation takes place for the issue of a special authorization.

The application shall conform to the model contained in subsection 3.2.4.2. The applicant shall be responsible for the accuracy of the particulars.

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1.5.2.2.2 The competent authority shall consider the application from the technical and safety point of view. If it has no reservations, it shall draw up a special authorization in accordance with the criteria contained in subsection 3.2.4.3 and immediately inform the other competent authorities involved in the carriage in question. The special authorization shall be issued only when the authorities concerned agree to it or have not expressed opposition within a period of two months after receiving the information. The applicant shall receive the original of the special authorization and keep a copy of it on board the vessel(s) involved in the carriage in question. The competent authorities shall immediately communicate to the Administrative Committee the applications for special authorizations, the applications rejected and the special authorizations granted.

1.5.2.2.3 If the special authorization is not issued because doubts or opposition have been expressed, the Administrative Committee shall decide whether or not to issue a special authorization.

1.5.2.3 ***Update of the list of substances authorized for carriage in tank vessels***

1.5.2.3.1 The Administrative Committee shall consider all the special authorizations and applications communicated to it and decide whether the substance is to be included in the list of substances in these Regulations, authorized for carriage in tank vessels.

1.5.2.3.2 If the Administrative Committee enters technical or safety reservations concerning the inclusion of the substance in the list of substances of these Regulations authorized for carriage in tank vessels or concerning certain conditions, the competent authority shall be so informed. The competent authority shall immediately withdraw or, if necessary, modify the special authorization.

1.5.3 Equivalents and derogations (Article 7, paragraph 3 of ADN)

1.5.3.1 ***Procedure for equivalents***

When the provisions of these Regulations prescribe for a vessel the use or the presence on board of certain materials, installations or equipment or the adoption of certain construction measures or certain fixtures, the competent authority may agree to the use or the presence on board of other materials, installations or equipment or the adoption of other construction measures or other fixtures for this vessel if, in line with recommendations established by the Administrative Committee, they are accepted as equivalent.

1.5.3.2 ***Derogations on a trial basis***

The competent authority may, on the basis of a recommendation by the Administrative Committee, issue a trial certificate of approval for a limited period for a specific vessel having new technical characteristics departing from the requirements of these Regulations, provided that these characteristics are sufficiently safe.

1.5.3.3 ***Particulars of equivalents and derogations***

The equivalents and derogations referred to in 1.5.3.1 and 1.5.3.2 shall be entered in the certificate of approval.

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CHAPTER 1.6

TRANSITIONAL MEASURES

1.6.1 General

1.6.1.1 Unless otherwise provided, the substances and articles of ADN may be carried until 30 June 2019 in accordance with the requirements of ADN applicable up to 31 December 2018.

1.6.1.2 (*Deleted*)

1.6.1.3 The transitional measures of 1.6.1.3 and 1.6.1.4 of ADR and RID, or falling within the scope of 4.1.5.19 of the IMDG Code, concerning the packaging of substances and articles of Class 1, are also valid for carriage subject to ADN.

1.6.1.4 (*Deleted*)

1.6.1.5 to 1.6.1.7 *(Reserved)*

1.6.1.8 Existing orange-coloured plates which meet the requirements of sub-section 5.3.2.2 applicable up to 31 December 2004 may continue to be used provided that the requirements in 5.3.2.2.1 and 5.3.2.2.2 that the plate, numbers and letters shall remain affixed irrespective of the orientation of the vehicle or wagon are met.

1.6.1.9 *(Reserved)*

1.6.1.10 (*Deleted*)

1.6.1.11 and 1.6.1.12 *(Reserved)*

1.6.1.13 (*Deleted*)

1.6.1.14 IBCs manufactured before 1 January 2011 and conforming to a design type which has not passed the vibration test of 6.5.6.13 of ADR or which was not required to meet the criteria of 6.5.6.9.5 (d) of ADR at the time it was subjected to the drop test, may still be used.

1.6.1.15 IBCs manufactured, remanufactured or repaired before 1 January 2011 need not be marked with the maximum permitted stacking load in accordance with 6.5.2.2.2 of ADR. Such IBCs, not marked in accordance with 6.5.2.2.2 of ADR, may still be used after 31 December 2010 but must be marked in accordance with 6.5.2.2.2 of ADR if they are remanufactured or repaired after that date. IBCs manufactured, remanufactured or repaired between 1 January 2011 and 31 December 2016 and marked with the maximum permitted stacking load in accordance with 6.5.2.2.2 of ADR in force up to 31 December 2014 may continue to be used.

1.6.1.16 to 1.6.1.20 (*Deleted*)

1.6.1.21 to 1.6.1.23 (*Reserved*)

1.6.1.24 and 1.6.1.25 *(Deleted)*

1.6.1.26 Large packagings manufactured or remanufactured before 1 January 2014 and which do not conform to the requirements of 6.6.3.1 of ADR regarding the height of letters, numerals and symbols applicable as from 1 January 2013 may continue to be used. Those manufactured or remanufactured before 1 January 2015 need not be marked with the maximum permitted stacking load in accordance with 6.6.3.3 of ADR. Such large packagings not marked in accordance with 6.6.3.3 of ADR may still be used after 31 December 2014 but must be marked in accordance with 6.6.3.3 of ADR if they are remanufactured after that date. Large

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packagings manufactured or remanufactured between 1 January 2011 and 31 December 2016 and marked with the maximum permitted stacking load in accordance with 6.6.3.3 of ADR in force up to 31 December 2014 may continue to be used.

1.6.1.27 Means of containment integral to equipment or machinery containing liquid fuels of UN Nos. 1202, 1203, 1223, 1268, 1863 and 3475 constructed before 1 July 2013, which do not conform to the requirements of paragraph (a) of special provision 363 of chapter 3.3 applicable as from 1 January 2013, may still be used.

1.6.1.28 *(Deleted)*

1.6.1.29 Lithium cells and batteries manufactured according to a type meeting the requirements of sub-section 38.3 of the Manual of Tests and Criteria, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type testing may continue to be carried, unless otherwise provided in ADN.

Lithium cells and batteries manufactured before 1 July 2003 meeting the requirements of the Manual of Tests and Criteria, Revision 3, may continue to be carried if all other applicable requirements are fulfilled.

1.6.1.30 Labels which meet the requirements of 5.2.2.2.1.1 applicable up to 31 December 2014, may continue to be used until 30 June 2019.

1.6.1.31 and 1.6.1.32 (*Deleted)*

1.6.1.33 Electric double layer capacitors of UN No. 3499, manufactured before 1 January 2014, need not be marked with the energy storage capacity in Wh as required by sub-paragraph (e) of special provision 361 of Chapter 3.3.

1.6.1.34 Asymmetric capacitors of UN No. 3508, manufactured before 1 January 2016, need not be marked with the energy storage capacity in Wh as required by sub-paragraph (c) of special provision 372 of Chapter 3.3.

1.6.1.35 to 1.6.1.37 *(Reserved)*

1.6.1.38 Contracting Parties may continue to issue training certificates for dangerous goods safety advisers conforming to the model applicable until 31 December 2016, instead of those conforming to the requirements of 1.8.3.18 applicable from 1 January 2017, until 31 December 2018. Such certificates may continue in use to the end of their five year validity.

1.6.1.39 and 1.6.1.40 *(Deleted)*

1.6.1.41 Notwithstanding the requirements of ADN applicable as from 1 January 2017, large packagings conforming to the packing group III performance level in accordance with special packing provision L2 of packing instruction LP02 of 4.1.4.3 of ADR applicable until 31 December 2016 may continue to be used until 31 December 2022 for UN No. 1950.

1.6.1.42 *(Deleted)*

1.6.1.43 Vehicles registered or brought into service before 1 July 2017, as defined in special provisions 388 and 669 of Chapter 3.3, and their equipment intended for use during carriage, which conform to the requirements of ADN applicable until 31 December 2016 but containing lithium cells and batteries which do not conform to the provisions of 2.2.9.1.7 may continue to be carried as a load in accordance with the requirements of special provision 666 of Chapter 3.3.

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1.6.1.44 Undertakings which participate in the carriage of dangerous goods only as consignors and which did not have to appoint a safety adviser on the basis of the provisions applicable until 31 December 2018 shall, by derogation from the provisions of 1.8.3.1 applicable from 1 January 2019, appoint a safety adviser no later than 31 December 2022.

1.6.1.45 Contracting Parties may, until 31 December 2020, continue to issue training certificates for dangerous goods safety advisers conforming to the model applicable until 31 December 2018, instead of those conforming to the requirements of 1.8.3.18 applicable from 1 January 2019. Such certificates may continue in use to the end of their five-year validity.

1.6.1.46 The carriage of machinery or equipment not specified in this annex and which happen to contain dangerous goods in their internal or operational equipment and which are therefore assigned to UN Nos. 3363, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 or 3548, which was exempted from the provisions of ADN according to 1.1.3.1 (b) applicable until 31 December 2018, may continue to be exempted from the provisions of ADN until 31 December 2022 provided that measures have been taken to prevent any leakage of contents in normal conditions of carriage.

1.6.1.47 Lithium cells and batteries not meeting the requirements of 2.2.9.1.7 (g) may continue to be carried until 31 December 2019.

1.6.2 Pressure receptacles and receptacles for Class 2

The transitional measures of sections 1.6.2 of ADR and RID are also valid for transport operations subject to ADN.

1.6.3 Fixed tanks (tank-vehicles and tank wagons), demountable tanks, battery vehicles and battery wagons

The transitional measures of sections 1.6.3 of ADR and RID are also valid for transport operations subject to ADN.

1.6.4 Tank-containers, portable tanks and MEGCs

The transitional measures of sections 1.6.4 of ADR and RID or of section 4.2.0 of the IMDG Code, depending on the case, are also valid for transport operations subject to ADN.

1.6.5 Vehicles

The transitional measures of section 1.6.5 of ADR are also valid for transport operations subject to ADN.

1.6.6 Class 7

The transitional measures of sections 1.6.6 of ADR and RID or of section 6.4.24 of the IMDG Code are also valid for transport operations subject to ADN.

1.6.7 Transitional provisions concerning vessels

1.6.7.1 ***General***

1.6.7.1.1 For the purposes of Article 8 of ADN, section 1.6.7 sets out general transitional provisions in 1.6.7.2 (see Article 8, paragraphs 1, 2 and 4) and supplementary transitional provisions in 1.6.7.3 (see Article 8, paragraph 3).

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1.6.7.1.2 In this section:

(a) "Vessel in service" means

- A vessel according to Article 8, paragraph 2, of ADN;
- A vessel for which a certificate of approval has already been issued according to 8.6.1.1 to 8.6.1.4;

In both cases vessels that, as from 31 December 2014, have been without a valid certificate of approval for more than twelve months shall be excluded;

(b) "N.R.M." means that the requirement does not apply to vessels in service except where the parts concerned are replaced or modified, i.e. it applies only to vessels which are **n**ew (as from the date indicated), or to parts which are **r**eplaced or **m**odified after the date indicated; the date of presentation for first inspection for obtaining a certificate of approval shall be decisive for nomination as a new vessel; where existing parts are replaced by spare or replacement parts of the same type and manufacture, this shall not be considered a replacement 'R' as defined in these transitional provisions.

Modification shall also be taken to mean the conversion of an existing type of tank vessel, a type of cargo tank or a cargo tank design to another type or design at a higher level.

When in the general transitional provisions in 1.6.7.2 no date is specified after 'N.R.M.', it refers to N.R.M. after 26 May 2000. When in the supplementary transitional provisions in 1.6.7.3, no date is specified, it refers to N.R.M. after 26 May 2000.

(c) "Renewal of the certificate of approval after the …" means that when a vessel has benefitted from the transitional measure in paragraph (b) the requirement shall be met at the next renewal of the certificate of approval following the date indicated. If the certificate of approval expires during the first year after the date of application of these Regulations, the requirement shall be mandatory only after the expiry of this first year.

(d) Requirements of chapter 1.6.7 applicable on board vessels in service are only valid if N.R.M. is not applicable.

1.6.7.2 ***General transitional provisions***

1.6.7.2.1 *General transitional provisions for dry cargo vessels*

1.6.7.2.1.1 Vessels in service shall meet:

(a) the requirements of paragraphs mentioned in the table below within the period established therein;

(b) the requirements of paragraphs not mentioned in the table below at the date of application of these Regulations.

The construction and equipment of vessels in service shall be maintained at least at the previous standard of safety.

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1.6.7.2.1.1 Table of general transitional provisions: Dry cargo		
Paragraphs	Subject	Time limit and comments
1.16.1.4 and 1.16.2.5	Annex to certificate of approval and provisional certificate of approval	Renewal of the certificate of approval after 31 December 2014
7.1.2.19.1	Vessels necessary to provide propulsion Adaptation to the new requirements in 9.1.0.12.4, 9.1.0.40.2, 9.1.0.51 and 9.1.0.52	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following requirements apply to vessels in service: In a pushed convoy or a side-by-side formation, where at least one vessel is required to be in possession of a certificate of approval for the carriage of dangerous goods, all vessels of the convoy or side-by-side formation shall be provided with an appropriate certificate of approval. Vessels not carrying dangerous goods shall comply with the requirements of the following sections, subsections and paragraphs: 1.16.1.1, 1.16.1.2, 1.16.1.3, 7.1.2.5, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 9.1.0.0, 9.1.0.12.3, 9.1.0.12.5, 9.1.0.17.2, 9.1.0.17.3, 9.1.0.31, 9.1.0.32, 9.1.0.34, 9.1.0.41, 9.1.0.52.7, 9.1.0.56, 9.1.0.71 and 9.1.0.74.
7.1.3.41	Smoking	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2020
7.1.3.51.1	Non-electrical installations and equipment	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2024
7.1.3.51.5	Disconnection of installations and equipment marked in red	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
7.1.3.51.5	Installations and equipment generating surface temperatures of above 200 °C	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
7.1.4.53	Lighting appliances in explosion hazardous areas of zone 2	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2022
8.1.2.2 (e) – (h)	Documents which must be carried on board	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2020
8.6.1.1 8.6.1.2	Changes to certificate of approval	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2018

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1.6.7.2.1.1 Table of general transitional provisions: Dry cargo		
Paragraphs	Subject	Time limit and comments
9.1.0.12.1	Ventilation of holds	N.R.M. Renewal of the certificate of approval after 31 December 2018 Until then, the following requirements apply on board vessels in service: Each hold shall have appropriate natural or artificial ventilation; for the carriage of substances of Class 4.3, each hold shall be equipped with forced-air ventilation; the appliances used for this purpose must be so constructed that water cannot enter the hold.
9.1.0.12.3	Ventilation of accommodation and wheelhouse	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.1.0.12.3	Ventilation of service spaces	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.1.0.12.3	Equipment in the accommodation, wheelhouse and service spaces where surface temperatures can be higher than those mentioned under 9.1.0.51 or where electrical installations and equipment which do not meet the requirements of 9.1.0.52.1 are used	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.1.0.12.4	Ventilation inlets	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.1.0.12.5	Ventilators used in the protected area and hold ventilators which are arranged in the air flow: Temperature class and explosion group	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.1.0.17.2	Gas-tight openings facing holds	N.R.M. Renewal of the certificate of approval after 31 December 2018 Until then, the following requirements apply on board vessels in service: Openings of accommodation and the wheelhouse facing the holds must be capable of being tightly closed.

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1.6.7.2.1.1 Table of general transitional provisions: Dry cargo		
Paragraphs	Subject	Time limit and comments
9.1.0.17.3	Entrances and openings in the protected area	N.R.M. Renewal of the certificate of approval after 31 December 2018 Until then, the following requirements apply on board vessels in service: Openings of engine rooms and service spaces facing the holds must be capable of being tightly closed.
9.1.0.31.2	Air intakes of engines	N.R.M. Renewal of the certificate of approval after 31 December 2034
9.1.0.32.2	Open ends of the air pipes not less than 0.50 m above the open deck	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.1.0.34.1	Position of exhaust pipes	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.1.0.35	Stripping pumps in the protected area	N.R.M. Renewal of the certificate of approval after 31 December 2018 Until then, the following requirements apply on board vessels in service: In the event of the carriage of substances of Class 4.1, UN No. 3175, of all substances of Class 4.3 in bulk or unpackaged and polymeric beads, expandable, of Class 9, UN No. 2211, the stripping of the holds may only be effected using a stripping installation located in the protected area. The stripping installation located above the engine room must be clamped.
9.1.0.40.1	Fire extinguishers, two pumps, etc.	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.1.0.40.2	Fire extinguishing systems permanently fixed in engine rooms	N.R.M. Renewal of the certificate of approval after 31 December 2034
9.1.0.41 in conjunction with 7.1.3.41	Fire and naked light	N.R.M. Renewal of the certificate of approval after 31 December 2018 Until then, the following requirements apply on board vessels in service: Outlets of funnels shall be located not less than 2 m from the nearest point on hold hatchways. Heating and cooking appliances shall be permitted only in metal-based accommodation and wheelhouses. However: - Heating appliances fuelled with liquid fuels having a flashpoint above 55 °C shall be permitted in engine rooms; - Central-heating boilers fuelled with solid fuels shall be permitted in spaces situated below deck and accessible only from the deck.

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1.6.7.2.1.1 Table of general transitional provisions: Dry cargo		
Paragraphs	Subject	Time limit and comments
9.1.0.51	Temperature of outer parts of engines and of their air inlets and exhaust ducts	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.1.0.52.1	Electrical installations, equipment and appliances located outside the protected area	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following requirements are applicable on board vessels in service: It shall be possible to isolate the electrical equipment in the protected area by means of centrally located switches except where: - In the holds it is of a certified safe type corresponding at least to temperature class T4 and explosion group II B; and - In the protected area on the deck it is of the limited explosion risk type. The corresponding electrical circuits shall have control lamps to indicate whether or not the circuits are live. The switches shall be protected against unintended unauthorized operation. The sockets used in this area shall be designed so as to prevent connection or disconnection except when they are not live. Submerged pumps installed or used in the holds shall be of the certified safe type at least for temperature class T4 and explosion group II B.
9.1.0.52.1	Electrical installations in operation during a stay in the immediate vicinity of or within an onshore assigned zone	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.1.0.52.2	Installations and equipment marked in red	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.1.0.52.5	Failure of the power supply for the safety and control equipment	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2024
9.1.0.53.5	Movable electric cables (sheathed, type H 07 RN-F)	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following provisions apply on board vessels in service: Until that date, movable electric cables (sheathed, type H 07 RN-F) must comply with IEC 60245-4:1994
9.1.0.53.6	Non-electrical installations and equipment within the protected area	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.2.0.31.2	Air intakes of engines	N.R.M. Renewal of the certificate of approval after 31 December 2034

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1.6.7.2.1.1 Table of general transitional provisions: Dry cargo		
Paragraphs	Subject	Time limit and comments
9.2.0.34.1	Position of exhaust pipes	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.2.0.41 in conjunction with 7.1.3.41	Fire and naked light	N.R.M. Renewal of the certificate of approval after 31 December 2018 Until then, the following requirements apply on board vessels in service: Outlets of funnels shall be located not less than 2 m from the nearest point on hold hatchways. Heating and cooking appliances shall be permitted only in metal-based accommodation and wheelhouses. However: - Heating appliances fuelled with liquid fuels having a flashpoint above 55 °C shall be permitted in engine rooms; - Central-heating boilers fuelled with solid fuels shall be permitted in spaces situated below deck and accessible only from the deck.

1.6.7.2.1.2 (*Deleted*)

1.6.7.2.1.3 By way of derogation from 7.1.4.1, transport in bulk of UN Nos. 1690, 1812 and 2505, may be carried out with single hull vessels until 31 December 2018.

1.6.7.2.1.4 For a vessel or a barge whose keel was laid before 1 July 2017 and which does not conform to the requirements of 9.x.0.1 concerning the vessel record, the retention of files for the vessel record shall start at the latest at the next renewal of the certificate of approval.

1.6.7.2.2 *General transitional provisions for tank vessels*

1.6.7.2.2.1 Vessels in service shall meet:

(a) the requirements of paragraphs mentioned in the table below within the period established therein;

(b) the requirements of paragraphs not mentioned in the table below at the date of application of these Regulations.

The construction and equipment of vessels in service shall be maintained at least at the previous standard of safety.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
1.2.1	Cargo area Spatial extent above the deck	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following requirements are applicable on board vessels in service: The spatial extent corresponds to a rectangular pyramidal frustum with the following dimensions: Floor area: from board to board and from outer cofferdam bulkhead to outer cofferdam bulkhead Angle of slope of the short sides: 45° Angle of slope of the long sides: 90° Height: 3.00 m Spatial extent of zone 1 corresponds to the cargo area above the deck
1.2.1	Classification in zones Zone 1 Spatial extent Zone 2 Spatial extent:	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following requirements are applicable on board vessels in service: the spatial extent of zone 1 corresponds to a rectangular pyramidal fustrum with the following dimensions: Floor area: from board to board and from outer cofferdam bulkhead to outer cofferdam bulkhead Angle of slope of the short sides: 45° Angle of slope of the long sides: 90° Height: 3.00 m N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034
1.2.1	Device for the safe depressurization of cargo tanks Deflagration safety Test according to ISO 16852:2016/Proof of conformity with applicable requirements	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 The deflagration safety shall be tested according to EN 12874:2001 including the manufacturer's confirmation under Directive 94/9/EC on board vessels built or modified from 1 January 2001 or if the safe pressure-relief device for the cargo tanks has been replaced since 1 January 2001. In other cases, they shall be of a type approved by the competent authority for the use prescribed.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
1.2.1	Flame arrester Test according to ISO 16852:2016 or EN ISO 16852:2016	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following requirements are applicable on board vessels in service: Flame arresters shall be: - Tested according to ISO 16852:2010 or EN ISO 16852:2010 if they have been replaced since 1 January 2015 or are on board vessels built or modified since 1 January 2015; - Tested according to EN 12874:2001 if they have been replaced since 1 January 2001 or are on board vessels built or modified since 1 January 2001; - Of a type approved by the competent authority for the use prescribed if they were replaced before 1 January 2001 or are on board vessels built or modified before 1 January 2001.
1.2.1	Flame arrester Proof of conformity with applicable requirement	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034
1.2.1	Gas detection system Test according to IEC 60079-29-1:2016 and EN 50271:2010	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2024
1.2.1	Gas detector Test according to IEC 60079-29-1:2016	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020
1.2.1	High velocity vent valve Test according to ISO 16852:2016 or EN ISO 16852:2016/Proof of conformity with applicable requirements	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following requirements are applicable on board vessels in service: High velocity vent valves shall be - Tested according to ISO 16852:2010 or EN ISO 16852:2010, including the manufacturer's confirmation in line with Directive 94/9/EC or equivalent, if they have been replaced since 1 January 2015 or are on board vessels built or modified since 1 January 2015. - Tested according to EN 12874:2001, including the manufacturer's confirmation in line with Directive 94/9/EC or equivalent, if they have been replaced since 1 January 2001 or are on board vessels built or modified since 1 January 2001. - Of a type approved by the competent authority for the use prescribed if they were replaced before 1 January 2001 or are on board vessels built or modified before 1 January 2001.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
1.2.1	Hold spaces	N.R.M. For Type N open vessels whose hold spaces contain auxiliary appliances and which are carrying only substances of Class 8, with remark 30 in column (20) of Table C of Chapter 3.2. Renewal of the certificate of approval after 31 December 2038.
1.2.1	Limited explosion risk electrical apparatus	N.R.M. Renewal of the certificate of approval after 31 December 2034 Until then, the following requirements apply on board vessels in service: Limited explosion risk electrical apparatus is: - Electrical apparatus which, during normal operation, does not cause sparks or exhibit surface temperatures exceeding 200 °C; or - Electrical apparatus with a spray-water protected housing which, during normal operation, does not exhibit surface temperatures above 200 °C.
1.2.1	Oxygen measuring system Test according to EN 50104:2010	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020
1.2.1	Oxygen meter Test according to EN 50104:2010	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020
1.2.1	Sampling opening Deflagration safety Test according to ISO 16852:2016 or EN ISO 16852:2016/Proof of conformity with applicable requirements	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 The deflagration safety of the sampling opening shall be: - Tested according to ISO 16852:2010 or EN ISO 16852:2010, including the manufacturer's confirmation under Directive 94/9/EC or equivalent, if the sampling opening has been replaced since 1 January 2015 or is on board a vessel built or modified since 1 January 2015. - Tested according to EN 12874:2001, including the manufacturer's confirmation under Directive 94/9/EC or equivalent, if the sampling opening has been replaced since 1 January 2001 or is on board a vessel built or modified since 1 January 2001. - Of a type approved by the competent authority for the use prescribed if the sampling opening was replaced before 1 January 2001 or is on board a vessel built or modified before 1 January 2001.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
1.16.1.4 and 1.16.2.5	Annex to certificate of approval and provisional certificate of approval	Renewal of the certificate of approval after 31 December 2014
7.2.2.6	Approved gas detection system	N.R.M. Renewal of the certificate of approval after 31 December 2010
7.2.2.6	Calibration of gas detection system for n-Hexane	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020
7.2.2.19.3	Vessels used for propulsion Adaptation to new provisions Provisions of 9.3.3.12.4, 9.3.3.51 and 9.3.3.52.1 to 9.3.3.52.8	N.R.M. from 1 January 2019 Renewal of certificate of approval after 31 December 2034
7.2.2.19.4	Vessels of the formation for which explosion protection is required	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following requirements apply to vessels in service: Vessels moving a pushed convoy or a side-by-side formation shall comply with the requirements of the following sections, subsections and paragraphs: 1.16.1.1, 1.16.1.2, 1.16.1.3, 7.2.2.5, 8.1.4, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 9.3.3.0.1, 9.3.3.0.3 (d), 9.3.3.0.5, 9.3.3.10.1, 9.3.3.10.2, 9.3.3.12.4 (a) except the wheelhouse, 9.3.3.12.4 (b) except for the t90 response time, 9.3.3.12.4 (c), 9.3.3.12.6, 9.3.3.16, 9.3.3.17.1 to 9.3.3.17.4, 9.3.3.31.1 to 9.3.3.31.5, 9.3.3.32.2, 9.3.3.34.1, 9.3.3.34.2, 9.3.3.40.1 (although a single fire or ballast pump is sufficient), 9.3.3.40.2, 9.3.3.41, 9.3.3.50.1 (c), 9.3.3.50.2, 9.3.3.51, 9.3.3.52.6, 9.3.3.52.7, 9.3.3.52.8, 9.3.3.56.5, 9.3.3.71 and 9.3.3.74, when at least one vessel of the convoy or side-by-side formation is carrying dangerous goods. Vessels moving only type N open tank vessels do not have to meet the requirements of paragraphs 9.3.3.10.1, 9.3.3.10.2 and 9.3.3.12.6. These derogations shall be specified in the certificate of approval or the provisional certificate of approval as follows: “Permitted derogations”: “Derogation from 9.3.3.10.1, 9.3.3.10.2 and 9.3.3.12.6; the vessel may only move type N open tank vessels.”.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
7.2.3.20.1	Ballast water Prohibition against filling cofferdams with water	N.R.M. Renewal of the certificate of approval after 31 December 2038 Until then, the following requirements apply on board vessels in service: Cofferdams may be filled with water during unloading to provide trim and to permit residue-free drainage as far as possible. When the vessel is underway, cofferdams may be filled with ballast water only when cargo tanks are empty.
7.2.3.20.1	Proof of stability in the event of a leak connected with ballast water	N.R.M. for Type G and Type N vessels. Renewal of the certificate of approval after 31 December 2044.
7.2.3.20.1	Fitting of ballast tanks and compartments with level indicators	N.R.M. after 1 January 2013 for Type C and Type G tank vessels and Type N double hull tank vessels. Renewal of the certificate of approval after 31 December 2012.
7.2.3.31.2	Motor vehicles only outside the cargo area	N.R.M. for Type N vessels. Renewal of the certificate of approval after 31 December 2034 Until then, the following requirement applies on board vessels in service: the vehicle shall not be started on board.
7.2.3.41	Smoking	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020
7.2.3.51.4	Disconnection of non-electrical installations and equipment marked in red	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
7.2.3.51.5	Surface temperature where T4, T5 or T6 are required	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2020
7.2.4.22.3	Sampling from other openings	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2018 Until then, on board vessels in service, cargo tank covers may be opened during loading for control and sampling.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
8.1.2.3 (r), (s), (t), (v)	Documents which must be carried on board	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020 Until that date, in addition to the documents required in accordance with 1.1.4.6, the following documents are required: (a) A plan indicating the boundaries of the cargo area and the location of the electrical equipment installed in that area; (b) A list of the machinery, appliances or other electrical equipment referred to in (a) above, including the following particulars: Machinery or appliance, location, type of protection, type of explosion protection, testing body and approval number; (c) A list of or general plan indicating the electrical equipment located outside the cargo area which may be operated during loading, unloading or gas-freeing. The documents listed above shall bear the stamp of the competent authority issuing the certificate of approval.
8.1.2.3 (u)	Documents which must be carried on board Plan with classification of zones	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034
8.1.6.2.	Hose assemblies	Hose assemblies of previous standards EN 12115:1999, EN 13765:2003 or EN ISO 10380:2003 may be used until 31 December 2018.
8.1.6.3	Verification of the oxygen measuring system	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020
8.1.7.2	Installations, equipment and self-contained protection systems, testing of installations, equipment and self-contained protection systems as well as compliance with the documents referred to in 8.1.2.3 (r) to (v) in respect of the situation on board	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020
8.1.7.2	Marking of installations and equipment to be used in explosion hazardous areas as well as of self-contained protection systems	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2024

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
8.6.1.3 8.6.1.4	Change to certificate of approval	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2018
9.3.2.0.1 (c) 9.3.3.0.1 (c)	Protection of venting piping against corrosion	N.R.M. from 1 January 2001 Renewal of the certificate of approval after 31 December 2034
9.3.1.0.3 (d) 9.3.2.0.3 (d) 9.3.3.0.3 (d)	Fire-resistant materials of accommodation and wheelhouse	N.R.M. Renewal of the certificate of approval after 31 December 2034
9.3.3.8.1	Continuation of class	N.R.M. for Type N open vessels with flame arresters and Type N open vessels. Renewal of the certificate of approval after 31 December 2044. Until then, the following requirements apply on board vessels in service: Except where otherwise provided, the type of construction, the strength, the subdivision, the equipment and the gear of the vessel shall conform or be equivalent to the construction requirements for classification in the highest class of a recognized classification society.
9.3.1.8.4 9.3.2.8.4 9.3.3.8.4	Compliance with the documents in 8.1.3.2 (r) to (v)	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2018
9.3.1.10.1 9.3.2.10.1 9.3.3.10.1	Penetration of gases and liquids into the wheelhouse Windows that can be opened	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2024
9.3.1.10.2 9.3.2.10.2 9.3.3.10.2	Height of protective coaming	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2020
9.3.1.10.3 9.3.2.10.3 9.3.3.10.3	Protection wall	N.R.M. from 1 January 2019 Renewal of certificate of approval after 31 December 2024
9.3.1.10.4 9.3.2.10.4 9.3.3.10.4	Door coamings, etc.	N.R.M. Renewal of the certificate of approval after 31 December 2034 Until then, the following requirements apply on board vessels in service, with the exception of Type N open vessels: This requirement may be met by fitting vertical protection walls not less than 0.50 m in height. Until then, on board vessels in service less than 50.00 m long, the height of 0.50 m may be reduced to 0.30 m in passageways leading to the deck.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.11.1 (b)	Ratio of length to diameter of pressure cargo tanks	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.3.11.1 (d)	Limitation of length of cargo tanks	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.1.11.2 (a)	Arrangement of cargo tanks Distance between cargo tanks and side walls Height of saddles	N.R.M. for Type G vessels whose keels were laid before 1 January 1977. Renewal of the certificate of approval after 31 December 2044
9.3.1.11.2 (a)	Arrangement of cargo tanks Distance between cargo tanks and side walls Height of saddles	N.R.M. Renewal of the certificate of approval after 31 December 2044 Until then, the following requirements apply on board vessels in service whose keels were laid after 31 December 1976: Where tank volume is more than 200 m^3 or where the ratio of length to diameter is less than 7 but more than 5, the hull in the tank area shall be such that, in the event of a collision, the tanks remain intact as far as possible. This requirement shall be considered as having been met where, in the tank area, the vessel: - is double-hulled with a distance of at least 80 cm between the side plating and the longitudinal bulkhead - or is designed as follows: (a) Between the gangboard and the top of the floorplates there shall be side stringers at regular intervals of not more than 60 cm; (b) The side stringers shall be supported by web frames spaced at intervals of not more than 2.00 m. The height of the web frames shall be not less than 10% of the depth and in any event not less than 30 cm. They shall be fitted with a face plate made of flat steel having a cross section of not less than 15 cm^2; (c) The side stringers referred to in (a) shall have the same height as the web frames and be fitted with a face plate made of flat steel having a cross section of not less than 7.5 cm^2.
9.3.1.11.2 (a)	Distance between suction wells and floor plates	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.1.11.2 (b) 9.3.2.11.2 (b) 9.3.3.11.2 (a)	Cargo tank fastenings	N.R.M. Renewal of the certificate of approval after 31 December 2044

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.11.2 (c) 9.3.2.11.2 (c) 9.3.3.11.2 (b)	Capacity of suction well	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.1.11.2 (d) 9.3.2.11.2 (d)	Side struts between the hull and the cargo tanks	N.R.M. from 1 January 2001 Renewal of the certificate of approval after 31 December 2044
9.3.3.11.2 (d)	Side struts between the hull and the cargo tanks	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2044
9.3.1.11.3 (a)	End bulkheads of cargo area with “A-60” insulation. Distance of 0.50 m from cargo tanks to end bulkheads	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.2.11.3 (a) 9.3.3.11.3 (a)	Width of cofferdams of 0.60 m Hold spaces with cofferdams or “A-60” insulated bulkheads Distance of 0.50 m from cargo tanks in hold spaces	N.R.M. Renewal of the certificate of approval after 31 December 2044 Until then, the following requirements apply on board vessels in service: Type C: minimum width of cofferdams: 0.50 m; Type N: minimum width of cofferdams: 0.50 m; on board vessels with a deadweight of up to 150 t: 0.40 m; Type N open: cofferdams shall not be required on board vessels with a deadweight up to 150 t and oil separator vessels: The distance between cargo tanks and end bulkheads of hold spaces shall be at least 0.40m.
9.3.3.11.4	Penetrations through the end bulkheads of hold spaces	N.R.M. from 1 January 2005 for Type N open vessels whose keels were laid before 1 January 1977. Renewal of the certificate of approval after 31 December 2044.
9.3.3.11.4	Distance of piping in relation to the bottom	N.R.M. from 1 January 2005 Renewal of the certificate of approval after 31 December 2038
9.3.3.11.4	Shut-off devices of the loading and unloading piping in the cargo tank from which they come	N.R.M. from 1 January 2005 Renewal of the certificate of approval after 31 December 2018
9.3.3.11.6 (a)	Form of cofferdam arranged as a pump room	N.R.M for Type N vessels whose keels were laid before 1 January 1977. Renewal of the certificate of approval after 31 December 2044.
9.3.3.11.7	Distance between the cargo tanks and the outer wall of the vessel	N.R.M. after 1 January 2001 Renewal of the certificate of approval after 31 December 2038

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.3.11.7	Width of double hull	N.R.M. after 1 January 2007 Renewal of the certificate of approval after 31 December 2038
9.3.1.11.7	Distance between the suction well and the bottom spaces	N.R.M. after 1 January 2003 Renewal of the certificate of approval after 31 December 2038
9.3.3.11.8	Arrangement of service spaces located in the cargo area below decks	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2038.
9.3.1.11.8 9.3.3.11.9	Dimensions of openings for access to spaces within the cargo area	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.11.8 9.3.2.11.10 9.3.3.11.9	Interval between reinforcing elements	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.2.12.1 9.3.3.12.1	Ventilation openings in hold spaces	N.R.M. from 1 January 2003 Renewal of the certificate of approval after 31 December 2018
9.3.1.12.2 9.3.3.12.2	Ventilation systems in double-hull spaces and double bottoms	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.12.3 9.3.2.12.3 9.3.3.12.3	Height above the deck of the air intake for service spaces located below deck	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.12.4 9.3.2.12.4 9.3.3.12.4	Ventilation of the wheelhouse	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2024
9.3.1.12.4 9.3.2.12.4 9.3.3.12.4	Equipment in the accommodation, wheelhouse and service spaces where surface temperatures can be higher than those mentioned in 9.3.x.51 (a)	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.3.1.12.4 9.3.2.12.4 9.3.3.12.4	Equipment in the wheelhouse where surface temperatures can be higher than those mentioned in 9.3.x.51 (a) or involving the use of electrical equipment which does not meet the requirements of 9.3.x.52.1	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.12.4 9.3.3.12.4	Electrical installations and equipment used during loading, unloading, gas-freeing and when in the immediate vicinity of or within an onshore assigned zone	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, on board type G and type N vessels whose keels were laid before 1 January 1977, all electrical equipment except the lighting installations in accommodation, radio telephone installations in the accommodation and the wheelhouse and combustion engine control appliances, shall meet the following requirements: Generators, engine, etc.: IP 13 protection mode Switchboards, switches near entrances to accommodation, etc.: IP23 protection mode Appliances, etc.: IP 55 protection mode
9.3.1.12.4 9.3.2.12.4 9.3.3.12.4	Non-electrical installations and equipment used during loading, unloading, degassing and when in the immediate vicinity of or within an onshore assigned zone	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.3.1.12.4 (b) 9.3.2.12.4 (b) 9.3.3.12.4 (b)	Gas detection system: T90-time	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.3.1.12.4 9.3.2.12.4 9.3.3.12.4	Alarms outstanding	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2024
9.3.1.12.6 9.3.2.12.6 9.3.3.12.6	Distance between ventilation inlets in the wheelhouse and the cargo area	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.3.1.12.6 9.3.2.12.6 9.3.3.12.6	Distance between ventilation openings of accommodation and service spaces and the cargo area	N.R.M. from 1 January 2003 Renewal of certificate of approval after 31 December 2034
9.3.1.12.6 9.3.2.12.6 9.3.3.12.6	Permanently installed devices according to 9.3.x.40.2.2 (c)	N.R.M. from 1 January 2003 Renewal of certificate of approval after 31 December 2018
9.3.1.13 9.3.3.13	Stability (general)	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.3.13.3 paragraph 2	Stability (general)	N.R.M. from 1 January 2007 Renewal of the certificate of approval after 31 December 2044

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.14 9.3.3.14	Stability (intact)	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.1.15	Stability (damaged condition)	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.3.15	Stability (damaged condition)	N.R.M. after 1 January 2007 Renewal of the certificate of approval after 31 December 2044
9.3.1.16.1 9.3.3.16.1	Distance of openings of engine rooms from the cargo area	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.3.16.1	Internal combustion engines outside the cargo area	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2034.
9.3.1.16.2 9.3.3.16.2	Hinges of doors facing the cargo area	N.R.M. for vessels whose keels were laid before 1 January 1977 where alterations would obstruct other major openings. Renewal of the certificate of approval after 31 December 2034.
9.3.3.16.2	Engine rooms accessible from the deck	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2034.
9.3.1.17.1 9.3.3.17.1	Accommodation and wheelhouse outside the cargo area	N.R.M. for vessels whose keels were laid before 1 January 1977, provided that there is no connection between the wheelhouse and other enclosed spaces. Renewal of the certificate of approval after 31 December 2044. Renewal of the certificate of approval after 31 December 2044 for vessels up to 50 m in length whose keels were laid before 1 January 1977 and whose wheelhouses are located in the cargo area even if it provides access to another enclosed space, provided that safety is ensured by appropriate service requirements of the competent authority.
9.3.3.17.1	Accommodation and wheelhouse outside the cargo area	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2044.
9.3.1.17.2 9.3.2.17.2 9.3.3.17.2	Arrangement of entrances and openings of forward superstructures	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.1.17.2 9.3.2.17.2 9.3.3.17.2	Entrances facing the cargo area	N.R.M. for vessels up to 50 m in length whose keels were laid before 1 January 1977, provided that gas screens are installed. Renewal of the certificate of approval after 31 December 2044.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.3.17.2	Entrances and openings	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2044.
9.3.1.17.4 9.3.3.17.4	Distance of openings from the cargo area	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2018.
9.3.3.17.5 (b), (c)	Approval of shaft passages and displaying of instructions	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2018.
9.3.1.17.6 9.3.2.17.6 9.3.3.17.6	Distance between the ventilation inlets in the pump-room and the wheelhouse	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034

9.3.1.17.6
9.3.3.17.6
	Pump-room below deck	N.R.M.
		Renewal of the certificate of approval after 31 December 2018
		Until then, the following requirements apply on board vessels in service:
		Pump-rooms below deck shall
		- meet the requirements for service spaces:
		  - for Type G vessels: 9.3.1.12.3
		  - for Type N vessels: 9.3.3.12.3
		- be equipped with a gas detection system referred to in 9.3.1.17.6 or 9.3.3.17.6

9.3.1.17.6 9.3.2.17.6 9.3.3.17.6	Oxygen measuring system Minimum value for the alarm	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2020
9.3.1.17.6 9.3.2.17.6 9.3.3.17.6	Alarms outstanding	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2024
9.3.2.20.1 9.3.3.20.1	Access to cofferdams or cofferdam compartments	N.R.M. from 1 January 2015 Renewal of the certificate of approval after 31 December 2034
9.3.2.20.2 9.3.3.20.2	Intake valve	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.3.20.2	Filling of cofferdams with pump	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2018.
9.3.2.20.2 9.3.3.20.2	Filling of cofferdams within 30 minutes	N.R.M. Renewal of the certificate of approval after 31 December 2018

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.2.20.4 9.3.3.20.4	Explosion group/subgroup	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2024
9.3.1.21.3 9.3.2.21.3 9.3.3.21.3	Marking on each level gauge of all permissible maximum filling levels of cargo tanks	N.R.M. from 1 January 2015 Renewal of the certificate of approval after 31 December 2018
9.3.3.21.1 (b)	Liquid level gauge	N.R.M. from 1 January 2005 for vessels of Type N open with flame-arresters and those of Type N open. Renewal of the certificate of approval after 31 December 2018. Until then, on board vessels in service fitted with gauging openings, such openings shall: - Be arranged so that the degree of filling can be measured using a sounding rod; - Be fitted with an automatically-closing cover.
9.3.3.21.1 (g)	Sampling opening	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2018.
9.3.2.21.1 (g) 9.3.3.21.1 (g)	Explosion group/subgroup	N.R.M. From 1 January 2019 Renewal of certificate of approval after 31 December 2024
9.3.1.21.4 9.3.2.21.4 9.3.3.21.4	Liquid-level alarm device independent from the liquid-level gauge	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.21.5 (a) 9.3.2.21.5 (a) 9.3.3.21.5 (a)	Socket close to the shore connections of the loading and unloading piping and switching off of vessel's pump	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.21.5 (b) 9.3.2.21.5 (b) 9.3.3.21.5 (d)	Installation of on-board pump switch-off from the shore	N.R.M. Renewal of the certificate of approval after 31 December 2006
9.3.2.21.5 (c)	Device for rapid shutting off of refuelling	N.R.M. Renewal of the certificate of approval after 31 December 2008
9.3.1.21.7 9.3.2.21.7 9.3.3.21.7	Alarms outstanding	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2024
9.3.1.21.7 9.3.2.21.7 9.3.3.21.7	Vacuum or over-pressure alarms in cargo tanks for the carriage of substances without remark 5 in column (20) of Table C of Chapter 3.2	N.R.M. from 1 January 2001 Renewal of the certificate of approval after 31 December 2018

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.21.7 9.3.2.21.7 9.3.3.21.7	Temperature alarms in cargo tanks	N.R.M. from 1 January 2001 Renewal of the certificate of approval after 31 December 2018
9.3.1.22.1 (b)	Height of cargo tank openings above the deck	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.3.22.1 (b)	Cargo tank openings 0.50 m above the deck	N.R.M. Renewal of the certificate of approval after 31 December 2044 for vessels whose keels were laid before 1 January 1977.
9.3.1.22.4	Prevention of spark-formation by closure devices	N.R.M. from 1 January 2003 Renewal of the certificate of approval after 31 December 2018
9.3.1.22.3 9.3.2.22.4 (a) 9.3.3.22.4 (a)	Position of exhaust outlets of pressure relief valves/high velocity vent valves above the deck	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.2.22.4 (a) 9.3.3.22.4 (e)	Set pressure of relief valve/high-velocity vent valve	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.2.22.4 (e) 9.3.3.22.4 (d)	Explosion group/subgroup	N.R.M. From 1 January 2019 Renewal of certificate of approval after 31 December 2024
9.3.3.23.2	Test pressure for cargo tanks	N.R.M. for vessels whose keels were laid before 1 January 1977, for which a test pressure of 15 kPa (0.15 bar) is required. Renewal of the certificate of approval after 31 December 2044. Until then, a test pressure of 10 kPa (0.10 bar) shall be sufficient.
9.3.3.23.2	Test pressure for cargo tanks	N.R.M. for oil-separator vessels in service before 1 January 1999. Renewal of the certificate of approval after 31 December 2044. Until then, a test pressure of 5 kPa (0.05 bar) is sufficient.
9.3.3.23.3	Test pressure for piping for loading and unloading	N.R.M. for oil-separator vessels in service before 1 January 1999. Renewal of the certificate of approval at the latest by 1 January 2039. Until then, a test pressure of 400 kPa (4 bar) is sufficient.
9.3.2.25.1 9.3.3.25.1	Shut-down of cargo pumps	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.25.1 9.3.2.25.1 9.3.3.25.1	Distance of pumps, etc. from accommodation, etc.	N.R.M. Renewal of the certificate of approval after 31 December 2044

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.25.2 (d) 9.3.2.25.2 (d)	Position of loading and unloading piping on deck	N.R.M. Renewal of the certificate of approval after 31 December 2044
9.3.1.25.2 (e) 9.3.2.25.2 (e) 9.3.3.25.2 (e)	Distance of shore connections from accommodation, etc.	N.R.M. Renewal of the certificate of approval after 31 December 2034
9.3.2.25.2 (i)	Piping for loading and unloading, and venting piping, shall not have flexible connections fitted with sliding seals.	N.R.M. from 1 January 2009 Vessels in service having connections with sliding seals may no longer transport substances with toxic or corrosive properties (see column (5) of Table C of Chapter 3.2, hazards 6.1 and 8) following the renewal of the certificate of approval after 31 December 2008. Vessels in service shall not have flexible connections fitted with sliding seals following the renewal of the certificate of approval after 31 December 2018
9.3.3.25.2 (h)	Piping for loading and unloading, and venting piping, shall not have flexible connections fitted with sliding seals	N.R.M. from 1 January 2009 Vessels in service having connections with sliding seals may no longer transport substances with corrosive properties (see column (5) of Table C of Chapter 3.2, hazard 8) following the renewal of the certificate of approval after 31 December 2008. Vessels in service shall not have flexible connections with sliding seals following the renewal of the certificate of approval after 31 December 2018.
9.3.2.25.8 (a)	Ballasting suction pipes located within the cargo area but outside the cargo tanks	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.2.25.9 9.3.3.25.9	Loading and unloading flow	N.R.M. from 1 January 2003 Renewal of the certificate of approval after 31 December 2018
9.3.3.25.12	9.3.3.25.1 (a) and (c), 9.3.3.25.2 (e), 9.3.3.25.3 and 9.3.3.25.4 (a) are not applicable for Type N open with the exception of Type N open carrying corrosive substances (see Chapter 3.2, Table C, column (5), hazard 8)	N.R.M. Renewal of the certificate of approval after 31 December 2018 This time limit concerns only Type N open vessels carrying corrosive substances (see Chapter 3.2, Table C, column (5), hazard 8).
9.3.2.26.2 9.3.3.26.2 (b)	Explosion group/subgroup	N.R.M. From 1 January 2019 Renewal of certificate of approval after 31 December 2024
9.3.1.31.2 9.3.2.31.2 9.3.3.31.2	Distance of engine air intakes from the cargo area	N.R.M. Renewal of the certificate of approval after 31 December 2044

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.31.5 9.3.2.31.5 9.3.3.31.5	Temperature in the engine room	N.R.M. Renewal of the certificate of approval after 31 December 2018 Until then, the following requirements apply on board vessels in service: The temperature in the engine room shall not exceed 45 °C.
9.3.3.34.1	Exhaust pipes	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.35.1 9.3.3.35.1	Stripping and ballast pumps in the cargo area	N.R.M. Renewal of the certificate of approval after 31 December 2034
9.3.3.35.3	Suction pipes for ballasting located within the cargo area but outside the cargo tanks	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.35.4	Stripping installation of the pump-room outside the pump-room	N.R.M. from 1 January 2003 Renewal of the certificate of approval after 31 December 2018
9.3.1.40.1 9.3.2.40.1 9.3.3.40.1	Fire extinguishing systems, two pumps, etc.	N.R.M. Renewal of the certificate of approval after 31 December 2018
9.3.1.40.2 9.3.2.40.2 9.3.3.40.2	Fixed fire extinguishing system in engine room	N.R.M. Renewal of the certificate of approval after 31 December 2034
9.3.1.41.1 9.3.3.41.1	Outlets of funnels located not less than 2 m from the cargo area	N.R.M. Renewal of the certificate of approval after 31 December 2044 for vessels whose keels were laid before 1 January 1977.
9.3.3.41.1	Outlets of funnels	N.R.M. at the latest by 1 January 2039 for oil-separator vessels
9.3.1.41.2 9.3.2.41.2 9.3.3.41.2 in conjunction with 7.2.3.41	Heating, cooking and refrigerating appliances	N.R.M. Renewal of the certificate of approval after 31 December 2010
9.3.3.42.2	Cargo heating system	N.R.M for Type N open vessels. Renewal of the certificate of approval after 31 December 2034. Until then, the following requirements apply on board vessels in service: This can be achieved by one oil separator fitted to the condensed water return pipe.

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.51 (a) 9.3.2.51 (a) 9.3.3.51 (a)	The surface temperature of non-electrical installations and equipment shall not exceed 200 °C	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.3.1.51 (b) 9.3.2.51 (b) 9.3.3.51 (b)	Surface temperature of outer parts of engines and of their air inlets and exhaust ducts	N.R.M. Renewal of the certificate of approval after 31 December 2018 Until then, the following requirements apply on board vessels in service: The temperature of outer parts shall not exceed 300 °C.
9.3.1.52.1 9.3.2.52.1 9.3.3.52.1	Electrical installations and equipment of the limited explosion risk type	N.R.M. Renewal of certificate of approval after 31 December 2034 Until that date, the following documents are required for electrical equipment used during loading, unloading and gas-freeing of vessels in service whose keels were laid after 1 January 1995: 9.3.1.52.3, 9.3.2.52.3 and 9.3.3.52.3 of the version of ADN in force until 31 December 2018
9.3.1.52.1 9.3.3.52.1	Electrical installations and equipment of the limited explosion risk type	N.R.M. Renewal of the certificate of approval after 31 December 2034 Until that date, on board vessels whose keels were laid before 1 January 1977, all electrical equipment except the lighting installations in the accommodation, radio telephone installations in the accommodation and the wheelhouse and combustion engine control appliances in use during loading, unloading and gas-freeing shall meet the following requirements: Generators, engines, switchboards, lighting, etc.: IP 13 protection mode Appliances, etc.: IP 55 protection mode
9.3.3.52.1	Electrical installations in operation during a stay in the immediate vicinity of or within an onshore assigned zone	N.R.M. from 1 January 2019 for open Type N vessels Renewal of certificate of approval after 31 December 2034
9.3.3.52.2	Electrical installations/echo sounding devices	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2034.
9.3.3.52.3	Electrical installations and equipment: marking in red	N.R.M. from 1 January 2019 for open Type N vessels Renewal of certificate of approval after 31 December 2034
9.3.1.52.3 9.3.2.52.3 9.3.3.52.3 last sentence	Disconnection of such installations from a centralized location	N.R.M. Renewal of the certificate of approval after 31 December 2034

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.52.4 9.3.2.52.4 9.3.3.52.4	Visual and audible alarm	N.R.M. Renewal of the certificate of approval after 31 December 2034
9.3.3.52.6	Shutting down multipolar switch for continuously driven generator	N.R.M. for Type N open vessels Renewal of the certificate of approval after 31 December 2034
9.3.3.52.9	Permanently fitted sockets	N.R.M. for Type N open vessels Renewal of the certificate of approval after 31 December 2034
9.3.3.52.10	Accumulators located outside the cargo area	N.R.M. for Type N open vessels. Renewal of the certificate of approval after 31 December 2034.
9.3.1.53.1 9.3.2.53.1 9.3.3.53.1	Type and location of electrical installations and equipment intended to be used in explosion hazardous areas Zone 0, Zone 1	N.R.M. from 1 January 2019 Renewal of certificate of approval after 31 December 2034 Until that date, the following requirements are applicable: (a) In cargo tanks and piping for loading and unloading, only measuring, regulation and alarm devices of the EEx (ia) type of protection may be installed. (b) Electrical equipment on deck in the cargo area and the measuring, regulation and alarm apparatus, motors driving essential equipment such as ballast pumps in the cofferdams, double-hull spaces, double bottoms, hold spaces and service spaces below deck in the cargo area shall be checked and approved by the competent authority with respect to the safety of operation in an explosive atmosphere, for example, intrinsically safe apparatus, flameproof enclosure apparatus, apparatus protected by pressurization, powder filling apparatus, apparatus protected by encapsulation and increased safety apparatus. (c) In the cofferdams, double-hull spaces, double bottoms, hold spaces and service spaces below deck in the cargo area, the lighting appliances must have the “flame-proof enclosure” or “apparatus protected by pressurization” type of protection. (d) The control and protective equipment of the equipment referred to in (a), (b) and (c) above shall be located outside the cargo area if they are not intrinsically safe. For the selection of electrical equipment, the explosion groups and temperature classes assigned to the substances carried in the list of substances shall be taken into consideration (see columns (15) and (16) of Table C of Chapter 3.2).

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
		Until that date, the following requirements apply on board vessels in service whose keels were laid after 31 December 1977: Until that date, the following conditions shall be met during loading, unloading and gas freeing on board vessels having non-gastight wheelhouse openings (e.g. doors, windows, etc.) in the cargo area: (a) All electrical equipment to be used in the wheelhouse shall be of a limited explosion-risk type, i.e., it shall be so designed that there is no sparking and the temperature of its outer surface does not rise above 200 °C during normal operation, or it shall be of a type protected against water jets and designed in such a way that its surface temperature may not exceed 200 °C during normal operation. (b) Electrical equipment which does not meet the requirements of (a) above shall be marked in red and it shall be possible to switch it off by means of a central switch.
9.3.1.53.1 9.3.2.53.1 9.3.3.53.1	Type and location of electrical installations and equipment intended to be used in explosion hazardous areas Zone 2	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.3.1.53.1 9.3.2.53.1 9.3.3.53.1	Temperature class and explosion group of non-electrical installations and equipment	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.3.1.53.1 9.3.2.53.1 9.3.3.53.1	Temperature class and explosion group of electrical installations and equipment	N.R.M. From 1 January 2019 Renewal of the certificate of approval after 31 December 2034
9.3.1.53.2 9.3.3.53.2	Metallic sheaths for all electric cables in the cargo area	N.R.M. for vessels whose keels were laid before 1 January 1977. Renewal of the certificate of approval after 31 December 2034.
9.3.3.53.2	Metallic sheaths for all electric cables in the cargo area	N.R.M. by 1 January 2039 at the latest for oil-separator vessels.
9.3.1.53.5 9.3.2.53.5 9.3.3.53.5	Movable electric cables (sheathed, type H 07 RN-F)	N.R.M. from 1 January 2019 Renewal of the certificate of approval after 31 December 2034 Until that date, the following provisions apply on board vessels in service: Until that date, movable electric cables (sheathed, type H 07 RN-F) must comply with IEC 60245-4:1994

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1.6.7.2.2.2 Table of general transitional provisions: Tank vessels		
Paragraphs	Subject	Time limit and comments
9.3.1.60 9.3.2.60 9.3.3.60	A spring-loaded non-return valve shall be fitted. The water shall meet the quality of drinking water on board.	N.R.M. Renewal of the certificate of approval after 31 December 2018

1.6.7.2.2.3 Transitional provisions concerning the application of the requirements of Table C of Chapter 3.2 to the carriage of goods in tank vessels.

1.6.7.2.2.3.1 The goods for which Type N closed with a minimum valve setting of 10 kPa (0.10 bar) is required in Table C of Chapter 3.2, may be carried in tank-vessels in service of Type N closed with a minimum valve setting of 6 kPa (0.06 bar) (cargo tank test pressure of 10 kPa (0.10 bar)). This transitional provision is valid until 31 December 2018.

1.6.7.2.2.3.2 and 1.6.7.2.2.3.3 (*Deleted*)

1.6.7.2.2.4 (*Deleted*)

1.6.7.2.2.5 For a vessel or a barge whose keel was laid before 1 January July 2017 and which does not conform to the requirements of 9.3.X.1 concerning the vessel record, the retention of files for the vessel record shall start at the latest at the next renewal of the certificate of approval.

1.6.7.3 ***Supplementary transitional provisions applicable to specific inland waterways***

Vessels in service to which the transitional provisions of this subsection are applied shall meet:

– the requirements of paragraphs and subparagraphs mentioned in the table below and in the table of general transitional provisions (see 1.6.7.2.1.1 and 1.6.7.2.2.1) within the period established therein;

– the requirements of paragraphs and subparagraphs not mentioned in the table below or in the table of general transitional provisions at the date of application of these Regulations.

The construction and equipment of vessels in service shall be maintained at least at the previous standard of safety.

Table of supplementary transitional provisions		
Paragraph	Subject	Time limit and comments
9.1.0.11.1 (b)	Holds, common bulkheads with oil fuel tanks	N.R.M. The following requirements apply on board vessels in service: Holds may share a common bulkhead with the oil fuel tanks, provided that the cargo or its packaging does not react chemically with the fuel.

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Table of supplementary transitional provisions		
Paragraph	Subject	Time limit and comments
9.1.0.92	Emergency exit	N.R.M. The following requirements apply on board vessels in service: Spaces the entrances or exits of which are partly or fully immersed in damaged condition shall be provided with an emergency exit not less than 0.075 m above the damage waterline.
9.1.0.95.1 (c)	Height of openings above damage waterline	N.R.M. The following requirements apply on board vessels in service: The lower edge of any non-watertight openings (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.075 m above the damage waterline.
9.1.0.95.2 9.3.2.15.2	Extent of the stability diagram (damaged condition)	N.R.M. The following requirements apply on board vessels in service: At the final stage of flooding the angle of heel shall not exceed: 20° before measures to right the vessel; 12° following measures to right the vessel.
9.3.3.8.1	Classification	N.R.M. for Type N open vessels with flame arresters and Type N open vessels. Renewal of the certificate of approval after 31 December 2044.
9.3.1.11.1 (a) 9.3.2.11.1 (a) 9.3.3.11.1 (a)	Maximum capacity of cargo tanks	N.R.M. The following requirements apply on board vessels in service: The maximum permissible capacity of a cargo tank shall be 760 m^3.
9.3.2.11.1 (d)	Length of cargo tanks	N.R.M. The following requirements apply on board vessels in service: The length of a cargo tank may exceed 10 m and 0.2 L.
9.3.1.12.3 9.3.2.12.3 9.3.3.12.3	Position of air inlets	N.R.M. The following requirements apply on board vessels in service: The air inlets to be positioned at least 5.00 m from the safety-valve outlets

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Table of supplementary transitional provisions		
Paragraph	Subject	Time limit and comments
9.3.2.15.1 (c)	Height of openings above damage waterline	N.R.M. The following requirements apply on board vessels in service: The lower edge of any non-watertight openings (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.075 m above the damage waterline.
9.3.2.20.2 9.3.3.20.2	Filling of cofferdams with water	N.R.M. The following requirements apply on board vessels in service: Cofferdams shall be fitted with a system for filling with water or inert gas.
9.3.1.92 9.3.2.92	Emergency exit	N.R.M. The following requirements apply on board vessels in service: Spaces the entrances or exits of which are partly or fully immersed in damaged condition shall be provided with an emergency exit not less than 0.075 m above the damage waterline.

1.6.7.4 ***Transitional provisions concerning the transport of substances hazardous to the environment or to health***

1.6.7.4.1 *Transitional provisions: vessels*

Supply vessels and oil separator vessels in service on 1 January 2009 with a dead weight on 1 January 2007 of less than 300 tonnes may continue to transport the substances they were authorized to carry on 31 December 2008 until 31 December 2038.

1.6.7.4.2 *(Deleted)*

1.6.7.5 ***Transitional provisions concerning the modification of tank vessels***

1.6.7.5.1 The modification of the cargo area of a vessel in order to achieve a Type N double-hull vessel is admissible until 31 December 2018 under the following conditions:

(a) The modified or new cargo area shall comply with the provisions of ADN. Transitional provisions under 1.6.7.2.2 may not be applied for the cargo area;

(b) The vessel parts outside of the cargo area shall comply with the provisions of ADN. Moreover, the following transitional provisions under 1.6.7.2.2 may be applied: 1.2.1, 9.3.3.0.3 (d), 9.3.3.51.3 and 9.3.3.52.4 last sentence;

(c) If goods which require explosion protection are entered in the list according to 1.16.1.2.5, accommodation and wheelhouses shall be equipped with a fire alarm system according to 9.3.3.40.2.3;

(d) The application of this sub-section shall be entered in the certificate of approval under No. 12 (Additional observations).

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1.6.7.5.2 Modified vessels may continue to be operated beyond 31 December 2018. The time limits stipulated in the applied transitional provisions under 1.6.7.2.2 shall be observed.

1.6.7.6 ***Transitional provisions concerning the transport of gases in tank vessels***

Tank vessels in service on 1 January 2011 with a pump room below deck may continue to transport the substances listed in the following table until the renewal of the certificate of approval after 1 January 2045.

UN No. or ID No.	Class and classification code	Name and description
1005	2, 2TC	AMMONIA, ANHYDROUS
1010	2, 2F	1,2-BUTADIENE, STABILIZED
1010	2, 2F	1,3-BUTADIENE, STABILIZED
1010	2, 2F	BUTADIENE STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, having a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l
1011	2, 2F	BUTANE
1012	2, 2F	1-BUTYLENE
1020	2,2A	CHLOROPENTAFLUOROETHANE (REFRIGERANT GAS R 115)
1030	2,2F	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)
1033	2,2F	DIMETHYL ETHER
1040	2,2TF	ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 °C
1055	2,2F	ISOBUTYLENE
1063	2,2F	METHYL CHLORIDE (REFRIGERANT GAS R 40)
1077	2,2F	PROPYLENE
1083	2,2F	TRIMETHYLAMINE, ANHYDROUS
1086	2,2F	VINYL CHLORIDE, STABILIZED
1912	2,2F	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A)
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A0)
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A01)
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A02)
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A1)
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE B)
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE B1)
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE B2)
1965	2,2F	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE C)
1969	2,2F	ISOBUTANE
1978	2,2F	PROPANE
9000		AMMONIA, ANHYDROUS, DEEPLY REFRIGERATED

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1.6.8 Transitional provisions concerning training of the crew

1.6.8.1 The responsible master and the person responsible for the loading or unloading of a barge shall be in possession of a certificate of special knowledge with the entry "The holder of this certificate has participated in an 8-lesson stability training" before 31 December 2019.

The condition for this entry is participation in a basic course required by the Regulations in force after 1 January 2013 or participation in a basic refresher course that, in derogation from 8.2.2.5, comprises 24 lessons of 45 minutes, including eight lessons devoted to the subject of stability.

Until 31 December 2018, the expert on the carriage of gases (as referred to in 8.2.1.5) does not have to be the responsible master (as referred to in 7.2.3.15) but can be any member of the crew when the type G tank vessel is only carrying UN No. 1972. In this case, the responsible master shall have attended the specialization course on gases and shall also have followed an additional training on the carriage of liquefied natural gas (LNG) in accordance with 1.3.2.2.

1.6.8.2 Instead of issuing certificates of special knowledge of ADN in accordance with 8.2.2.8.2 and 8.6.2, Contracting Parties may, until 31 December 2021, issue certificates according to the model applicable until 31 December 2018. Such certificates shall be valid until the expiry of their validity of five years.

1.6.9 Transitional provisions concerning recognition of classification societies

1.6.9.1 The provisions of 1.15.3.8 concerning the maintenance of an effective system of internal quality by the recommended classification societies still applicable on 31 December 2015 may continue to be applied until 14 September 2018.

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CHAPTER 1.7

GENERAL PROVISIONS CONCERNING RADIOACTIVE MATERIAL

1.7.1 Scope and application

NOTE 1: *In the event of accidents or incidents during the carriage of radioactive material, emergency provisions, as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment. Appropriate guidelines for such provisions are contained in "Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material", IAEA Safety Standard Series No. TS-G-1.2 (ST-3), IAEA, Vienna (2002).*

NOTE 2: *Emergency procedures shall take into account the formation of other dangerous substances that may result from the reaction between the contents of a consignment and the environment in the event of an accident.*

1.7.1.1 ADN establishes standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the carriage of radioactive material. These standards are based on the IAEA Regulations for the Safe Transport of Radioactive Material, 2012 Edition, IAEA Safety Standards Series No. SSR–6, IAEA, Vienna (2012). Explanatory material can be found in "Advisory material for the IAEA Regulations for the Safe Transport of Radioactive Material (2012 Edition), IAEA Safety Standards Series No. SSG-26, IAEA, Vienna (2014).

1.7.1.2 The objective of ADN is to establish requirements that shall be satisfied to ensure safety and to protect persons, property and the environment from the effects of radiation in the carriage of radioactive material. This protection is achieved by requiring:

(a) Containment of the radioactive contents;

(b) Control of external radiation levels;

(c) Prevention of criticality; and

(d) Prevention of damage caused by heat.

These requirements are satisfied firstly by applying a graded approach to contents limits for packages and vehicles and to performance standards applied to package designs depending upon the hazard of the radioactive contents. Secondly, they are satisfied by imposing conditions on the design and operation of packages and on the maintenance of packagings, including a consideration of the nature of the radioactive contents. Finally, they are satisfied by requiring administrative controls including, where appropriate, approval by competent authorities.

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1.7.1.3 ADN applies to the carriage of radioactive material by inland waterways including carriage which is incidental to the use of the radioactive material. Carriage comprises all operations and conditions associated with and involved in the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of loads of radioactive material and packages. A graded approach is applied to the performance standards in ADN that are characterized by three general severity levels:

(a) Routine conditions of carriage (incident free);

(b) Normal conditions of carriage (minor mishaps);

(c) Accident conditions of carriage.

1.7.1.4 The provisions laid down in ADN do not apply to any of the following:

(a) Radioactive material that is an integral part of the means of transport;

(b) Radioactive material moved within an establishment which is subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;

(c) Radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;

(d) Radioactive material in or on a person who is to be transported for medical treatment because the person has been subject to accidental or deliberate intake of radioactive material or to contamination;

(e) Radioactive material in consumer products which have received regulatory approval, following their sale to the end user;

(f) Natural material and ores containing naturally occurring radionuclides (which may have been processed), provided the activity concentration of the material does not exceed 10 times the values specified in Table 2.2.7.2.2.1, or calculated in accordance with 2.2.7.2.2.2 (a) and 2.2.7.2.2.3 to 2.2.7.2.2.6. For natural materials and ores containing naturally occurring radionuclides that are not in secular equilibrium the calculation of the activity concentration shall be performed in accordance with 2.2.7.2.2.4;

(g) Non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the limit set out in the definition for “contamination” in 2.2.7.1.2.

1.7.1.5 ***Specific provisions for the carriage of excepted packages***

1.7.1.5.1 Excepted packages which may contain radioactive material in limited quantities, instruments, manufactured articles or empty packagings as specified in 2.2.7.2.4.1 shall be subject only to the following provisions of Parts 5 to 7:

(a) The applicable provisions specified in 5.1.2.1, 5.1.3.2, 5.1.5.2.2, 5.1.5.2.3, 5.1.5.4, 5.2.1.10, 7.1.4.14.7.3.1, 7.1.4.14.7.5.1 to 7.1.4.14.7.5.4 and 7.1.4.14.7.7; and

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(b) The requirements for excepted packages specified in 6.4.4 of ADR;

except when the radioactive material possesses other hazardous properties and has to be classified in a class other than Class 7 in accordance with special provision 290 or 369 of Chapter 3.3, where the provisions listed in (a) and (b) above apply only as relevant and in addition to those relating to the main class.

1.7.1.5.2 Excepted packages are subject to the relevant provisions of all other parts of ADN. If the excepted package contains fissile material, one of the fissile exceptions provided by 2.2.7.2.3.5 shall apply and the requirements of 7.1.4.14.7.4.3 shall be met.

1.7.2 Radiation protection programme

1.7.2.1 The carriage of radioactive material shall be subject to a radiation protection programme which shall consist of systematic arrangements aimed at providing adequate consideration of radiation protection measures.

1.7.2.2 Doses to persons shall be below the relevant dose limits. Protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account within the restriction that the doses to individuals be subject to dose constraints. A structured and systematic approach shall be adopted and shall include consideration of the interfaces between carriage and other activities.

1.7.2.3 The nature and extent of the measures to be employed in the programme shall be related to the magnitude and likelihood of radiation exposures. The programme shall incorporate the requirements in 1.7.2.2, 1.7.2.4, 1.7.2.5 and 7.5.11 CV33 (1.1) of ADR. Programme documents shall be available, on request, for inspection by the relevant competent authority.

1.7.2.4 For occupational exposures arising from transport activities, where it is assessed that the effective dose either:

(a) is likely to be between 1 mSv and 6 mSv in a year, a dose assessment programme via work place monitoring or individual monitoring shall be conducted; or

(b) is likely to exceed 6 mSv in a year, individual monitoring shall be conducted.

When individual monitoring or work place monitoring is conducted, appropriate records shall be kept.

NOTE: *For occupational exposures arising from transport activities, where it is assessed that the effective dose is most unlikely to exceed 1mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record keeping need be required.*

1.7.2.5 Workers (see 7.1.4.14.7, NOTE 3) shall be appropriately trained in radiation protection including the precautions to be observed in order to restrict their occupational exposure and the exposure of other persons who might be affected by their actions.

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1.7.3 Management system

1.7.3.1 A management system based on international, national or other standards acceptable to the competent authority shall be established and implemented for all activities within the scope of ADN, as identified in 1.7.1.3, to ensure compliance with the relevant provisions of ADN. Certification that the design specification has been fully implemented shall be available to the competent authority. The manufacturer, consignor or user shall be prepared:

(a) To provide facilities for inspection during manufacture and use; and

(b) To demonstrate compliance with ADN to the competent authority.

Where competent authority approval is required, such approval shall take into account and be contingent upon the adequacy of the management system.

1.7.4 Special arrangement

1.7.4.1 Special arrangement shall mean those provisions, approved by the competent authority, under which consignments which do not satisfy all the requirements of ADN applicable to radioactive material may be transported.

NOTE: *Special arrangement is not considered to be a temporary derogation in accordance with 1.5.1.*

1.7.4.2 Consignments for which conformity with any provision applicable to radioactive material is impracticable shall not be transported except under special arrangement. Provided the competent authority is satisfied that conformity with the radioactive material provisions of ADN is impracticable and that the requisite standards of safety established by ADN have been demonstrated through alternative means the competent authority may approve special arrangement transport operations for single or a planned series of multiple consignments. The overall level of safety in carriage shall be at least equivalent to that which would be provided if all the applicable requirements had been met. For international consignments of this type, multilateral approval shall be required.

1.7.5 Radioactive material possessing other dangerous properties

In addition to the radioactive and fissile properties, any subsidiary hazard of the contents of the package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall also be taken into account in the documentation, packing, labelling, marking, placarding, stowage, segregation and carriage, in order to be in compliance with all relevant provisions for dangerous goods of ADN.

1.7.6 Non-compliance

1.7.6.1 In the event of non-compliance with any limit in ADN applicable to radiation level or contamination,

(a) The consignor, consignee, carrier and any organization involved during carriage who may be affected, as appropriate, shall be informed of the non-compliance by:

(i) by the carrier if the non-compliance is identified during carriage; or

(ii) by the consignee if the non-compliance is identified at receipt;

(b) The carrier, consignor or consignee, as appropriate shall:

(i) take immediate steps to mitigate the consequences of the non-compliance;

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(ii) investigate the non-compliance and its causes, circumstances and consequences;

(iii) take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance; and

(iv) communicate to the competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken;

(c) The communication of the non-compliance to the consignor and competent authority(ies), respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing.

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CHAPTER 1.8

CHECKS AND OTHER SUPPORT MEASURES TO ENSURE COMPLIANCE WITH SAFETY REQUIREMENTS

1.8.1 Monitoring compliance with requirements

1.8.1.1 *General*

1.8.1.1.1 In accordance with Article 4, paragraph 3 of ADN, Contracting Parties shall ensure that a representative proportion of consignments of dangerous goods carried by inland waterways is subject to monitoring in accordance with the provisions of this Chapter, and including the requirements of 1.10.1.5.

1.8.1.1.2 Participants in the carriage of dangerous goods (see Chapter 1.4) shall, without delay, in the context of their respective obligations, provide the competent authorities and their agents with the necessary information for carrying out the checks.

1.8.1.2 *Monitoring procedure*

1.8.1.2.1 In order to carry out the checks provided for in Article 4, paragraph 3 of ADN, the Contracting Parties shall use the checklist developed by the Administrative Committee.* A copy of this checklist shall be given to the master of the vessel. Competent authorities of other Contracting Parties may decide to simplify or refrain from conducting subsequent checks if a copy of the checklist is presented to them. This paragraph shall not prejudice the right of Contracting Parties to carry out specific measures or more detailed checks.

1.8.1.2.2 The checks shall be random and shall as far as possible cover an extensive portion of the inland waterway network.

1.8.1.2.3 When exercising the right to monitor, the authorities shall make all possible efforts to avoid unduly detaining or delaying a vessel.

1.8.1.3 *Infringements of the requirements*

Without prejudice to other penalties which may be imposed, vessels in respect of which one or more infringements of the rules on the transport of dangerous goods by inland waterways are established may be detained at a place designated for this purpose by the authorities carrying out the check and required to be brought into conformity before continuing their journey or may be subject to other appropriate measures, depending on the circumstances or the requirements of safety.

1.8.1.4 *Checks in companies and at places of loading and unloading*

1.8.1.4.1 Checks may be carried out at the premises of undertakings, as a preventive measure or where infringements which jeopardize safety in the transport of dangerous goods have been recorded during the voyage.

1.8.1.4.2 The purpose of such checks shall be to ensure that safety conditions for the transport of dangerous goods by inland waterways comply with the relevant laws.

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* *Note by the secretariat: The model of the checklist can be found on the United Nations Economic Commission for Europe website (http://www.unece.org/trans/danger/danger.html).*

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1.8.1.4.3 *Sampling*

Where appropriate and provided that this does not constitute a safety hazard, samples of the goods transported may be taken for examination by laboratories recognized by the competent authority.

1.8.1.4.4 *Cooperation of the competent authorities*

1.8.1.4.4.1 Contracting Parties shall assist one another in order to give proper effect to these requirements.

1.8.1.4.4.2 Serious or repeated infringements jeopardizing the safety of the transport of dangerous goods committed by a foreign vessel or undertaking shall be reported to the competent authority in the Contracting Party where the certificate of approval of the vessel was issued or where the undertaking is established.

1.8.1.4.4.3 The competent authority of the Contracting Party where serious or repeated infringements have been recorded may ask the competent authority of the Contracting Party where the certificate of approval of the vessel was issued or where the undertaking is established for appropriate measures to be taken with regard to the offender or offenders.

1.8.1.4.4.4 The latter competent authority shall notify the competent authorities of the Contracting Party where the infringements were recorded of any measures taken with regard to the offender or offenders.

1.8.2 Administrative assistance during the checking of a foreign vessel

If the findings of a check on a foreign vessel give grounds for believing that serious or repeated infringements have been committed which cannot be detected in the course of that check in the absence of the necessary data, the competent authorities of the Contracting Parties concerned shall assist one another in order to clarify the situation.

1.8.3 Safety adviser

1.8.3.1 Each undertaking, the activities of which include the consigning or the carriage of dangerous goods by inland waterways, or the related packing, loading, filling or unloading shall appoint one or more safety advisers, hereinafter referred to as “advisers”, for the carriage of dangerous goods, responsible for helping to prevent the risks inherent in such activities with regard to persons, property and the environment.

NOTE: *This obligation does not apply to reception facility operators.*

1.8.3.2 The competent authorities of the Contracting Parties may provide that these requirements shall not apply to undertakings:

(a) the activities of which concern:

(i) The carriage of dangerous goods fully or partially exempted according to the provisions of 1.7.1.4 or of chapters 3.3, 3.4 or 3.5;

(ii) Quantities per transport unit, wagon or container not exceeding those referred to in 1.1.3.6 of ADR or RID;

(iii) When (ii) above is not relevant, quantities per vessel not exceeding those referred to in 1.1.3.6 of these Regulations.

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(b) the main or secondary activities of which are not the carriage or the related packing, filling, loading or unloading of dangerous goods but which occasionally engage in the national carriage or the related packing, filling, loading or unloading of dangerous goods posing little danger or risk of pollution.

1.8.3.3 The main task of the adviser shall be, under the responsibility of the head of the undertaking, to seek by all appropriate means and by all appropriate action, within the limits of the relevant activities of that undertaking, to facilitate the conduct of those activities in accordance with the requirements applicable and in the safest possible way.

With regard to the undertaking's activities, the adviser has the following duties in particular:

– monitoring compliance with the requirements governing the carriage of dangerous goods;

– advising his undertaking on the carriage of dangerous goods;

– preparing an annual report to the management of his undertaking or a local public authority, as appropriate, on the undertaking's activities in the carriage of dangerous goods. Such annual reports shall be preserved for five years and made available to the national authorities at their request.

The adviser's duties also include monitoring the following practices and procedures relating to the relevant activities of the undertaking:

– the procedures for compliance with the requirements governing the identification of dangerous goods being transported;

– the undertaking's practice in taking account, when purchasing means of transport, of any special requirements in connection with the dangerous goods being transported;

– the procedures for checking the equipment used in connection with the carriage, packing, filling, loading or unloading of dangerous goods;

– the proper training of the undertaking's employees, including on the changes to the Regulations, and the maintenance of records of such training;

– the implementation of proper emergency procedures in the event of any accident or incident that may affect safety during the carriage, packing, filling, loading or unloading of dangerous goods;

– investigating and, where appropriate, preparing reports on serious accidents, incidents or serious infringements recorded during the consigning, carriage, packing, filling, loading or unloading of dangerous goods;

– the implementation of appropriate measures to avoid the recurrence of accidents, incidents or serious infringements;

– the account taken of the legal prescriptions and special requirements associated with the carriage of dangerous goods in the choice and use of sub-contractors or third parties;

– verification that employees involved in the carriage, packing, filling, loading or unloading of dangerous goods have detailed operational procedures and instructions,

– the introduction of measures to increase awareness of the risks inherent in the carriage, packing, filling, loading and unloading of dangerous goods;

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– the implementation of verification procedures to ensure the presence on board means of transport of the documents and safety equipment which must accompany transport and the compliance of such documents and equipment with the regulations;

– the implementation of verification procedures to ensure compliance with the requirements governing packing, filling, loading and unloading;

– the existence of the security plan indicated in 1.10.3.2.

1.8.3.4 The safety adviser may also be the head of the undertaking, a person with other duties in the undertaking, or a person not directly employed by that undertaking, provided that that person is capable of performing the duties of adviser.

1.8.3.5 Each undertaking concerned shall, on request, inform the competent authority or the body designated for that purpose by each Contracting Party of the identity of its adviser.

1.8.3.6 Whenever an accident affects persons, property or the environment or results in damage to property or the environment during carriage, packing, filling, loading or unloading carried out by the undertaking concerned, the safety adviser shall, after collecting all the relevant information, prepare an accident report to the management of the undertaking or to a local public authority, as appropriate. That report shall not replace any report by the management of the undertaking which might be required under any other international or national legislation.

1.8.3.7 A safety adviser shall hold a vocational training certificate, valid for transport by inland waterways. That certificate shall be issued by the competent authority or the body designated for that purpose by each Contracting Party.

1.8.3.8 To obtain a certificate, a candidate shall undergo training and pass an examination approved by the competent authority of the Contracting Party.

1.8.3.9 The main aims of the training shall be to provide candidates with sufficient knowledge of the risks inherent in the carriage packing, filling, loading or unloading of dangerous goods, of the applicable laws, regulations and administrative provisions and of the duties listed in 1.8.3.3.

1.8.3.10 The examination shall be organized by the competent authority or by an examining body designated by the competent authority. The examining body shall not be a training provider.

The examining body shall be designated in writing. This approval may be of limited duration and shall be based on the following criteria:

– competence of the examining body;

– specifications of the form of the examinations the examining body is proposing, including, if necessary, the infrastructure and organisation of electronic examinations in accordance with 1.8.3.12.5, if these are to be carried out;

– measures intended to ensure that examinations are impartial;

– independence of the body from all natural or legal persons employing safety advisers.

1.8.3.11 The aim of the examination is to ascertain whether candidates possess the necessary level of knowledge to carry out the duties incumbent upon a safety adviser as listed in 1.8.3.3, for the purpose of obtaining the certificate prescribed in subsection 1.8.3.7, and it shall cover at least the following subjects:

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(a) Knowledge of the types of consequences which may be caused by an accident involving dangerous goods and knowledge of the main causes of accidents;

(b) Requirements under national law, international conventions and agreements, with regard to the following in particular:

- classification of dangerous goods (procedure for classifying solutions and mixtures, structure of the list of substances, classes of dangerous goods and principles for their classification, nature of dangerous goods transported, physical, chemical and toxicological properties of dangerous goods);
- general packing provisions, provisions for tanks and tank-containers (types, code, marking, construction, initial and periodic inspection and testing);
- marking and labelling, placarding and orange-coloured plate marking (marking and labelling of packages, placing and removal of placards and orange-coloured plates);
- particulars in transport documents (information required);
- method of consignment and restrictions on dispatch (full load, carriage in bulk, carriage in intermediate bulk containers, carriage in containers, carriage in fixed or demountable tanks);
- transport of passengers;
- prohibitions and precautions relating to mixed loading;
- segregation of goods;
- limitation of the quantities carried and quantities exempted;
- handling and stowage (packing, filling, loading and unloading - filling ratios - stowage and segregation);
- cleaning and/or degassing before packing, filling, loading and after unloading;
- crews, vocational training;
- vehicle documents (transport documents, instructions in writing, vessel approval certificate, ADN dangerous goods training certificate, copies of any derogations, other documents);
- instructions in writing (implementation of the instructions and crew protection equipment);
- supervision requirements (berthing);
- traffic regulations and restrictions;
- operational discharges or accidental leaks of pollutants;
- requirements relating to equipment for transport (vessel).

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1.8.3.12 ***Examinations***

1.8.3.12.1 The examination shall consist of a written test which may be supplemented by an oral examination.

1.8.3.12.2 The competent authority or an examining body designated by the competent authority shall invigilate every examination. Any manipulation and deception shall be ruled out as far as possible. Authentication of the candidate shall be ensured. The use in the written test of documentation other than international or national regulations is not permitted. All examination documents shall be recorded and kept as a print-out or electronically as a file.

1.8.3.12.3 Electronic media may be used only if provided by the examining body. There shall be no means of a candidate introducing further data to the electronic media provided; the candidate may only answer to the questions posed.

1.8.3.12.4 The written test shall consist of two parts:

(a) Candidates shall receive a questionnaire. It shall include at least 20 open questions covering at least the subjects mentioned in the list in 1.8.3.11. However, multiple choice questions may be used. In this case, two multiple choice questions count as one open question. Amongst these subjects particular attention shall be paid to the following subjects:

– general preventive and safety measures;

– classification of dangerous goods;

– general packing provisions, including tanks, tank-containers, tank-vehicles, etc.;

– danger marking, labelling and placarding;

– information in the transport document;

– handling and stowage;

– crew, vocational training;

– vehicle documents and transport certificates;

– instructions in writing;

– requirements concerning equipment for transport by vessel;

(b) Candidates shall undertake a case study in keeping with the duties of the adviser referred to in 1.8.3.3, in order to demonstrate that they have the necessary qualifications to fulfil the task of adviser.

1.8.3.12.5 Written examinations may be performed, in whole or in part, as electronic examinations, where the answers are recorded and evaluated using electronic data processing (EDP) processes, provided the following conditions are met:

(a) The hardware and software shall be checked and accepted by the competent authority or by an examining body designated by the competent authority;

(b) Proper technical functioning shall be ensured. Arrangements as to whether and how the examination can be continued shall be made for a failure of the devices and applications. No aids shall be available on the input devices (e.g. electronic search

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function), the equipment provided according to 1.8.3.12.3 shall not allow the candidates to communicate with any other device during the examination;

(c) Final inputs of each candidate shall be logged. The determination of the results shall be transparent.

1.8.3.13 The Contracting Parties may decide that candidates who intend working for undertakings specializing in the carriage of certain types of dangerous goods need only be questioned on the substances relating to their activities. These types of goods are:

– Class 1;

– Class 2;

– Class 7;

– Classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, 8 and 9;

– UN Nos. 1202, 1203, 1223, 3475, and aviation fuel classified under UN Nos. 1268 or 1863.

The certificate prescribed in 1.8.3.7 shall clearly indicate that it is only valid for one type of the dangerous goods referred to in this subsection and on which the adviser has been questioned under the conditions defined in 1.8.3.12.

1.8.3.14 The competent authority or the examining body shall keep a running list of the questions that have been included in the examination.

1.8.3.15 The certificate prescribed in 1.8.3.7 shall take the form laid down in 1.8.3.18 and shall be recognized by all Contracting Parties.

1.8.3.16 ***Validity and renewal of certificates***

1.8.3.16.1 The certificate shall be valid for five years. The period of validity of a certificate shall be extended from the date of its expiry for five years at a time where, during the year before its expiry, its holder has passed an examination. The examination shall be approved by the competent authority.

1.8.3.16.2 The aim of the examination is to ascertain that the holder has the necessary knowledge to carry out the duties set out in 1.8.3.3. The knowledge required is set out in 1.8.3.11 (b) and shall include the amendments to the Regulations introduced since the award of the last certificate. The examination shall be held and supervised on the same basis as in 1.8.3.10 and 1.8.3.12 to 1.8.3.14. However, holders need not undertake the case study specified in 1.8.3.12.4 (b).

1.8.3.17 The requirements set out in 1.8.3.1 to 1.8.3.16 shall be considered to have been fulfilled if the relevant conditions of Council Directive 96/35/EC of 3 June 1996 on the appointment and vocational qualification of safety advisers for the transport of dangerous goods by road, rail and inland waterway [1] and of Directive 2000/18/EC of the European Parliament and of the Council of 17 April 2000 on minimum examination requirements for safety advisers for the transport of dangerous goods by road, rail or inland waterway[2] are applied.

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1 *Official Journal of the European Communities, No. L145 of 19 June 1996, page 10.*

2 *Official Journal of the European Communities, No. L118 of 19 May 2000, page 41.*

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1.8.3.18 ***Form of certificate***

Certificate of training as safety adviser for the transport of dangerous goods

Certificate No: .....

Distinguishing sign of the State issuing the certificate: .....

Surname: .....

Forename(s): .....

Date and place of birth: .....

Nationality: .....

Signature of holder: .....

Valid until ..... for undertakings which transport dangerous goods and for undertakings which carry out related consigning, packing, filling, loading or unloading:

□ by road □ by rail □ by inland waterway

Issued by: .....

Date: ..... Signature: .....

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1.8.3.19 ***Extension of the certificate***

Where an adviser extends the scope of his certificate during its period of validity by meeting the requirements of 1.8.3.16.2, the period of validity of a new certificate shall remain that of the previous certificate.

1.8.4 List of competent authorities and bodies designated by them

The Contracting Parties shall communicate to the secretariat of the United Nations Economic Commission for Europe the addresses of the authorities and bodies designated by them which are competent in accordance with national law to implement ADN, referring in each case to the relevant requirement of ADN and giving the addresses to which the relevant applications should be made.

The secretariat of the United Nations Economic Commission for Europe shall establish a list on the basis of the information received and shall keep it up-to-date. It shall communicate this list and the amendments thereto to the Contracting Parties.

1.8.5 Notifications of occurrences involving dangerous goods

1.8.5.1 If a serious accident or incident takes place during loading, filling, carriage or unloading of dangerous goods, or during degassing of tank vessels on the territory of a Contracting Party, the loader, filler, carrier, consignee or reception facility operator, respectively, shall ascertain that a report conforming to the model prescribed in 1.8.5.4 is made to the competent authority of the Contracting Party concerned at the latest one month after the occurrence.

1.8.5.2 The Contracting Party shall in turn, if necessary, make a report to the secretariat of the United Nations Economic Commission for Europe with a view to informing the other Contracting Parties.

1.8.5.3 *An occurrence subject to report* in accordance with 1.8.5.1 has occurred if dangerous goods were released or if there was an imminent risk of loss of product, if personal injury, material or environmental damage occurred, or if the authorities were involved and one or more of the following criteria has/have been met:

Personal injury means an occurrence in which death or injury directly relating to the dangerous goods carried has occurred, and where the injury

(a) requires intensive medical treatment,

(b) requires a stay in hospital of at least one day, or

(c) results in the inability to work for at least three consecutive days.

Loss of product means the release of dangerous goods of:

(a) Classes 1 or 2 or packing group I or other substances not assigned to a packing group in quantities of 50 kg or 50 litres or more;

(b) Packing group II in quantities of 333 kg or 333 litres or more; or

(c) Packing group III in quantities of 1,000 kg or 1,000 litres or more.

The loss of product criterion also applies if there was an imminent risk of loss of product in the above-mentioned quantities. As a rule, this has to be assumed if, owing to structural damage, the means of containment is no longer suitable for further carriage or if, for any other reason, a sufficient level of safety is no longer ensured (e.g. owing to distortion of tanks or containers, overturning of a tank or fire in the immediate vicinity).

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If dangerous goods of Class 6.2 are involved, the obligation to report applies without quantity limitation.

In occurrences involving radioactive material, the criteria for loss of product are:

(a) Any release of radioactive material from the packages;

(b) Exposure leading to a breach of the limits set out in the regulations for protection of workers and members of the public against ionizing radiation (Schedule II of IAEA Safety Series No. 115 – "International Basic Safety Standards for Protection Against Ionizing Radiation and for Safety of Radiation Sources"); or

(c) Where there is reason to believe that there has been a significant degradation in any package safety function (containment, shielding, thermal protection or criticality) that may have rendered the package unsuitable for continued carriage without additional safety measures.

NOTE: *See the provisions of 7.1.4.14.7.7 for undeliverable consignments.*

Material damage or *environmental damage* means the release of dangerous goods, irrespective of the quantity, where the estimated amount of damage exceeds 50,000 Euros. Damage to any directly involved means of carriage containing dangerous goods and to the modal infrastructure shall not be taken into account for this purpose.

Involvement of authorities means the direct involvement of the authorities or emergency services during the occurrence involving dangerous goods and the evacuation of persons or closure of public traffic routes (roads/railways/inland waterways) for at least three hours owing to the danger posed by the dangerous goods.

If necessary, the competent authority may request further relevant information.

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1.8.5.4 ***Model report on occurrences during the carriage of dangerous goods***

Report on occurrences during the carriage of dangerous goods in accordance with ADN, section 1.8.5

Report No.:

Carrier/Filler/Consignee/Loader: .....

Official number of vessel: .....

Dry cargo vessel (single-hull, double-hull): .....

Tank vessel (type): .....

Address:

Contact name: ..... Telephone: .....

Fax/e-mail: .....

(*The competent authority shall remove this cover sheet before forwarding the report)*

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1. Mode

Inland waterway ……..	Official number of vessel/name of vessel (optional) ……..

2. Date and location of occurrence

Year: ..... Month: ..... Day: ..... Time: .....

□ Port □ Loading/unloading/transhipment facility Location/Country: ..... or □ Free sector Name of sector: ..... Kilometre point: ..... or □ Structure such as bridge or guide wall	Comments concerning description of location: ....

3. Conditions of inland waterway

Water level (reference gauge): .....
Estimated speed through water: .....
□ High water
□ Low water

4. Particular weather conditions

□ Rain
□ Snow
□ Fog
□ Thunderstorm
□ Storm
Temperature: ..... °C

5. Description of occurrence

□ Collision with bank, structure or berthing installation
□ Collision with another cargo vessel (collision/impact)
□ Collision with a passenger vessel (collision/impact)
□ Contact with the waterway bed, whether or not vessel has run aground
□ Fire
□ Explosion
□ Leak/Location and extent of damage (with additional description)
□ Shipwreck
□ Capsizing
□ Technical fault (optional)
□ Human error (optional)
Additional description of occurrence:
.....
.....
.....
.....

6. Dangerous goods involved

UN Number[1] or Identification number	Class	Packing group if known	Estimated quantity of loss of products (kg or l)[2]	Means of containment in accordance with ADN, 1.2.1[3]	Means of containment material	Type of failure of means of containment[4]

[1] For dangerous goods assigned to collective entries to which special provision 274 applies, also the technical name shall be indicated.

[2] For class 7, indicate values according to the criteria in 1.8.5.3.

[3] Indicate the appropriate number:
1 Packaging
2 IBC
3 Large packaging
4 Small container
5 Wagon
6 Vehicle
7 Tank-wagon
8 Tank-vehicle
9 Battery-wagon
10 Battery-vehicle
11 Wagon with demountable tanks
12 Demountable tank
13 Large container

[4] Indicate the appropriate number:
1 Loss
2 Fire
3 Explosion
4 Structural failure

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14 Tank container 15 MEGC 16 Portable tank 17 Dry cargo vessel (single-hull, double-hull) 18 Tank vessel (type)	

7. Cause of occurrence (if clearly known) (optional)

□ Technical fault
□ Faulty load securing
□ Operational cause
□ Other: .....
.....
.....
.....

8. Consequences of occurrence

Personal injury in connection with the dangerous goods involved:

□ Deaths (number: .....)
□ Injured (number: .....)

Loss of product:

□ Yes
□ No
□ Imminent risk of loss of product

Material/Environment damage:

□ Estimated level of damage ≤ 50 000 Euros
□ Estimated level of damage > 50 000 Euros

Involvement of authorities:

□ Yes
- □ Evacuation of persons for a duration of at least three hours caused by the dangerous goods involved
- □ Closure of public traffic routes for a duration of at least three hours caused by the dangerous goods involved

□ No

If necessary, the competent authority may request further relevant information.

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CHAPTER 1.9

TRANSPORT RESTRICTIONS BY THE COMPETENT AUTHORITIES

1.9.1 In accordance with Article 6, paragraph 1 of ADN, the entry of dangerous goods into the territory of Contracting Parties may be subject to regulations or prohibitions imposed for reasons other than safety during carriage. Such regulations or prohibitions shall be published in an appropriate form.

1.9.2 Subject to the provisions of 1.9.3, a Contracting Party may apply to vessels engaged in the international carriage of dangerous goods by inland waterways on its territory certain additional provisions not included in ADN, provided that those provisions do not conflict with Article 4, paragraph 2 of ADN, and are contained in its domestic legislation applying equally to vessels engaged in the domestic carriage of dangerous goods by inland waterways on the territory of that Contracting Party.

1.9.3 Additional provisions falling within the scope of 1.9.2 are as follows:

(a) Additional safety requirements or restrictions concerning vessels using certain structures such as bridges or tunnels, or vessels entering or leaving ports or other transport terminals;

(b) Requirements for vessels to follow prescribed routes to avoid commercial or residential areas, environmentally sensitive areas, industrial zones containing hazardous installations or inland waterways presenting severe physical hazards;

(c) Emergency requirements regarding routing or parking of vessels carrying dangerous goods resulting from extreme weather conditions, earthquake, accident, industrial action, civil disorder or military hostilities;

(d) Restrictions on movement of vessels carrying dangerous goods on certain days of the week or year.

1.9.4 The competent authority of the Contracting Party applying on its territory any additional provisions within the scope of 1.9.3 (a) and (d) above shall notify the secretariat of the United Nations Economic Commission for Europe of the additional provisions, which secretariat shall bring them to the attention of the Contracting Parties.

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CHAPTER 1.10

SECURITY PROVISIONS

NOTE: *For the purposes of this Chapter, "security" means measures or precautions to be taken to minimise theft or misuse of dangerous goods that may endanger persons, property or the environment.*

1.10.1 General provisions

1.10.1.1 All persons engaged in the carriage of dangerous goods shall consider the security requirements set out in this Chapter commensurate with their responsibilities.

1.10.1.2 Dangerous goods shall only be offered for carriage to carriers that have been appropriately identified.

1.10.1.3 Holding areas in trans-shipment zones for dangerous goods shall be secured, well lit and, where possible and appropriate, not accessible to the general public.

1.10.1.4 For each crew member of a vessel carrying dangerous goods, means of identification, which includes a photograph, shall be on board during carriage.

1.10.1.5 Safety checks in accordance with 1.8.1 shall also concern the implementation of security measures.

1.10.1.6 The competent authority shall maintain up-to-date registers of all valid certificates for experts stipulated in 8.2.1 issued by it or by any recognized organization.

1.10.2 Security training

1.10.2.1 The training and the refresher training specified in Chapter 1.3 shall also include elements of security awareness. The security refresher training need not be linked to regulatory changes only.

1.10.2.2 Security awareness training shall address the nature of security risks, recognising security risks, methods to address and reduce such risks and actions to be taken in the event of a security breach. It shall include awareness of security plans (if appropriate) commensurate with the responsibilities and duties of individuals and their part in implementing security plans.

1.10.2.3 Such training shall be provided or verified upon employment in a position involving dangerous goods transport and shall be periodically supplemented with refresher training.

1.10.2.4 Records of all security training received shall be kept by the employer and made available to the employee or competent authority, upon request. Records shall be kept by the employer for a period of time established by the competent authority.

1.10.3 Provisions for high consequence dangerous goods

NOTE: *In addition to the security provisions of ADN, competent authorities may implement further security provisions for reasons other than safety during carriage (see also Article 4, paragraph 1 of the Agreement). In order not to impede international and multimodal carriage by different explosives security marks, it is recommended that such marks be formatted consistent with an internationally harmonized standard (e.g. European Union Commission Directive 2008/43/EC).*

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1.10.3.1 *Definition of high consequence dangerous goods*

1.10.3.1.1 High consequence dangerous goods are those which have the potential for misuse in a terrorist event and which may, as a result, produce serious consequences such as mass casualties, mass destruction or, particularly for Class 7, mass socio-economic disruption.

1.10.3.1.2 High consequence dangerous goods in classes other than Class 7 are those listed in Table 1.10.3.1.2 below and carried in quantities greater than those indicated therein.

Table 1.10.3.1.2: List of high consequence dangerous goods

Class	Division	Substance or article	Quantity		
			Tank or cargo tank (litres)[c]	Bulk*/ (kg) [d]	Goods in packages (kg)
1	1.1	Explosives	[a]	[a]	0
	1.2	Explosives	[a]	[a]	0
	1.3	Compatibility group C explosives	[a]	[a]	0
	1.5	Explosives	0	[a]	0
1	1.4	Explosives of UN Nos. 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456 and 0500	[a]	[a]	0
2		Flammable, non-toxic gases (classification codes including only letters F or FC)	3000	[a]	[b]
		Toxic gases (classification codes including letter(s) T, TF, TC, TO, TFC or TOC) excluding aerosols	0	[a]	0
3		Flammable liquids of packing groups I and II	3000	[a]	[b]
		Desensitized explosives	0	[a]	0
4.1		Desensitized explosives	[a]	[a]	0
4.2		Packing group I substances	3000	[a]	[b]
4.3		Packing group I substances	3000	[a]	[b]
5.1		Oxidizing liquids of packing group I	3000	[a]	[b]
		Perchlorates, ammonium nitrate, ammonium nitrate fertilisers and ammonium nitrate emulsions or suspensions or gels	3000	3000	[b]
6.1		Toxic substances of packing group I	0	[a]	0
6.2		Infectious substances of Category A (UN Nos. 2814 and 2900, except for animal material)	[a]	0	0
8		Corrosive substances of packing group I	3000	[a]	[b]

**/ Bulk means bulk in the vessel, or bulk in a vehicle or a container.*

[a] *Not relevant.*

[b] *The provisions of 1.10.3 do not apply, whatever the quantity is.*

[c] *A value indicated in this column is applicable only if carriage in tanks is authorized according to chapter 3.2, table A, column (10) or (12) of ADR or RID or if letter "T" is indicated in chapter 3.2, table A, column (8) of ADN. For substances which are not authorized for carriage in tanks, the instruction in this column is not relevant.*

[d] *A value indicated in this column is applicable only if carriage in bulk is authorized according to chapter 3.2, table A, column (10) or (17) of ADR or RID, or if letter "B" is indicated in chapter 3.2, table A, column (8) of ADN. For substances which are not authorized for carriage in bulk, the instruction in this column is not relevant.*

1.10.3.1.3 For dangerous goods of Class 7, high consequence radioactive material is that with an activity equal to or greater than a transport security threshold of 3 000 A_2 per single package (see also 2.2.7.2.2.1) except for the following radionuclides where the transport security threshold is given in Table 1.10.3.1.3 below.

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Table 1.10.3.1.3: Transport security thresholds for specific radionuclides

Element	Radionuclide	Transport security threshold (TBq)
Americium	Am-241	0.6
Gold	Au-198	2
Cadmium	Cd-109	200
Caesium	Cs-137	1
Californium	Cf-252	0.2
Curium	Cm-244	0.5
Cobalt	Co-57	7
Cobalt	Co-60	0.3
Iron	Fe-55	8000
Germanium	Ge-68	7
Gadolinium	Gd-153	10
Iridium	Ir-192	0.8
Nickel	Ni-63	600
Palladium	Pd-103	900
Promethium	Pm-147	400
Polonium	Po-210	0.6
Plutonium	Pu-238	0.6
Plutonium	Pu-239	0.6
Radium	Ra-226	0.4
Ruthenium	Ru-106	3
Selenium	Se-75	2
Strontium	Sr-90	10
Thallium	Tl-204	200
Thulium	Tm-170	200
Ytterbium	Yb-169	3

1.10.3.1.4 For mixtures of radionuclides, determination of whether or not the transport security threshold has been met or exceeded can be calculated by summing the ratios of activity present for each radionuclide divided by the transport security threshold for that radionuclide. If the sum of the fractions is less than 1, then the radioactivity threshold for the mixture has not been met nor exceeded.

This calculation can be made with the formula:

$$\sum_i \frac{A_i}{T_i} < 1$$

Where:

A_i = activity of radionuclide *i* that is present in a package (TBq)

T_i = transport security threshold for radionuclide *i* (TBq).

1.10.3.1.5 When radioactive material possess subsidiary hazards of other classes, the criteria of Table 1.10.3.1.2 shall also be taken into account (see also 1.7.5).

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1.10.3.2 ***Security plans***

1.10.3.2.1 Carriers, consignors and other participants specified in 1.4.2 and 1.4.3 engaged in the carriage of high consequence dangerous goods (see Table 1.10.3.1.2) or high consequence radioactive material (see 1.10.3.1.3) shall adopt, implement and comply with a security plan that addresses at least the elements specified in 1.10.3.2.2.

1.10.3.2.2 The security plan shall comprise at least the following elements:

(a) specific allocation of responsibilities for security to competent and qualified persons with appropriate authority to carry out their responsibilities;

(b) records of dangerous goods or types of dangerous goods concerned;

(c) review of current operations and assessment of security risks, including any stops necessary to the transport operation, the keeping of dangerous goods in the vessel, tank or container before, during and after the journey and the intermediate temporary storage of dangerous goods during the course of intermodal transfer or transshipment between units;

(d) clear statement of measures that are to be taken to reduce security risks, commensurate with the responsibilities and duties of the participant, including:

- training;
- security policies (e.g. response to higher threat conditions, new employee/employment verification, etc.);
- operating practices (e.g. choice/use of routes where known, access to dangerous goods in intermediate temporary storage (as defined in (c)), proximity to vulnerable infrastructure etc.);
- equipment and resources that are to be used to reduce risks;

(e) effective and up to date procedures for reporting and dealing with security threats, breaches of security or security incidents;

(f) procedures for the evaluation and testing of security plans and procedures for periodic review and update of the plans;

(g) measures to ensure the physical security of transport information contained in the security plan; and

(h) measures to ensure that the distribution of information relating to the transport operation contained in the security plan is limited to those who need to have it. Such measures shall not preclude the provision of information required elsewhere in ADN.

NOTE: *Carriers, consignors and consignees should co-operate with each other and with competent authorities to exchange threat information, apply appropriate security measures and respond to security incidents.*

1.10.3.3 Operational or technical measures shall be taken on vessels carrying high consequence dangerous goods (see Table 1.10.3.1.2) or high consequence radioactive material (see 1.10.3.1.3) in order to prevent the improper use of the vessel and of the dangerous goods. The application of these protective measures shall not jeopardize emergency response.

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NOTE: *When appropriate and already fitted, the use of transport telemetry or other tracking methods or devices should be used to monitor the movement of high consequence dangerous goods (see Table 1.10.3.1.2 or 1.10.3.1.3).*

1.10.4 Except for radioactive material, the requirements of 1.10.1, 1.10.2 and 1.10.3 do not apply when the quantities carried in packages on a vessel do not exceed those referred to in 1.1.3.6.1. In addition the provisions of this Chapter do not apply to the carriage of UN No. 2912 RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I) and UN No. 2913 RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I).

1.10.5 For radioactive material, the provisions of this Chapter are deemed to be complied with when the provisions of the Convention on Physical Protection of Nuclear Material[1] and the IAEA circular on "The Physical Protection of Nuclear Material and Nuclear Facilities"[2] are applied.

[1] *IAEACIRC/274/Rev.1, IAEA, Vienna (1980).*

[2] *IAEACIRC/225/Rev.4 (Corrected), IAEA, Vienna (1999.*

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CHAPTERS 1.11 to 1.14

(Reserved)

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CHAPTER 1.15

RECOGNITION OF CLASSIFICATION SOCIETIES

1.15.1 General

In the event of the conclusion of an international agreement concerning more general regulations or the navigation of vessels on inland waterways and containing provisions relating to the full range of activities of classification societies and their recognition, any provision of this Chapter in contradiction with any of the provisions of the said international agreement would, in the relations among Parties to this Agreement which had become parties to the international agreement and as from the day of the entry into force of the latter, automatically be deleted and replaced ipso facto by the relevant provision of the international agreement. This Chapter would become null and void once the international agreement came into force if all Parties to this Agreement became Parties to the international agreement.

1.15.2 Procedure for the recognition of classification societies

1.15.2.1 A classification society which wishes to be recommended for recognition under this Agreement shall submit its application for recognition, in accordance with the provisions of this Chapter, to the competent authority of a Contracting Party.

The classification society shall prepare the relevant information in accordance with the provisions of this Chapter. It shall produce it in, at least, an official language of the State where the application is submitted and in English.

The Contracting Party shall forward the application to the Administrative Committee unless in its opinion the conditions and criteria referred to in 1.15.3 have manifestly not been met.

1.15.2.2 The Administrative Committee shall appoint a Committee of Experts and determine its composition and its rules of procedure. This Committee of Experts shall consider the proposal; it shall determine whether the classification society meets the criteria set out in 1.15.3 and shall make a recommendation to the Administrative Committee within a period of six months.

1.15.2.3 The Administrative Committee shall examine the report of the experts. It shall decide in accordance with the procedure set out in Article 17, 7(c), within one year maximum, whether or not to recommend to the Contracting Parties that they should recognize the classification society in question. The Administrative Committee shall establish a list of the classification societies recommended for recognition by the Contracting Parties.

1.15.2.4 Each Contracting Party may or may not decide to recognize the classification societies in question, only on the basis of the list referred to in 1.15.2.3. The Contracting Party shall inform the Administrative Committee and the other Contracting Parties of its decision.

The Administrative Committee shall update the list of recognitions issued by Contracting Parties.

1.15.2.5 If a Contracting Party considers that a classification society no longer meets the conditions and criteria set out in 1.15.3, it may submit a proposal to the Administrative Committee for withdrawal from the list of recommended societies. Such a proposal shall be substantiated by convincing evidence of a failure to meet the conditions and criteria.

1.15.2.6 The Administrative Committee shall set up a new Committee of Experts following the procedure set out under 1.15.2.2 which shall report to the Administrative Committee within a period of six months. The classification society shall be informed and invited by the Committee of Experts to comment on the findings.

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1.15.2.7 The Administrative Committee may decide, in case of a failure(s) to meet the conditions and criteria in 1.15.3, that the classification society shall have the opportunity to present a plan to address the identified failure(s) within a deadline of six months and to avoid any reoccurrence or, in accordance with Article 17, 7 (c), to withdraw the name of the society in question from the list of societies recommended for recognition.

1.15.3 Conditions and criteria for the recognition of a classification society applying for recognition

A classification society applying for recognition under this Agreement shall meet all the following conditions and criteria:

1.15.3.1 A classification society shall be able to demonstrate extensive knowledge of and experience in the assessment of the design and construction of inland navigation vessels. The society should have comprehensive rules and regulations for the design, construction and periodical inspection of vessels. These rules and regulations shall be published and continuously updated and improved through research and development programmes.

1.15.3.2 Registers of the vessels classified by the classification society shall be published annually.

1.15.3.3 The classification society shall not be controlled by shipowners or shipbuilders, or by others engaged commercially in the manufacture, fitting out, repair or operation of ships. The classification society shall not be substantially dependent on a single commercial enterprise for its revenue.

1.15.3.4 The headquarters or a branch of the classification society authorized and entitled to give a ruling and to act in all areas incumbent on it under the regulations governing inland navigation shall be located in one of the Contracting Parties.

1.15.3.5 The classification society and its experts shall have a good reputation in inland navigation; the experts shall be able to provide proof of their professional abilities.

1.15.3.6 The classification society:

– shall have sufficient professional staff and engineers for the technical tasks of monitoring and inspection and for the tasks of management, support and research, in proportion to the tasks and the number of vessels classified and sufficient to keep regulations up to date and develop them in the light of quality requirements;

– shall have experts in at least two Contracting Parties.

1.15.3.7 The classification society shall be governed by a code of ethics.

1.15.3.8 The classification society shall have prepared and implemented and shall maintain an effective system of internal quality based on the relevant aspects of internationally recognized quality standards and conforming to the standards EN ISO/IEC 17020:2012 (except clause 8.1.3) (inspection bodies) and ISO 9001 or EN ISO 9001:2015. The classification society is subject to certification of its quality system by an independent body of auditors recognized by the administration of the State in which it is located.

1.15.4 Obligations of recommended classification societies

1.15.4.1 Recommended classification societies shall undertake to cooperate with each other so as to guarantee equivalence from the point of view of safety of their technical standards which are relevant to the implementation of the provisions of the present Agreement.

1.15.4.2 They shall exchange experiences in joint meetings at least once a year. They shall report annually to the Safety Committee. The secretariat of the Safety Committee shall be informed

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of those meetings. The opportunity will be given to Contracting Parties to attend the meetings as observers.

1.15.4.3 Recommended classification societies shall undertake to apply the present and future provisions of the Agreement taking into account the date of their entry into force. In response to requests from the competent authority, recommended classification societies shall provide all relevant information regarding their technical requirements.

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CHAPTER 1.16

PROCEDURE FOR THE ISSUE OF THE CERTIFICATE OF APPROVAL

1.16.0 For the purposes of this Chapter, "owner" means "the owner or his designated representative or, if the vessel is chartered by an operator, the operator or his designated representative".

1.16.1 Certificate of approval

1.16.1.1 *General*

1.16.1.1.1 Dry cargo vessels carrying dangerous goods in quantities greater than exempted quantities, the vessels referred to in 7.1.2.19.1, tank vessels carrying dangerous goods and the vessels referred to in 7.2.2.19.3 shall be provided with an appropriate certificate of approval.

1.16.1.1.2 The certificate of approval shall be valid for not more than five years, subject to the provisions of 1.16.11.

1.16.1.2 *Format of the certificate of approval, particulars to be included*

1.16.1.2.1 The certificate of approval shall conform to the model 8.6.1.1 or 8.6.1.3 with regard to content, form and layout and include the required particulars, as appropriate. It shall include the date of expiry of the period of validity.

Its dimensions are 210 mm x 297 mm (A4). Front and back pages may be used.

It shall be drawn up in the language or one of the languages of the issuing country. If this language is not English, French or German, the title of the certificate and each entry under items 5, 9 and 10 in the certificate of approval for dry cargo vessels (8.6.1.1) and under items 12, 16 and 17 in the certificate of approval for tank vessels (8.6.1.3) shall also be provided in English, French or German.

1.16.1.2.2 The certificate of approval shall attest that the vessel has been inspected and that its construction and equipment comply completely with the applicable requirements of this Regulation.

1.16.1.2.3 All particulars for amendments to the certificate of approval provided for in these Regulations and in the other regulations drawn up by mutual agreement by the Contracting Parties may be entered in the certificate by the competent authority.

1.16.1.2.4 The competent authority shall include the following particulars in the certificate of approval of double-hull vessels meeting the additional requirements of 9.1.0.80 to 9.1.0.95 or 9.2.0.80 to 9.2.0.95:

"The vessel meets the additional requirements for double-hull vessels of 9.1.0.80 to 9.1.0.95" or "The vessel meets the additional requirements for double-hull vessels of 9.2.0.80 to 9.2.0.95."

1.16.1.2.5 For tank vessels, the certificate of approval shall be supplemented by a list of all the dangerous goods accepted for carriage in the tank vessel, drawn up by the recognized classification society which has classified the vessel (vessel substance list). To the extent required for safe carriage, the list shall contain reservations for certain dangerous goods regarding:

– the criteria for strength and stability of the vessel; and

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– the compatibility of the accepted dangerous goods with all the construction materials of the vessel, including installations and equipment, which come into contact with the cargo.

Classification societies shall update the vessel substance list at each renewal of the class of a vessel on the basis of the annexed Regulations in force at the time. Classification societies shall inform the owner of the vessel about amendments to Table C of chapter 3.2 which have become relevant in the meantime. If these amendments require an update of the vessel substance list, the owner of the vessel shall request this from a recognized classification society. This updated vessel substance list shall be issued within the period referred to in 1.6.1.1.

The entire vessel substance list shall be withdrawn by the recognized classification society within the period referred to in 1.6.1.1 if, due to amendments to these Regulations or due to changes in classification, goods contained in it are no longer permitted to be carried in the vessel.

The recognized classification society shall without delay, after the delivery to the holder of the certificate of approval, transmit a copy of the vessel substance list to the authority responsible for issuing the certificate of approval and without delay inform it about amendments or withdrawal.

NOTE: *When the substance list is available electronically, see 5.4.0.2.*

1.16.1.2.6 (*Deleted*)

1.16.1.3 ***Provisional certificate of approval***

1.16.1.3.1 For a vessel which is not provided with a certificate of approval, a provisional certificate of approval of limited duration may be issued in the following cases, subject to the following conditions:

(a) The vessel complies with the applicable requirements of these Regulations, but the normal certificate of approval could not be issued in time. The provisional certificate of approval shall be valid for an appropriate period but not exceeding three months;

(b) The vessel does not comply with every applicable requirement of these Regulations, but the safety of carriage is not impaired according to the appraisal of the competent authority.

The one-off provisional certificate of approval shall be valid for an appropriate period to bring the vessel into compliance with the applicable provisions, but not exceeding three months.

The competent authority may request additional reports in addition to the inspection report and may require additional conditions.

NOTE: *For the issuance of the final certificate of approval according to 1.16.1.2 a new inspection report according to 1.16.3.1 shall be prepared, which confirms conformity also with all hitherto unfulfilled requirements of these Regulations.*

(c) The vessel does not comply with every applicable provision of these Regulations after sustaining damage. In this case the provisional certificate of approval shall be valid only for a single specified voyage and for a specified cargo. The competent authority may impose additional conditions.

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1.16.1.3.2 The provisional certificate of approval shall conform to the model in 8.6.1.2 or 8.6.1.4 with regard to content, form and layout or a single model certificate combining a provisional certificate of inspection and the provisional certificate of approval provided that the single model certificate contains the same information as the model in 8.6.1.2 or 8.6.1.4 and is approved by the competent authority. Its dimensions are 210 mm x 297 mm (A4). Front and back pages may be used.

It shall be drawn up in the language or one of the languages of the issuing country. If this language is not English, French or German, the title of the certificate and each entry under item 5 in the provisional certificate of approval for dry cargo vessels (8.6.1.2) and under item 12 in the provisional certificate of approval for tank vessels (8.6.1.4) shall also be provided in English, French or German.

1.16.1.3.3 For tank vessels, the relief pressure of the safety valves or of the high-velocity vent valves shall be entered in the certificate of approval.

If a vessel has cargo tanks with different valve opening pressures, the opening pressure of each tank shall be entered in the certificate of approval.

1.16.1.4 ***Annex to the certificate of approval***

1.16.1.4.1 The certificate of approval and the provisional certificate of approval according to 1.16.1.3.1 (a) shall be complemented by an annex in accordance with the model under 8.6.1.5.

1.16.1.4.2 The annex to the certificate of approval shall include the date from which the transitional provisions according to 1.6.7 may be applied. This date shall be:

(a) For vessels according to Article 8, paragraph 2 of ADN for which evidence can be provided that they were already approved for the carriage of dangerous goods on the territory of a Contracting Party before 26 May 2000, 26 May 2000;

(b) For vessels according to Article 8, paragraph 2, of ADN for which evidence cannot be provided that they were already approved for the carriage of dangerous goods on the territory of a Contracting Party before 26 May 2000, the proven date of the first inspection for the issue of an approval for the carriage of dangerous goods on the territory of a Contracting Party or, if this date is not known, the date of issue of the first proven approval for the carriage of dangerous goods on the territory of a Contracting Party;

(c) For all other vessels, the proven date of the first inspection for the issue of a certificate of approval in the sense of ADN or, if this date is not known, the date of issue of the first certificate of approval in the sense of ADN;

(d) In derogation to (a) to (c) above, the date of a renewed first inspection according to 1.16.8 if the vessel no longer had a valid certificate of approval as from 31 December 2014 for more than twelve months.

1.16.1.4.3 All approvals for the carriage of dangerous goods issued on the territory of a Contracting Party which are valid as from the date under 1.16.1.4.2 and all ADN certificates of approval and provisional certificates of approval according to 1.16.1.3.1 (a) shall be entered in the annex to the certificate of approval.

Certificates of approval issued before the issuance of the annex to the certificate of approval shall be recorded by the competent authority that issues the annex to the certificate of approval.

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1.16.2 Issue and recognition of certificates of approval

1.16.2.1 The certificate of approval referred to in 1.16.1 shall be issued by the competent authority of the Contracting Party where the vessel is registered, or in its absence, of the Contracting Party where it has its home port or, in its absence, of the Contracting Party where the owner is domiciled or in its absence, by the competent authority selected by the owner.

The other Contracting Parties shall recognize such certificates of approval.

The Contracting Parties shall communicate to the secretariat of the United Nations Economic Commission for Europe (UNECE) the contact information of the authorities and bodies designated by them which are competent in accordance with national law for the issuance of certificates of approval.

The UNECE secretariat shall bring them to the attention of the Contracting Parties through its website.

1.16.2.2 The competent authority of any of the Contracting Parties may request the competent authority of any other Contracting Party to issue a certificate of approval in its stead.

1.16.2.3 The competent authority of any of the Contracting Parties may delegate the authority to issue the certificate of approval to an inspection body as defined in 1.16.4.

1.16.2.4 The provisional certificate of approval referred to in 1.16.1.3 shall be issued by the competent authority of one of the Contracting Parties for the cases and under the conditions referred to in these Regulations.

The other Contracting Parties shall recognize such provisional certificates of approval.

1.16.2.5 The annex to the certificate of approval shall be issued by the competent authority of a Contracting Party. The Contracting Parties shall assist one another at the time of issuance. They shall recognize this annex to the certificate of approval. Each new certificate of approval or provisional certificate of approval issued in accordance with 1.16.1.3.1 (a) shall be entered in the annex to the certificate of approval. Should the annex to the certificate of approval be replaced (e.g. in case of damage or loss), all existing entries shall be transferred.

1.16.2.6 The annex to the certificate of approval shall be withdrawn and a new annex to the certificate of approval shall be issued if according to 1.16.8 a renewed first inspection takes place, as the validity of the certificate of approval expired, as from 31 December 2014, more than twelve months previously.

The valid date is the date on which the application was received by the competent authority. In this case, only such certificates of approval which have been issued after the renewed first inspection shall be recorded.

1.16.3 Inspection procedure

1.16.3.1 The competent authority of the Contracting Party shall supervise the inspection of the vessel. Under this procedure, the inspection may be performed by an inspection body designated by the Contracting Party or by a recognized classification society according to Chapter 1.15. The inspection body or the recognized classification society shall issue an inspection report certifying that the vessel conforms partially or completely to the applicable requirements of these Regulations related to the construction and equipment of the vessel.

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1.16.3.2 This inspection report shall contain:

- Name and address of the Inspection Body or the recognized classification society that carried out the inspection;
- Applicant of the inspection;
- Date and place of the inspection;
- Type of the inspected vessel;
- Identification of the vessel (name, vessel number, ENI number, etc.);
- Declaration that the vessel conforms partially or completely to the applicable requirements of ADN on the construction and equipment of the vessel (in the version applicable on the date of the inspection or, if later, on the estimated date of issuance of the certificate of approval);
- Indication (list, description and references in ADN) of any non-conformities;
- Used transitional provisions;
- Used equivalents and derogations from the regulations applicable to the vessel with reference to the relevant recommendation of the ADN Administrative Committee;
- Date of issuance of the inspection report;
- Signature and official seal of the inspection body or recognized classification society.

If the inspection report does not ensure that all the applicable requirements referred to in 1.16.3.1 are fulfilled, the competent authority may require any additional information in order to issue a provisional certificate of approval according to 1.16.1.3.1 (b).

The authority which is issuing the certificate of approval may request information about the name of the office and surveyor(s) which carried out the inspection including email and phone number, but this information will not become part of the vessel record.

1.16.3.3 The inspection report shall be drawn up in a language accepted by the competent authority and shall contain all the necessary information to enable the certificate to be drawn up.

1.16.3.4 The provisions of 1.16.3.1, 1.16.3.2 and 1.16.3.3 apply to the first inspection referred to in 1.16.8, to the special inspection referred to in 1.16.9 and to the periodic inspection referred to in 1.16.10.

1.16.3.5 Where the inspection report is issued by a recognized classification society, the inspection report may include the certificate referred to in 9.1.0.88.1, 9.2.0.88.1, 9.3.1.8.1, 9.3.2.8.1 or 9.3.3.8.1.

The presence on board of the certificates issued by the recognized classification society for the purposes of 8.1.2.3 (f) and 8.1.2.3 (o) remains mandatory.

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1.16.4 Inspection body

1.16.4.1 Inspection bodies shall be subject to recognition by the Contracting Party administration as expert bodies on the construction and inspection of inland navigation vessels and as expert bodies on the transport of dangerous goods by inland waterway. They shall meet the following criteria:

– Compliance by the body with the requirements of impartiality;

– Existence of a structure and personnel that provide objective evidence of the professional ability and experience of the body;

– Compliance with the material contents of standard EN ISO/IEC 17020:2012 (except clause 8.1.3) supported by detailed inspection procedures.

1.16.4.2 Inspection bodies may be assisted by experts (e.g. an expert in electrical installations) or specialized bodies according to the national provisions applicable (e.g. classification societies).

1.16.4.3 The Administrative Committee shall maintain an up-to-date list of the inspection bodies appointed.

1.16.5 Application for the issue of a certificate of approval

The owner of a vessel shall deposit an application for a certificate of approval with the competent authority referred to in 1.16.2.1. The competent authority shall specify the documents to be submitted to it. In order to obtain a certificate of approval, at least a valid vessel certificate, the inspection report referred to in 1.16.3.1 and the certificate referred to in 9.1.0.88.1, 9.2.0.88.1, 9.3.1.8.1, 9.3.2.8.1 or 9.3.3.8.1 shall accompany the request.

1.16.6 Particulars entered in the certificate of approval and amendments thereto

1.16.6.1 The owner of a vessel shall inform the competent authority of any change in the name of the vessel or change of official number or registration number and shall transmit to it the certificate of approval for amendment.

1.16.6.2 All amendments to the certificate of approval provided for in these Regulations and in the other regulations drawn up by mutual agreement by the Contracting Parties may be entered in the certificate by the competent authority.

1.16.6.3 When the owner of the vessel has the vessel registered in another Contracting Party, he shall request a new certificate of approval from the competent authority of that Contracting Party. The competent authority may issue the new certificate for the remaining period of validity of the existing certificate without making a new inspection of the vessel, provided that the state and the technical specifications of the vessel have not undergone any modification.

1.16.6.4 In cases of the transfer of responsibility to another competent authority according to 1.16.6.3, the competent authority to which the last certificate of approval was returned shall submit on request the annex to the certificate according to 1.16.1.4 to the competent authority that will issue the new certificate of approval.

1.16.7 Presentation of the vessel for inspection

1.16.7.1 The owner shall present the vessel for inspection unladen, cleaned and equipped; he shall be required to provide such assistance as may be necessary for the inspection, such as providing a suitable launch and personnel, and uncovering those parts of the hull or installations which are not directly accessible or visible.

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1.16.7.2 In the case of a first, special or periodical inspection, the inspection body or the recognized classification society may require a dry-land inspection.

1.16.8 First inspection

If a vessel does not yet have a certificate of approval or if the validity of the certificate of approval expired more than twelve months ago, the vessel shall undergo a first inspection.

1.16.9 Special inspection

If the vessel's hull or equipment has undergone alterations liable to diminish safety in respect of the carriage of dangerous goods, or has sustained damage affecting such safety, the vessel shall be presented without delay by the owner for further inspection.

1.16.10 Periodic inspection and renewal of the certificate of approval

1.16.10.1 To renew the certificate of approval, the owner of the vessel shall present the vessel for a periodic inspection. The owner of the vessel may request an inspection at any time.

1.16.10.2 If the request for a periodic inspection is made during the last year preceding the expiry of the validity of the certificate of approval, the period of validity of the new certificate shall commence when the validity of the preceding certificate of approval expires.

1.16.10.3 A periodic inspection may also be requested during a period of twelve months after the expiry of the certificate of approval. After this period of time, the vessel shall undergo a first inspection in accordance with 1.16.8.

1.16.10.4 The competent authority shall establish the period of validity of the new certificate of approval on the basis of the results of the periodic inspection.

1.16.11 Extension of the certificate of approval without an inspection

By derogation from 1.16.10, at the substantiated request of the owner, the competent authority that has issued the certificate of approval may grant an extension of the validity of the certificate of approval of not more than one year without an inspection. This extension shall be granted in writing and shall be kept on board the vessel. Such extensions may be granted only once every two validity periods.

1.16.12 Official inspection

1.16.12.1 If the competent authority of a Contracting Party has reason to assume that a vessel which is in its territory may constitute a danger in relation to the transport of dangerous goods, for the persons on board or for shipping or for the environment, it may order an inspection of the vessel in accordance with 1.16.3.

1.16.12.2 When exercising this right to inspect, the authorities will make all possible efforts to avoid unduly detaining or delaying a vessel. Nothing in this Agreement affects rights relating to compensation for undue detention or delay. In any instance of alleged undue detention or delay the burden of proof shall lie with the owner of the vessel.

1.16.13 Withdrawal, withholding and return of the certificate of approval

1.16.13.1 The certificate of approval may be withdrawn if the vessel is not properly maintained or if the vessel's construction or equipment no longer complies with the applicable provisions of these Regulations, or if the vessel's highest class according to 9.2.0.88.1, 9.3.1.8.1, 9.3.2.8.1 or 9.3.3.8.1 is not valid.

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1.16.13.2 The certificate of approval may only be withdrawn by the authority by which it has been issued.

Nevertheless, in the cases referred to in 1.16.9 and 1.16.13.1 above, the competent authority of the State in which the vessel is staying may prohibit its use for the carriage of those dangerous goods for which the certificate is required. For this purpose it may withdraw the certificate until such time as the vessel again complies with the applicable provisions of these Regulations. In that case it shall notify the competent authority which issued the certificate.

1.16.13.3 Notwithstanding 1.16.2.2 above, any competent authority may amend or withdraw the certificate of approval at the request of the vessel's owner, provided that it so notifies the competent authority which issued the certificate.

1.16.13.4 When an inspection body or a recognized classification society observes, in the course of an inspection, that a vessel or its equipment suffers from serious defects in relation to dangerous goods which might jeopardize the safety of the persons on board or the safety of shipping, or constitute a hazard for the environment, or when the vessel's highest class is not valid, it shall immediately notify the competent authority on behalf of which it acts with a view to a decision to withhold the certificate.

If this authority which decided to withdraw the certificate is not the authority which issued the certificate, it shall immediately inform the latter and, where necessary, return the certificate to it if it presumes that the defects cannot be eliminated in the near future.

1.16.13.5 When the inspection body or the recognized classification society referred to in 1.16.13.4 above ascertains, by means of a special inspection according to 1.16.9, that these defects have been remedied, the certificate of approval shall be returned by the competent authority to the owner.

This inspection may be made at the request of the owner by another inspection body or another recognized classification society. In this case, the certificate of approval shall be returned through the competent authority to which the inspection body or the recognized classification society answers.

1.16.13.6 When a vessel is finally immobilized or scrapped, the owner shall send the certificate of approval back to the competent authority which issued it.

1.16.14 Duplicate copy

In the event of the loss, theft or destruction of the certificate of approval or when it becomes unusable for other reasons, an application for a duplicate copy, accompanied by appropriate supporting documents, shall be made to the competent authority which issued the certificate.

This authority shall issue a duplicate copy of the certificate of approval, which shall be designated as such.

1.16.15 Register of certificates of approval

1.16.15.1 The competent authorities shall assign a serial number to the certificates of approval which they issue. They shall keep a register of all the certificates issued.

1.16.15.2 The competent authorities shall keep copies of all the certificates which they have issued, as well as of the associated vessel substance lists of the recognised classification societies and of all amendments, withdrawals, new issuances and declarations of cancellation of these documents.

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PART 2

Classification

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PART 3

Dangerous goods list, special provisions and exemptions related to limited and excepted quantities

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CHAPTER 3.1

GENERAL

(See Volume II)

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CHAPTER 3.2

LIST OF DANGEROUS GOODS

3.2.1 Table A: List of dangerous goods in numerical order

See Volume II

3.2.2 Table B: List of dangerous goods in alphabetical order

See Volume II

3.2.3 Table C: List of dangerous goods accepted for carriage in tank vessels in numerical order

3.2.3.1 *Explanations concerning Table C:*

As a rule, each row of Table C of this Chapter deals with the substance(s) covered by a specific UN number or identification number. However, when substances belonging to the same UN number or identification number have different chemical properties, physical properties and/or carriage conditions, several consecutive rows may be used for that UN number or identification number.

Each column of Table C is dedicated to a specific subject as indicated in the explanatory notes below. The intersection of columns and rows (cell) contains information concerning the subject treated in that column, for the substance(s) of that row:

– The first four cells identify the substance(s) belonging to that row;

– The following cells give the applicable special provisions, either in the form of complete information or in coded form. The codes cross-refer to detailed information that is to be found in the numbers indicated in the explanatory notes below. An empty cell means either that there is no special provision and that only the general requirements apply, or that the carriage restriction indicated in the explanatory notes is in force;

– If a cell contains an asterisk, "*", the applicable requirements should be determined by applying 3.2.3.3. The determination of the applicable requirements by applying 3.2.3.3 should take precedence over using the entries for mixtures for which no sufficient data is available.

The applicable general requirements are not referred to in the corresponding cells.

Explanatory notes for each column:

Column (1) "UN number/identification number"

Contains the UN number or identification number:

– of the dangerous substance if the substance has been assigned its own specific UN number or identification number, or

– of the generic or n.o.s. entry to which the dangerous substances not mentioned by name shall be assigned in accordance with the criteria ("decision trees") of Part 2.

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Column (2) "Name and description"

Contains, in upper case characters, the name of the substance, if the substance has been assigned its own specific UN number or identification number or of the generic or n.o.s. entry to which the dangerous substances have been assigned in accordance with the criteria ("decision trees") of Part 2. This name shall be used as the proper shipping name or, when applicable, as part of the proper shipping name (see 3.1.2 for further details on the proper shipping name).

A descriptive text in lower case characters is added after the proper shipping name to clarify the scope of the entry if the classification or carriage conditions of the substance may be different under certain conditions.

Column (3a) "Class"

Contains the number of the Class, whose heading covers the dangerous substance. This Class number is assigned in accordance with the procedures and criteria of Part 2.

Column (3b) "Classification code"

Contains the classification code of the dangerous substance.

– For dangerous substances of Class 2, the code consists of a number and one or more letters representing the hazardous property group, which are explained in 2.2.2.1.2 and 2.2.2.1.3.

– For dangerous substances or articles of Classes 3, 4.1, 6.1 and 9, the codes are explained in 2.2.x.1.2; [1]

– For dangerous substances or articles of Class 8, the codes are explained in 2.2.8.1.4.1.

Column (4) "Packing group"

Contains the packing group number(s) (I, II or III) assigned to the dangerous substance. These packing group numbers are assigned on the basis of the procedures and criteria of Part 2. Certain substances are not assigned to packing groups.

Column (5) "Dangers"

This column contains information concerning the hazards inherent in the dangerous substance. These hazards are included on the basis of the danger labels of Table A, column (5).

In the case of a chemically unstable substance, the code 'unst.' is added to the information.

In the case of a substance or mixture with CMR properties, the code 'CMR' is added to the information.

[1] *x = the Class number of the dangerous substance or article, without dividing point if applicable.*

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CMR is used to indicate substances with long-term effects on health (*carcinogenic, mutagenic or toxic to reproduction*, Categories 1A and 1B in accordance with the criteria of Chapters 3.5, 3.6 and 3.7 of the GHS).

In the case of a substance or mixture hazardous to the aquatic environment, the code 'N1', 'N2' or 'N3' is added to the information. (See 2.2.9.1.10).

In the case of a substance or mixture that floats on the water surface, does not evaporate and is not readily soluble in water or that sinks to the bottom of the water and is not readily soluble, the code 'F' (standing for 'Floater') or 'S' (standing for 'Sinker'), respectively, is added to the information.

Where the information is shown in brackets, only the relevant codes for the substance carried should be used.

Column (6) "Type of tank vessel"

Contains the type of tank vessel: G, C or N.

Column (7) "Cargo tank design"

Contains information concerning the design of the cargo tank:

1 Pressure cargo tank

2 Closed cargo tank

3 Open cargo tank with flame arrester

4 Open cargo tank

Column (8) "Cargo tank type"

Contains information concerning the cargo tank type.

1 Independent cargo tank

2 Integral cargo tank

3 Cargo tank with walls distinct from the outer hull

Column (9) "Cargo tank equipment"

Contains information concerning the cargo tank equipment.

1 Refrigeration system

2 Possibility of cargo heating

3 Water-spray system

4 Cargo heating system on board

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Column (10) "Opening pressure of the pressure relief valve/high-velocity vent valve in kPa"

Contains information concerning the opening pressure of the pressure relief valve/high-velocity vent valve in kPa.

Column (11) "Maximum degree of filling (%)"

Contains information concerning the maximum degree of filling of cargo tanks as a percentage.

Column (12) "Relative density at 20 °C"

Contains information concerning the relative density of the substance at 20 °C. Data concerning the density are for information only.

Column (13) "Type of sampling device"

Contains information concerning the prescribed type of sampling device.

1 Closed-type sampling device

2 Partly closed-type sampling device

3 Sampling opening

Column (14) "Pump room below deck permitted"

Contains an indication of whether a pump room is permitted below deck.

Yes pump room below deck permitted

No pump room below deck not permitted

Column (15) "Temperature class"

Contains the temperature class of the substance.

Column (16) "Explosion group"

Contains the explosion group of the substance.

Values between square brackets indicate the explosion group II B subgroups to be used in selecting the relevant self-contained protection systems (flame arresters, vacuum relief valves, pressure relief valves/high velocity vent valves and devices for safe pressure relief of cargo tanks with integrated flame arrester plate stack).

NOTE:

Where self-contained protection systems for explosion group II B are in place, products in explosion group II A or II B, including subgroups II B3, II B2 and II B1, may be transported.

Where self-contained protection systems for explosion group II B3 are in place, products in explosion subgroups II B3, II B2 and II B1, or in explosion group II A, may be transported.

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Where self-contained protection systems for explosion group II B2 are in place, products in explosion subgroups II B2 and II B1, or in explosion group II A, may be transported.

Where self-contained protection systems for explosion group II B1 are in place, products in explosion subgroup II B1 or in explosion group II A may be transported.

Column (17) "Anti-explosion protection required"

Contains information on protection against explosions.

Yes anti-explosion protection required

No anti-explosion protection not required

Column (18) "Equipment required"

This column contains the alphanumeric codes for the equipment required for the carriage of the dangerous substance (see 8.1.5).

Column (19) "Number of cones/blue lights"

This column contains the number of cones/blue lights which should constitute the marking of the vessel during the carriage of this dangerous substance.

Column (20) "Additional requirements/Remarks"

This column contains the additional requirements or remarks applicable to the vessel.

These additional requirements or remarks are:

1. Anhydrous ammonia is liable to cause stress crack corrosion in cargo tanks and cooling systems constructed of carbon-manganese steel or nickel steel.

   In order to minimize the risk of stress crack corrosion the following measures shall be taken:

   (a) Where carbon-manganese steel is used, cargo tanks, pressure vessels of cargo refrigeration systems and cargo piping shall be constructed of fine-grained steel having a specified minimum yield stress of not more than 355 N/mm^2. The actual yield stress shall not exceed 440 N/mm^2. In addition, one of the following construction or operational measures shall be taken:

      .1 Material with a low tensile strength

      ($R_m < 410$ N/mm^2) shall be used; or

      .2 Cargo tanks, etc., shall undergo a post-weld heat treatment for the purpose of stress relieving; or

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.3 The transport temperature shall preferably be maintained close to the evaporation temperature of the cargo of -33° C, but in no case above -20° C; or

.4 Ammonia shall contain not less than 0.1% water, by mass.

(b) When carbon-manganese steel with yield stress values higher than those referred to in (a) above is used, the completed tanks, pipe sections, etc., shall undergo a post-weld heat treatment for the purpose of stress relieving.

(c) Pressure vessels of the cargo refrigeration systems and the piping systems of the condenser of the cargo refrigeration system constructed of carbon-manganese steel or nickel steel shall undergo a post-weld heat treatment for the purpose of stress relieving.

(d) The yield stress and the tensile strength of welding consumables may exceed only by the smallest value possible the corresponding values of the tank and piping material.

(e) Nickel steels containing more than 5% nickel and carbon-manganese steel which are not in compliance with the requirements of (a) and (b) above may not be used for cargo tanks and piping systems intended for the transport of this substance.

(f) Nickel steels containing not more than 5% nickel may be used if the transport temperature is within the limits referred to in (a) above.

(g) The concentration of oxygen dissolved in the ammonia shall not exceed the values given in the table below:

t in °C	O_2 in %
-30 and below	0.90
-20	0.50
-10	0.28
0	0.16
10	0.10
20	0.05
30	0.03

2. Before loading, air shall be removed and subsequently kept away to a sufficient extent from the cargo tanks and the accessory cargo piping by the means of inert gas (see also 7.2.4.18).

3. Arrangements shall be made to ensure that the cargo is sufficiently stabilized in order to prevent a reaction at any time during carriage. The transport document shall contain the following additional particulars:

(a) Name and amount of inhibitor added;

(b) Date on which inhibitor was added and expected duration of effectiveness under normal conditions;

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(c) Any temperature limits having an effect on the inhibitor.

When stabilization is ensured solely by blanketing with an inert gas it is sufficient to mention the name of the inert gas used in the transport document.

When stabilization is ensured by another measurement, e.g. the special purity of the substance, this measurement shall be mentioned in the transport document.

4. The substance shall not be allowed to solidify; the transport temperature shall be maintained above the melting point. In instances where cargo heating installations are required, they must be so designed that polymerisation through heating is not possible in any part of the cargo tank. Where the temperature of steam-heated coils could give rise to overheating, lower-temperature indirect heating systems shall be provided.

5. This substance is liable to clog the venting piping and its fittings or the fittings of cargo tanks. Careful surveillance should be ensured.

If a closed-type tank vessel cargo tank is required for the carriage of this substance and explosion protection is necessary or the substance for which explosion protection is necessary is carried in a closed cargo tank, the cargo tank shall conform to 9.3.2.22.4 or 9.3.3.22.4 or the venting piping shall conform to 9.3.2.22.5 (a) or 9.3.2.22.5 (b) or to 9.3.3.22.5 (a) or 9.3.3.22.5 (b).

This requirement does not apply when the cargo tanks and the corresponding piping are inerted in accordance with 7.2.4.18.

6. When external temperatures are below or equal to that indicated in column (20), the substance may only be carried in tank vessels equipped with a possibility of heating the cargo.

In addition, in the event of carriage in a closed cargo tank, the venting piping, the safety valves and the flame arresters shall be heatable.

The temperature of the venting piping, safety valves and flame arresters shall be kept at least above the melting point of the substance.

7. If a closed cargo tank is required to carry this substance or if the substance is carried in a closed cargo tank, the venting piping, the safety valves and the flame arresters shall be heatable.

The temperature of the venting piping, safety valves and flame arresters shall be kept at least above the melting point of the substance.

8. Double-hull spaces, double bottoms and heating coils shall not contain any water.

9. (a) While the vessel is underway, an inert-gas pad shall be maintained in the ullage space above the liquid level.

(b) Cargo piping and vent lines shall be independent of the corresponding piping used for other cargoes.

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(c) Safety valves shall be made of stainless steel.

10. *(Reserved)*

11. (a) Stainless steel of type 416 or 442 and cast iron shall not be used for cargo tanks and piping for loading and unloading.

(b) The cargo may be discharged only by deep-well pumps or pressure inert gas displacement. Each cargo pump shall be arranged to ensure that the substance does not heat significantly if the pressure discharge line from the pump is shut off or otherwise blocked.

(c) The cargo shall be cooled and maintained at temperatures below 30° C.

(d) The safety valves shall be set at a pressure of not less than 550 kPa (5.5 bar) gauge pressure. Special authorization is required for the maximum setting pressure.

(e) While the vessel is underway, a nitrogen pad shall be maintained in the ullage space above the cargo (see also 7.2.4.18). An automatic nitrogen supply system shall be installed to prevent the pressure from falling below 7 kPa (0.07 bar) gauge within the cargo tank in the event of a cargo temperature fall due to ambient temperature conditions or to some other reason. In order to satisfy the demand of the automatic pressure control a sufficient amount of nitrogen shall be available on board. Nitrogen of a commercially pure quality of 99.9%, by volume, shall be used for padding. A battery of nitrogen cylinders connected to the cargo tanks through a pressure reduction valve satisfies the intention of the expression “automatic” in this context.

The required nitrogen pad shall be such that the nitrogen concentration in the vapour space of the cargo tank is not less than 45% at any time.

(f) Before loading and while the cargo tank contains this substance in a liquid or gaseous form, it and the corresponding piping shall be inerted with nitrogen.

(g) The water-spray system shall be fitted with remote-control devices which can be operated from the wheelhouse or from the control station, if any.

(h) Transfer arrangements shall be provided for emergency transfer of ethylene oxide in the event of an uncontrollable self-reaction.

12. (a) The substance shall be acetylene free.

(b) Cargo tanks which have not undergone appropriate cleaning shall not be used for the carriage of these substances if one of the previous three cargoes consisted of a substance known to promote polymerisation, such as:

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.1 mineral acids (e.g. sulphuric acid, hydrochloric acid, nitric acid);

.2 carboxylic acids and anhydrides (e.g. formic acid, acetic acid);

.3 halogenated carboxylic acids (e.g. chloroacetic acid);

.4 sulphonic acids (e.g. benzene sulphonic acid);

.5 caustic alkalis (e.g. sodium hydroxide, potassium hydroxide);

.6 ammonia and ammonia solutions;

.7 amines and amine solutions;

.8 oxidizing substances.

(c) Before loading, cargo tanks and their piping shall be efficiently and thoroughly cleaned so as to eliminate all traces of previous cargoes, except when the last cargo was constituted of propylene oxide or a mixture of ethylene oxide and propylene oxide. Special precautions shall be taken in the case of ammonia in cargo tanks built of steel other than stainless steel.

(d) In all cases the efficiency of the cleaning of cargo tanks and their piping shall be monitored by means of appropriate tests or inspections to check that no trace of acid or alkaline substance remains that could present a danger in the presence of these substances.

(e) The cargo tanks shall be entered and inspected prior to each loading of these substances to ensure freedom from contamination, heavy rust deposits or visible structural defects.

When these cargo tanks are fitted in type C tank vessels, with cargo tank design 1 and cargo tank type 1, and are in continuous service for these substances, such inspections shall be performed at intervals of not more than two and a half years.

When these cargo tanks are fitted in type G tank vessels, with cargo tank design 1 and cargo tank type 1, and are in continuous service for these substances, such inspections shall be performed during the periodic inspection for the renewal of the certificate of approval according to 1.16.10.

(f) Cargo tanks which have contained these substances may be reused for other cargoes once they and their piping have been thoroughly cleaned by washing and flushing with an inert gas.

(g) Substances shall be loaded and unloaded in such a way that there is no release of gas into the atmosphere. If gas is returned to the shore installation during loading, the gas

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return system connected to the tank containing that substance shall be independent from all other cargo tanks.

(h) During discharge operations, the pressure in the cargo tanks shall be maintained above 7 kPa (0.07 bar) gauge.

(i) The cargo shall be discharged only by deep-well pumps, hydraulically operated submerged pumps or pressure inert gas displacement. Each cargo pump shall be arranged to ensure that the substance does not heat significantly if the pressure discharge line from the pump is shut off or otherwise blocked.

(j) Each cargo tank carrying these substances shall be ventilated by a system independent from the ventilation systems of other cargo tanks carrying other substances.

(k) Hose assemblies for loading and unloading shall be marked as follows:

"To be used only for the transfer of alkylene oxide."

(l) (*Reserved*)

(m) No air shall be allowed to enter the cargo pumps and cargo piping system while these substances are contained within the system.

(n) Before the shore connections are disconnected, piping containing liquids or gas shall be depressurised at the shore link by means of appropriate devices.

(o) The piping system for cargo tanks to be loaded with these substances shall be separate from the piping system for all other cargo tanks, including empty cargo tanks. If the piping system for the cargo tanks to be loaded is not independent, separation shall be accomplished by the removal of spool pieces, shut-off valves, other pipe sections and by fitting blank flanges at these locations. The required separation applies to all liquid pipes and vapour vent lines and any other connections which may exist such as common inert gas supply lines.

(p) These substances may be carried only in accordance with cargo handling plans that have been approved by a competent authority.

Each loading arrangement shall be shown on a separate cargo handling plan. Cargo handling plans shall show the entire cargo piping system and the locations for installations of blank flanges needed to meet the above piping separation requirements. A copy of each cargo handling plan shall be kept on board. Reference to the approved cargo handling plans shall be included in the certificate of approval.

(q) Before loading of these substances and before carriage is resumed a qualified person approved by the competent authority shall certify that the prescribed separation of the

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piping has been effected; this certificate shall be kept on board. Each connection between a blank flange and a shut-off valve in the piping shall be fitted with a sealed wire to prevent the flange from being disassembled inadvertently.

(r) During the voyage, the cargo shall be covered with nitrogen. An automatic nitrogen make-up system shall be installed to prevent the cargo tank pressure from falling below 7 kPa (0.07 bar) gauge in the event of a cargo temperature fall due to ambient temperature conditions or to some other reason. Sufficient nitrogen shall be available on board to satisfy the demand of automatic pressure control. Nitrogen of commercially pure quality of 99.9%, by volume, shall be used for padding. A battery of nitrogen cylinders connected to the cargo tanks through a pressure reduction valve satisfies the intention of the expression "automatic" in this context.

(s) The vapour space of the cargo tanks shall be checked before and after each loading operation to ensure that the oxygen content is 2%, by volume, or less.

(t) Loading flow

The loading flow (L_R) of cargo tank shall not exceed the following value:

$L_R = 3600 \times U/t$ (m^3/h)

In this formula:

U = the free volume (m^3) during loading for the activation of the overflow prevention system;

T = the time (s) required between the activation of the overflow prevention system and the complete stop of the flow of cargo into the cargo tank;

The time is the sum of the partial times needed for successive operations, e.g. reaction time of the service personnel, the time needed to stop the pumps and the time needed to close the shut-off valves;

The loading flow shall also take account of the design pressure of the piping system.

13. If no stabilizer is supplied or if the supply is inadequate, the oxygen content in the vapour phase shall not exceed 0.1%. Overpressure must be constantly maintained in cargo tanks. This requirement applies also to voyages on ballast or empty with uncleaned cargo tanks between cargo transport operations.

14. The following substances may not be carried in a type N vessel:

– substances with self-ignition temperatures ≤ 200 °C;

– substances with a flash point < 23°C and an explosion range > 15 percentage points;

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– mixtures containing halogenated hydrocarbons;

– mixtures containing more than 10% benzene;

– substances and mixtures carried in a stabilized state.

15. Provision shall be made to ensure that alkaline or acidic substances such as sodium hydroxide solution or sulphuric acid do not contaminate this cargo.

16. If there is a possibility of a dangerous reaction such as polymerisation, decomposition, thermal instability or evolution of gases resulting from local overheating of the cargo in either the cargo tank or associated piping system, this cargo shall be loaded and carried adequately segregated from other substances the temperature of which is sufficiently high to initiate such reaction. Heating coils inside cargo tanks carrying this substance shall be blanked off or secured by equivalent means.

17. The melting point of the cargo shall be shown in the transport documents.

18. *(Reserved)*

19. Provision shall be made to ensure that the cargo does not come into contact with water. The following additional requirements apply:

Carriage of the cargo is not permitted in cargo tanks adjacent to slop tanks or cargo tanks containing ballast water, slops or any other cargo containing water. Pumps, piping and vent lines connected to such tanks shall be separated from similar equipment of tanks carrying these substances. Pipes from slop tanks or ballast water pipes shall not pass through cargo tanks containing this cargo unless they are encased in a tunnel.

20. The maximum permitted transport temperature given in column (20) shall not be exceeded.

21. *(Reserved)*

22. The relative density of the cargo shall be shown in the transport document.

23. The instrument for measuring the pressure of the vapour phase in the cargo tank shall activate the alarm when the internal pressure reaches 40 kPa (0.4 bar). The water-spray system shall immediately be activated and remain in operation until the internal pressure drops to 30 kPa (0.3 bar).

24. Substances having a flash-point above 60 °C which are handed over for carriage or which are carried heated within a limiting range of 15 K below their flash-point shall be carried under the conditions of substance number 9001.

25. Type 3 cargo tank may be used for the carriage of this substance provided that the construction of the cargo tank has been accepted by a recognized classification society for the maximum permitted transport temperature.

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26. Type 2 cargo tank may be used for the carriage of this substance provided that the construction of the cargo tank has been accepted by a recognized classification society for the maximum permitted transport temperature.

27. The requirements of 3.1.2.8.1 are applicable.

28. (a) When UN 2448 SULPHUR, MOLTEN is carried, the forced ventilation of the cargo tanks shall be brought into service at latest when the concentration of hydrogen sulphide reaches 1.0%, by volume.

(b) When during the carriage of UN 2448 SULPHUR, MOLTEN, the concentration of hydrogen sulphide exceeds 1.85%, the boat master shall immediately notify the nearest competent authority.

When a significant increase in the concentration of hydrogen sulphide in a hold space leads it to be supposed that the sulphur has leaked, the cargo tanks shall be unloaded as rapidly as possible. A new load may only be taken on board once the authority which issued the certificate of approval has carried out a further inspection.

(c) When UN 2448 SULPHUR, MOLTEN is carried, the concentration of hydrogen sulphide shall be measured in the vapour phase of the cargo tanks and concentrations of sulphur dioxide and hydrogen sulphide in the hold spaces.

(d) The measurements prescribed in (c) shall be made every eight hours. The results of the measurements shall be recorded in writing.

29. When particulars concerning the vapour pressure or the boiling point are given in column (2), the relevant information shall be added to the proper shipping name in the transport document, e.g.

UN 1224 KETONES, LIQUID, N.O.S.,

110 kPa < vp 50 ≤ 175 kPa or

UN 2929 TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S., boiling point ≤ 60°C

30. When these substances are carried, the hold spaces of open type N tank vessels may contain auxiliary equipment.

31. When these substances are carried, the vessel shall be equipped with a quick closing valve placed directly on the shore connection.

32. In the case of transport of this substance, the following additional requirements are applicable:

(a) The outside of the cargo tanks shall be equipped with insulation of low flammability. This insulation shall be strong enough to resist shocks and vibration. Above deck, the insulation shall be protected by a covering.

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The outside temperature of this covering shall not exceed 70 °C.

(b) The hold spaces containing the cargo tanks shall be provided with ventilation. Connections for forced ventilation shall be fitted.

(c) The cargo tanks shall be equipped with forced ventilation installations which, in all transport conditions, will reliably keep the concentration of hydrogen sulphide above the liquid phase below 1.85% by volume.

The ventilation installations shall be fitted in such a way as to prevent the deposit of the goods to be transported.

The exhaust line of the ventilation shall be fitted in such a way as not to present a risk to personnel.

(d) The cargo tank and the hold spaces shall be fitted with outlets and piping to allow gas sampling.

(e) The outlets of the cargo tanks shall be situated at a height such that for a trim of 2º and a list of 10º, no sulphur can escape. All the outlets shall be situated above the deck in the open air. Each outlet shall be equipped with a permanently fixed closing mechanism.

One of these mechanisms shall be capable of being opened for slight overpressure within the tank.

(f) The piping for loading and unloading shall be equipped with adequate insulation. They shall be capable of being heated.

(g) The heat transfer fluid shall be such that in the event of a leak into a tank, there is no risk of a dangerous reaction with the sulphur.

33. The following provisions are applicable to transport of this substance:

Construction requirements:

(a) Hydrogen peroxide solutions may be transported only in cargo tanks equipped with deep-well pumps.

(b) Cargo tanks and their equipment shall be constructed of solid stainless steel of a type appropriate to hydrogen peroxide solutions (for example, 304, 304L, 316, 316L or 316 Ti). None of the non-metallic materials used for the system of cargo tanks shall be attacked by hydrogen peroxide solutions or cause the decomposition of the substance.

(c) The temperature sensors shall be installed in the cargo tanks directly under the deck and at the bottom. Remote temperature read-outs and monitoring shall be provided for in the wheelhouse.

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(d) Fixed oxygen monitors (or gas-sampling lines) shall be provided in the areas adjacent to the cargo tanks so that leaks in such areas can be detected. Account shall be taken of the increased flammability arising from the increased presence of oxygen. Remote read-outs, continuous monitoring (if the sampling lines are used, intermittent monitoring will suffice) and visible and audible alarms similar to those for the temperature sensors shall also be located in the wheelhouse. The visible and audible alarms shall be activated if the oxygen concentration in these void spaces exceeds 30% by volume. Two additional oxygen monitors shall also be available.

(e) The cargo tank venting systems which are equipped with filters shall be fitted with pressure/vacuum relief valves appropriate to closed-circuit ventilation and with an extraction installation should cargo tank pressure rise rapidly as a result of an uncontrolled decomposition (see under m). These air supply and extraction systems shall be so designed that water cannot enter the cargo tanks. In designing the emergency extraction installation account shall be taken of the design pressure and the size of the cargo tanks.

(f) A fixed water-spray system shall be provided for diluting and washing away any hydrogen peroxide solutions spilled onto the deck. The area covered by the jet of water shall include the shore connections and the deck containing the cargo tanks designated for carrying hydrogen peroxide solutions.

The following minimum requirements shall be complied with:

.1 The substance shall be diluted from the original concentration to a 35% concentration within five minutes from the spillage on the deck;

.2 The rate and estimated size of the spill shall be determined in the light of the maximum permissible loading or unloading rates, the time required to halt the spillage in the event of tank overfill or a pipe or hose assembly failure, and the time necessary to begin application of dilution water with actuation of the alarm at the cargo control location or in the wheelhouse.

(g) The outlets of the pressure valves shall be situated at least 2 metres above the walkways if they are less than 4 metres from the walkway.

(h) A temperature sensor shall be installed by each pump to make it possible to monitor the temperature of the cargo during unloading and detect any overheating due to defective operation of the pump.

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Servicing requirements:

Carrier

(i) Hydrogen peroxide solutions may only be carried in cargo tanks which have been thoroughly cleaned and passivated, in accordance with the procedure described under (j), of all traces of previous cargoes, their vapours or their ballast waters. A certificate stating that the procedure described under (j) has been duly complied with must be carried on board.

Particular care in this respect is essential to ensure the safe carriage of hydrogen peroxide solutions:

.1 When a hydrogen peroxide solution is being carried, no other cargo may be carried simultaneously;

.2 Tanks which have contained hydrogen peroxide solutions may be reused for other cargoes after they have been cleaned by persons or companies approved for this purpose by the competent authority;

.3 In the design of the cargo tanks, efforts must be made to keep to a minimum any internal tank structure, to ensure free draining, no entrapment and ease of visual inspection.

(j) Procedures for inspection, cleaning, passivation and loading for the transport of hydrogen peroxide solutions with a concentration of 8 to 60 per cent in cargo tanks which have previously carried other cargoes.

Before their reuse for the transport of hydrogen peroxide solutions, cargo tanks which have previously carried cargoes other than hydrogen peroxide must be inspected, cleaned and passivated. The procedures described in paragraphs .1 to .7 below for inspection and cleaning apply to stainless steel cargo tanks. The procedure for passivating stainless steel is described in paragraph 8. Failing any other instructions, all the measures apply to cargo tanks and to all their structures which have been in contact with other cargoes.

.1 After unloading of the previous cargo, the cargo tank must be made gasfree and inspected for any remaining traces, carbon residues and rust.

.2 The cargo tanks and their equipment must be washed with clear filtered water. The water used must be at least of the same quality as drinking water and have a low chlorine content.

.3 Traces of the residues and vapours of the previous cargo must be removed by the steam cleaning of the cargo tanks and their equipment.

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.4 The cargo tanks and their equipment must then be rewashed with clear water of the quality specified in paragraph 2 above and dried in filtered, oil-free air.

.5 Samples must be taken of the atmosphere in the cargo tanks and these must be analysed for their content of organic gases and oxygen.

.6 The cargo tank must be reinspected for any traces of the previous cargo, carbon residues or rust or odours of the previous cargo.

.7 If the inspection and the other measures point to the presence of traces of the previous cargo or of its gases, the measures described in paragraphs .2 to .4 above must be repeated.

.8 Stainless steel cargo tanks and their structures which have contained cargoes other than hydrogen peroxide solutions and which have been repaired must, regardless of whether or not they have previously been passivated, be cleaned and passivated in accordance with the following procedure:

.8.1 The new weld seams and other repaired parts must be cleaned and scrubbed with stainless steel brushes, graving tools, sandpaper and polishers. Rough surfaces must be made smooth and a final polishing must be carried out;

.8.2 Fatty and oily residues must be removed with the use of organic solvents or appropriate cleaning products diluted with water. The use of chlorinated products shall be avoided because these might seriously interfere with the passivation procedure;

.8.3 Any residues that have been removed must be eliminated and the tanks must then be washed.

(k) During the transfer of the hydrogen peroxide solutions, the related piping system must be separated from all other systems. Loading and unloading piping used for the transfer of hydrogen peroxide solutions must be marked as follows:

"For Hydrogen Peroxide
Solution Transfer only"

(l) If the temperature in the cargo tanks rises above 35 °C, visible and audible alarms shall activate in the wheelhouse.

Master

(m) If the temperature rise exceeds 4 °C for 2 hours or if the temperature in the cargo tanks exceeds 40 °C, the master must contact the consignor directly, with a view to taking any action that might be necessary.

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Filler

(n) Hydrogen peroxide solutions must be stabilized to prevent decomposition. The manufacturer must provide a stabilization certificate which must be carried on board and must specify:

.1 The disintegration date of the stabilizer and the duration of its effectiveness;

.2 Actions to be taken should the product become unstable during the voyage.

(o) Only those hydrogen peroxide solutions which have a maximum decomposition rate of 1.0 per cent per year at 25 °C may be carried. A certificate from the filler stating that the product meets this standard must be presented to the master and kept on board. An authorized representative of the manufacturer must be on board to monitor the loading operations and to test the stability of the hydrogen peroxide solutions to be transported. He shall certify to the master that the cargo has been loaded in a stable condition.

34. For type N carriage, the flanges and stuffing boxes of the loading and unloading piping must be fitted with a protection device to protect against splashing.

35. Only an indirect system for the cargo refrigerating system is permitted for this substance. Direct or combined systems are not permitted.

36. Merged with remark 35.

37. For this substance, the cargo tank system shall be capable of resisting the vapour pressure of the cargo at higher ambient temperatures whatever the system that has been adopted for treating the boil-off gas.

38. For an initial boiling point above 60 °C and under or equal to 85 °C as determined in accordance with ASTMD 86-01, the applicable conditions of transport are identical to those stipulated for an initial boiling point under or equal to 60 °C.

39. (a) The joints, outlets, closing devices and other technical equipment shall be of such a sort that there cannot be any leakage of carbon dioxide during normal transport operations (cold, fracturing of materials, freezing of fixtures, run-off outlets etc.).

(b) The loading temperature (at the loading station) shall be mentioned in the transport document.

(c) An oxygen meter shall be kept on board, together with instructions on its use which can be read by everyone on board. The oxygen meter shall be used as a testing device when entering holds, pump rooms, areas situated at depth and when work is being carried out on board.

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(d) At the entry of accommodation and in other places where the crew may spend time there shall be a measuring device which lets off an alarm when the oxygen level is too low or when the CO_2 level is too high.

(e) The loading temperature (established after loading) and the maximum duration of the journey shall be mentioned in the transport document.

40. *(Deleted)*

41. n-BUTYLBENZENE is assigned to the entry UN No. 2709 BUTYLBENZENES (n-BUTYLBENZENE).

42. Loading of refrigerated liquefied gases shall be carried out in such a manner as to ensure that unsatisfactory temperature gradients do not occur in any cargo tank, piping or other ancillary equipment. When determining the holding time (as described in 7.2.4.16.17), it shall be assured that the degree of filling does not exceed 98% in order to prevent the safety valves from opening when the tank is in liquid full condition. When refrigerated liquefied gases are carried using a system according to 9.3.1.24.1 (b) or 9.3.1.24.1 (c), a refrigeration system is not required.

43. It may be that the mixture has been classified as a floater as a precautionary measure, because some of its components meet the relevant criteria.

44. A substance shall only be assigned to this entry where there is measurement data or verified information in accordance with IEC 60079-20-1 or equivalent that allows for an assignment to subgroup II B3 of explosion group II B.

3.2.3.2 ***Table C***

UN No. or substance identification No.	Name and description	Class	Classification code	Packing group	Dangers	Type of tank vessel	Cargo tank design	Cargo tank type	Cargo tank equipment	Opening pressure of the pressure relief valve/high velocity vent valve, in kPa	Maximum degree of filling in %	Relative density at 20 °C	Type of sampling device	Pump room below deck permitted	Temperature class	Explosion group	Anti-explosion protection required	Equipment required	Number of cones/blue lights	Additional requirements/Remarks
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1005	AMMONIA, ANHYDROUS	2	2TC		2.3+8+2.1+N1	G	1	1	3		91		1	no	T1 [12)]	II A	yes	PP, EP, EX, TOX, A	2	1; 2; 31
1010	1,2-BUTADIENE, STABILIZED	2	2F		2.1+unst.	G	1	1			91		1	no	T2 [12)]	II B[4)]	yes	PP, EX, A	1	2; 3; 31
1010	1,3-BUTADIENE, STABILIZED	2	2F		2.1+unst.+ CMR	G	1	1			91		1	no	T2 [12)]	II B (II B2[4)])	yes	PP, EP, EX, TOX, A	1	2; 3; 31
1010	BUTADIENES STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, having a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l (contains less than 0.1% 1.3-butadiene)	2	2F		2.1+unst.	G	1	1			91		1	no	T2 [12)]	II B[4)] (II B2[4)])	yes	PP, EX, A	1	2; 3; 31
1010	BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, having a vapour pressure at 70° C not exceeding 1.1 MPa (11 bar) and a density at 50° C not lower than 0.525 kg/l, (with 0.1% or more 1.3-butadiene)	2	2F		2.1+unst.+ CMR	G	1	1			91		1	no	T2 [12)]	II B[4)] (II B2[4)])	yes	PP, EP, EX, TOX, A	1	2; 3; 31
1011	BUTANE (contains less than 0.1% 1.3-butadiene)	2	2F		2.1	G	1	1			91		1	no	T2 [12)]	II A	yes	PP, EX, A	1	2; 31
1011	BUTANE (with 0.1% or more 1.3-butadiene)	2	2F		2.1+CMR	G	1	1			91		1	no	T2 [12)]	II A	yes	PP, EP, EX, TOX, A	1	2 ; 31
1012	1-BUTYLENE	2	2F		2.1	G	1	1			91		1	no	T2 [12)]	II A	yes	PP, EX, A	1	2; 31
1020	CHLOROPENTAFLUORO-ETHANE (REFRIGERANT GAS R 115)	2	2A		2.2	G	1	1			91		1	no			no	PP	0	31
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	2	2F		2.1	G	1	1			91		1	no	T1 [12)]	II A	yes	PP, EX, A	1	2; 31

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UN No. or substance identification No.	Name and description	Class	Classification code	Packing group	Dangers	Type of tank vessel	Cargo tank design	Cargo tank type	Cargo tank equipment	Opening pressure of the pressure relief valve/high velocity vent valve, in kPa	Maximum degree of filling in %	Relative density at 20 °C	Type of sampling device	Pump room below deck permitted	Temperature class	Explosion group	Anti-explosion protection required	Equipment required	Number of cones/blue lights	Additional requirements/Remarks
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1033	DIMETHYL ETHER	2	2F		2.1	G	1	1			91		1	no	T3	II B (II B2)	yes	PP, EX, A	1	2; 31
1038	ETHYLENE, REFRIGERATED LIQUID	2	3F		2.1	G	1	1	1		95		1	no	T1 [12)]	II B (II B3)	yes	PP, EX, A	1	2; 31; 42
1040	ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 °C	2	2TF		2.3+2.1	G	1	1			91		1	no	T2 [12)]	II B (II B3)	yes	PP, EP, EX, TOX, A	2	2: 3; 11; 31; 35
1055	ISOBUTYLENE	2	2F		2.1	G	1	1			91		1	no	T2 [1), 12)]	II A	yes	PP, EX, A	1	2; 31
1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	2	2F		2.1	G	1	1			91		1	no	T1 [12)]	II A	yes	PP, EX, A	1	2; 31
1077	PROPYLENE	2	2F		2.1	G	1	1			91		1	no	T1 [12)]	II A	yes	PP, EX, A	1	2; 31
1083	TRIMETHYLAMINE, ANHYDROUS	2	2F		2.1	G	1	1			91		1	no	T4	II A	yes	PP, EX, A	1	2; 31
1086	VINYL CHLORIDE, STABILIZED	2	2F		2.1+unst.	G	1	1			91		1	no	T2 [12)]	II A	yes	PP, EX, A	1	2; 3; 13; 31
1088	ACETAL	3	F1	II	3	N	2	2		10	97	0.83	3	yes	T3	II B [4)]	yes	PP, EX, A	1	
1089	ACETALDEHYDE (ethanal)	3	F1	I	3+N3	C	1	1			95	0.78	1	yes	T4	II A	yes	PP, EX, A	1	35
1090	ACETONE	3	F1	II	3	N	2	2		10	97	0.79	3	yes	T1 [12)]	II A	yes	PP, EX, A	1	
1092	ACROLEINE, STABILIZED	6.1	TF1	I	6.1+3+unst.+ N1	C	2	2	3	50	95	0.84	1	no	T3 [2)]	II B (II B3)	yes	PP, EP, EX, TOX, A	2	2; 3; 5; 23
1093	ACRYLONITRILE, STABILIZED	3	FT1	I	3+6.1+unst.+ N2+CMR	C	2	2	3	50	95	0.8	1	no	T1 [12)]	II B (II B2)	yes	PP, EP, EX, TOX, A	2	3; 5; 23
1098	ALLYL ALCOHOL	6.1	TF1	I	6.1+3+N1	C	2	2		40	95	0.85	1	no	T2 [12)]	II B (II B3)	yes	PP, EP, EX, TOX, A	2	
1100	ALLYL CHLORIDE	3	FT1	I	3+6.1+N1	C	2	2	3	50	95	0.94	1	no	T2 [12)]	II A	yes	PP, EP, EX, TOX, A	2	23
1105	PENTANOLS (n- PENTANOL)	3	F1	III	3	N	3	2			97	0.81	3	yes	T2 [12)]	II A	yes	PP, EX, A	0	
1106	AMYLAMINE (n-AMYLAMINE)	3	FC	II	3+8	C	2	2		40	95	0.76	2	yes	T4 [3)]	II A [7)]	yes	PP, EP, EX, A	1	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1107	AMYL CHLORIDES (l-CHLOROPENTANE)	3	F1	II	3	C	2	2		40	95	0.88	2	yes	T3	II A	yes	PP, EX, A	1	
1107	AMYL CHLORIDES (1-CHLORO-3-METHYLBUTANE)	3	F1	II	3	C	2	2		45	95	0.89	2	yes	T3	II A	yes	PP, EX, A	1	
1107	AMYL CHLORIDES (2-CHLORO-2-METHYLBUTANE)	3	F1	II	3	C	2	2		50	95	0.87	2	yes	T2 [12)]	II A	yes	PP, EX, A	1	
1107	AMYL CHLORIDES (1-CHLORO-2,2-DIMETHYL-PROPANE)	3	F1	II	3	C	2	2		50	95	0.87	2	yes	T3 [2)]	II A	yes	PP, EX, A	1	
1107	AMYL CHLORIDES	3	F1	II	3	C	1	1			95	0.9	1	yes	T3 [2)]	II A	yes	PP, EX, A	1	27
1108	1-PENTENE (n-AMYLENE)	3	F1	I	3+N3	N	1	1			97	0.64	1	yes	T3	II B[4)]	yes	PP, EX, A	1	
1114	BENZENE	3	F1	II	3+N3+CMR	C	2	2	3	50	95	0.88	2	yes	T1 [12)]	II A	yes	PP, EP, EX, TOX, A	1	6: +10 ºC; 17; 23
1120	BUTANOLS (tert- BUTYLALCOHOL)	3	F1	II	3	N	2	2	2	10	97	0.79	3	yes	T1 [12)]	II A [7)]	yes	PP, EX, A	1	7; 17
1120	BUTANOLS (sec-BUTYLALCOHOL)	3	F1	III	3	N	3	2			97	0.81	3	yes	T2 [12)]	II A	yes	PP, EX, A	0	
1120	BUTANOLS (n- BUTYL ALCOHOL)	3	F1	III	3	N	3	2			97	0.81	3	yes	T2 [12)]	II B (II B2)	yes	PP, EX, A	0	
1123	BUTYL ACETATES (sec-BUTYLACETATE)	3	F1	II	3	N	2	2		10	97	0.86	3	yes	T2 [12)]	II A [7)]	yes	PP, EX, A	1	
1123	BUTYL ACETATES (n-BUTYL ACETATE)	3	F1	III	3+N3	N	3	2			97	0.86	3	yes	T2 [12)]	II A	yes	PP, EX, A	0	
1125	n-BUTYLAMINE	3	FC	II	3+8+N3	C	2	2	3	50	95	0.75	2	yes	T2 [12)]	II A	yes	PP, EP, EX, A	1	23
1127	CHLOROBUTANES (1-CHLOROBUTANE)	3	F1	II	3	C	2	2	3	50	95	0.89	2	yes	T3	II A	yes	PP, EX, A	1	23
1127	CHLOROBUTANES (2-CHLOROBUTANE)	3	F1	II	3	C	2	2	3	50	95	0.87	2	yes	T3	II A	yes	PP, EX, A	1	23

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1127	CHLOROBUTANES (1-CHLORO-2-METHYLPROPANE)	3	F1	II	3	C	2	2	3	50	95	0.88	2	yes	T3	II A	yes	PP, EX, A	1	23
1127	CHLOROBUTANES (2-CHLORO-2-METHYLPROPANE)	3	F1	II	3	C	2	2	3	50	95	0.84	2	yes	T1 [12)]	II A	yes	PP, EX, A	1	23
1127	CHLOROBUTANES	3	F1	II	3	C	1	1			95	0.89	1	yes	T4 [3)]	II A	yes	PP, EX, A	1	27
1129	BUTYRALDEHYDE (n-BUTYRALDEHYDE)	3	F1	II	3+N3	C	2	2	3	50	95	0.8	2	yes	T4	II A	yes	PP, EX, A	1	15; 23
1131	CARBON DISULPHIDE	3	FT1	I	3+6.1+N2	C	2	2	3	50	95	1.26	1	no	T6	II C	yes	PP, EP, EX, TOX, A	2	2; 9; 23
1134	CHLOROBENZENE (phenyl chloride)	3	F1	III	3+N2+S	C	2	2		30	95	1.11	2	yes	T1 [12)]	II A [8)]	yes	PP, EX, A	0	
1135	ETHYLENE CHLOROHYDRIN (2-CHLOROETHANOL)	6.1	TF1	I	6.1+3+N3	C	2	2		30	95	1.21	1	no	T2 [12)]	II A [8)]	yes	PP, EP, EX, TOX, A	2	
1143	CROTONALDEHYDE, STABILIZED	6.1	TF1	I	6.1+3+unst.+ N1	C	2	2		40	95	0.85	1	no	T3	II B (II B2)	yes	PP, EP, EX, TOX, A	2	3; 5; 15
1145	CYCLOHEXANE	3	F1	II	3+N1	C	2	2	3	50	95	0.78	2	yes	T3	II A	yes	PP, EX, A	1	6: +11 ºC; 17
1146	CYCLOPENTANE	3	F1	II	3+N2	N	2	3		10	97	0.75	3	yes	T2 [12)]	II A	yes	PP, EX, A	1	
1148	DIACETONE ALCOHOL	3	F1	III	3	N	3	2			97	0.93	3	yes	T1 [12)]	II A	yes	PP, EX, A	0	
1150	1,2-DICHLOROETHYLENE (cis-1,2-DICHLOROETHYLENE)	3	F1	II	3+N2	C	2	2	3	50	95	1.28	2	yes	T2 [1), 12)]	II A	yes	PP, EX, A	1	23
1150	1,2-DICHLOROETHYLENE (trans-1,2-DICHLOROETHYLENE)	3	F1	II	3+N2	C	2	2	3	50	95	1.26	2	yes	T2 [12)]	II A	yes	PP, EX, A	1	23
1153	ETHYLENE GLYCOL DIETHYL ETHER	3	F1	III	3	N	3	2			97	0.84	3	yes	T4	II B (II B2)	yes	PP, EX, A	0	
1154	DIETHYLAMINE	3	FC	II	3+8+N3	C	2	2	3	50	95	0.7	2	yes	T2 [12)]	II A	yes	PP, EP, EX, A	1	23
1155	DIETHYL ETHER	3	F1	I	3	C	1	1			95	0.71	1	yes	T4	II B (II B1)	yes	PP, EX, A	1	

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1157	DIISOBUTYL KETONE	3	F1	III	3+N3+F	N	3	3			97	0.81	3	yes	T2 [12)]	II B[4)]	yes	PP, EX, A	0	
1159	DIISOPROPYL ETHER	3	F1	II	3+N2	C	2	2	3	50	95	0.72	2	yes	T2 [12)]	II A	yes	PP, EX, A	1	
1160	DIMETHYLAMINE AQUEOUS SOLUTION	3	FC	II	3+8+N3	C	2	2	3	50	95	0.82	2	yes	T2 [12)]	II A	yes	PP, EP, EX, A	1	23
1163	DIMETHYLHYDRAZINE, UNSYMMETRICAL	6.1	TFC	I	6.1+3+8+ N2+CMR	C	2	2	3	50	95	0.78	1	no	T3	II B (II B1)	yes	PP, EP, EX, TOX, A	2	23
1165	DIOXANE	3	F1	II	3	N	2	2		10	97	1.03	3	yes	T2 [12)]	II B (II B3)	yes	PP, EX, A	1	6: +14 ºC; 17
1167	DIVINYL ETHER, STABILIZED	3	F1	I	3+unst.	C	1	1			95	0.77	1	yes	T2 [12)]	II B	yes	PP, EX, A	1	2; 3
1170	ETHANOL (ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION), aqueous solution with more than 70% alcohol by volume	3	F1	II	3	N	2	2		10	97	0,79 - 0,87	3	yes	T2 [12)]	II B (II B1)	yes	PP, EX, A	1	
1170	ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION), aqueous solution with more than 24% and not more than 70% alcohol by volume	3	F1	III	3	N	3	2			97	0,87 - 0,96	3	yes	T2 [12)]	II B (II B1[4)])	yes	PP, EX, A	0	
1171	ETHYLENE GLYCOL MONOETHYL ETHER	3	F1	III	3+CMR	N	2	3	3	10	97	0.93	3	yes	T3	II B (II B2)	yes	PP, EP, EX, TOX, A	0	
1172	ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	3	F1	III	3+N3+ CMR	N	2	3	3	10	97	0.98	3	yes	T2 [12)]	II A	yes	PP, EP, EX, TOX, A	0	
1173	ETHYL ACETATE	3	F1	II	3	N	2	2		10	97	0.9	3	yes	T1 [12)]	II A	yes	PP, EX, A	1	
1175	ETHYLBENZENE	3	F1	II	3+N3	N	2	2		10	97	0.87	3	yes	T2 [12)]	II A	yes	PP, EX, A	1	
1177	2-ETHYLBUTYL ACETATE	3	F1	III	3	N	3	2			97	0.88	3	yes	T3	II A [7)]	yes	PP, EX, A	0	
1179	ETHYL BUTYL ETHER (ETHYL tert-BUTYL ETHER)	3	F1	II	3+N3	N	2	2		10	97	0.74	3	yes	T2 [12)]	II B[4)]	yes	PP, EX, A	1	
1184	ETHYLENE DICHLORIDE (1,2-dichloroethane)	3	FT1	II	3+6.1+ CMR	C	2	2		50	95	1.25	2	no	T2 [12)]	II A	yes	PP, EP, EX, TOX, A	2	
1188	ETHYLENE GLYCOL MONOMETHYL ETHER	3	F1	III	3+CMR	N	2	3	3	10	97	0.97	3	yes	T3	II B (II B2)	yes	PP, EP, EX, TOX, A	0	

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1191	OCTYL ALDEHYDES (2-ETHYLCAPRONALDEHYDE)	3	F1	III	3+N3+F	C	2	2		30	95	0.82	2	yes	T4	II A [7)]	yes	PP, EX, A	0	
1191	OCTYL ALDEHYDES (n-OCTALDEHYDE)	3	F1	III	3+N3+F	N	3	3			97	0.82	3	yes	T3	II A	yes	PP, EX, A	0	
1193	ETHYL METHYL KETONE (METHYL ETHYL KETONE)	3	F1	II	3	N	2	2		10	97	0.8	3	yes	T1 [12)]	II A	yes	PP, EX, A	1	
1198	FORMALDEHYDE SOLUTION, FLAMMABLE	3	FC	III	3+8+N3	N	3	2			97	1.09	3	yes	T2 [12)]	II B	yes	PP, EP, EX, A	0	34
1199	FURALDEHYDES (a-FURALDEHYDE) or FURFURALDEHYDES (a-FURFURYLALDEHYDE)	6.1	TF1	II	6.1+3	C	2	2		25	95	1.16	2	no	T3 [2)]	II B (II B1)	yes	PP, EP, EX, TOX, A	2	15
1202	GAS OIL or DIESEL FUEL or HEATING OIL, LIGHT (flash-point not more than 60 °C)	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*	< 0,85	*	yes			no	*	0	*see 3.2.3.3
1202	GAS OIL complying with standard EN 590:2013 + A1:2017 or DIESEL FUEL or HEATING OIL, LIGHT with flash-point as specified in EN 590:2013 + A1:2017	3	F1	III	3+N2+F	N	4	3			97	0,82 - 0,85	3	yes			no	PP	0	
1202	GAS OIL or DIESEL FUEL or HEATING OIL, LIGHT (flash-point more than 60 °C but not more than 100 °C)	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*	< 1,1	*	yes			no	*	0	*see 3.2.3.3
1203	MOTOR SPIRIT or GASOLINE or PETROL	3	F1	II	3+N2+CMR+F	N	2	3	3	10	97	0,68 - 0,72 [10)]	3	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	
1203	MOTOR SPIRIT or GASOLINE or PETROL, WITH MORE THAN 10% BENZENE	3	F1	II	3+N2+CMR+F	C	*	*	*	*	*		*	yes	T3	II A	yes	*	1	*see 3.2.3.3
1203	MOTOR SPIRIT or GASOLINE or PETROL, WITH MORE THAN 10% BENZENE BOILING POINT ≤ 60 °C	3	F1	II	3+N2+CMR+F	C	1	1			95		1	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	29

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1203	MOTOR SPIRIT or GASOLINE or PETROL WITH MORE THAN 10% BENZENE 60 °C < BOILING POINT ≤ 85 °C	3	F1	II	3+N2+CMR+F	C	2	2	3	50	95		2	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	23; 29
1203	MOTOR SPIRIT or GASOLINE or PETROL WITH MORE THAN 10% BENZENE 85 °C < BOILING POINT ≤ 115 °C	3	F1	II	3+N2+CMR+F	C	2	2		50	95		2	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	29
1203	MOTOR SPIRIT or GASOLINE or PETROL WITH MORE THAN 10% BENZENE BOILING POINT > 115 °C	3	F1	II	3+N2+CMR+F	C	2	2		35	95		2	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	29
1206	HEPTANES	3	F1	II	3+N1	C	2	2	3	50	95	0.67 – 0.70	2	yes	T3	II A	yes	PP, EX, A	1	
1208	HEXANES	3	F1	II	3+N2	N	2	3		50	97	0.65 – 0.70	2	yes	T3	II A	yes	PP, EX, A	1	
1208	HEXANES	3	F1	II	3+N2	N	2	3	3	10	97	0.65 – 0.70	2	yes	T3	II A	yes	PP, EX, A	1	
1212	ISOBUTANOL or ISOBUTYL ALCOHOL	3	F1	III	3	N	3	2			97	0.8	3	yes	T2 [12)]	II A	yes	PP, EX, A	0	
1213	ISOBUTYLACETATE	3	F1	II	3+N3	N	2	2		10	97	0.87	3	yes	T2 [12)]	II A[7)]	yes	PP, EX, A	1	
1214	ISOBUTYLAMINE	3	FC	II	3+8+N3	C	2	2	3	50	95	0.73	2	yes	T2 [12)]	II A[7)]	yes	PP, EP, EX, A	1	23
1216	ISOOCTENES	3	F1	II	3+N2	N	2	3		10	97	0.73	3	yes	T3	II B[4)]	yes	PP, EX, A	1	
1218	ISOPRENE, STABILIZED	3	F1	I	3+unst.+N2+CMR	N	1	1			95	0.68	1	yes	T3	II B (II B2)	yes	PP, EP, EX, TOX, A	1	2; 3; 5;16
1219	ISOPROPANOL or ISOPROPYL ALCOHOL	3	F1	II	3	N	2	2		10	97	0.78	3	yes	T2 [12)]	II A	yes	PP, EX, A	1	
1220	ISOPROPYLE ACETATE	3	F1	II	3	N	2	2		10	97	0.88	3	yes	T2 [12)]	II A[7)]	yes	PP, EX, A	1	
1221	ISOPROPYLAMINE	3	FC	I	3+8+N3	C	1	1			95	0.69	1	yes	T2 [12)]	II A[7)]	yes	PP, EP, EX, A	1	
1223	KEROSENE	3	F1	III	3+N2+F	N	3	3			97	≤ 0,83	3	yes	T3	II A[7)]	yes	PP, EX, A	0	14

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1224	KETONES, LIQUID, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	1	14; 27; 29 *see 3.2.3.3
1224	KETONES, LIQUID, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	14; 27; 29; 44 *see 3.2.3.3
1224	KETONES, LIQUID, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	0	14; 27 *see 3.2.3.3
1224	KETONES, LIQUID, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	0	14; 27; 44 *see 3.2.3.3
1229	MESITYL OXYDE	3	F1	III	3	N	3	2			97	0.85	3	yes	T2 [12]	II A	yes	PP, EX, A	0	
1230	METHANOL	3	FT1	II	3+6.1	N	2	2	3	50	95	0.79	2	yes	T2 [12]	II A	yes	PP, EP, EX, TOX, A	2	23
1231	METHYL ACETATE	3	F1	II	3	N	2	2		10	97	0.93	3	yes	T1 [12]	II A	yes	PP, EX, A	1	
1235	METHYLAMINE, AQUEOUS SOLUTION	3	FC	II	3+8+N3	C	2	2		50	95		2	yes	T2 [12]	II A	yes	PP, EP, EX, A	1	
1243	METHYL FORMATE	3	F1	I	3	C	1	1			95	0.97	1	yes	T2 [12]	II A	yes	PP, EX, A	1	
1244	METHYLHYDRAZINE	6.1	TFC	I	6.1+3+8	C	2	2		45	95	0.88	1	no	T4	II C[5]	yes	PP, EP, EX, TOX, A	2	
1245	METHYL ISOBUTYL KETONE	3	F1	II	3	N	2	2		10	97	0.8	3	yes	T1 [12]	II A	yes	PP, EX, A	1	
1247	METHYL METHACRYLATE MONOMER, STABILIZED	3	F1	II	3+unst.+N3	C	2	2		40	95	0.94	1	yes	T2 [12]	II A	yes	PP, EX, A	1	3; 5; 16
1262	OCTANES	3	F1	II	3+N1	C	2	2		45	95	0.69 – 0.71	2	yes	T3	II A	yes	PP, EX, A	1	
1264	PARALDEHYDE	3	F1	III	3	N	3	2			97	0.99	3	yes	T3	II A[7]	yes	PP, EX, A	0	6: +16 ºC; 17
1265	PENTANES, liquid	3	F1	I	3+N2	*	*	*	*	*	*	*	*	yes	*	II A	yes	PP, EX, A	1	14; * see 3.2.3.3

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1265	PENTANES, liquid	3	F1	II	3+N2	*	*	*	*	*	*	*	*	yes	*	II A	yes	PP, EX, A	1	14; * see 3.2.3.3
1265	PENTANES, liquid (2- METHYLBUTANE)	3	F1	I	3+N2	N	1	1			97	0.62	1	yes	T2 [12)]	II A	yes	PP, EX, A	1	
1265	PENTANES, liquid (n-PENTANE)	3	F1	II	3+N2	N	2	3		50	97	0.63	3	yes	T3	II A	yes	PP, EX, A	1	
1265	PENTANES, liquid (n-PENTANE)	3	F1	II	3+N2	N	2	3	3	10	97	0.63	3	yes	T3	II A	yes	PP, EX, A	1	
1267	PETROLEUM CRUDE OIL	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	1	14; *see 3.2.3.3
1267	PETROLEUM CRUDE OIL	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	14; 44 *see 3.2.3.3
1267	PETROLEUM CRUDE OIL	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	1	14; *see 3.2.3.3
1267	PETROLEUM CRUDE OIL	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	14; 44 *see 3.2.3.3
1267	PETROLEUM CRUDE OIL	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	0	14; *see 3.2.3.3
1267	PETROLEUM CRUDE OIL	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	14; 44 *see 3.2.3.3
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	1	*see 3.2.3.3
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	44 *see 3.2.3.3
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	1	*see 3.2.3.3
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	44 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	0	*see 3.2.3.3
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	0	44 *see 3.2.3.3
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29; 43
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 43; 44
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	0	29
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2	3	50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	23; 29; 38
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2	3	50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	23; 29; 38; 44

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2	3	50	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	23; 29; 38
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2	3	50	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	1	23; 29; 38; 44
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2		50	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	1	29
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2		50	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2		50	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	29
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2		50	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2		35	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	1	29
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2		35	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2		35	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	29
1267	PETROLEUM CRUDE OIL WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2		35	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	1	14; 27 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	14; 27; 44 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	1	14; 27 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	14; 27; 44 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	0	14; 27 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	14; 27; 44 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	1	27 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	27; 44 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	1	27 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	27; 44 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	0	27 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	0	27; 44 *see 3.2.3.3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	27; 29; 43
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	27; 29; 43; 44
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	27; 29

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+CMR+F+(N1, N2, N3)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	27; 29; 44
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2	3	50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	23; 27; 29; 38
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2	3	50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	23; 27; 29; 38; 44
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2		50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	27; 29
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2		50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	27; 29; 44

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2		35	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	1	27; 29
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	2	2		35	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	1	27; 29; 44
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (NAPHTA) 110 kPa < vp50 ≤ 175 kPa	3	F1	II	3+N2+ CMR+F	N	2	3		50	97	0,735	3	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	14; 29
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (NAPHTA) 110 kPa < vp50 ≤ 150 kPa	3	F1	II	3+N2+ CMR+F	N	2	3	3	10	97	0,735	3	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	14; 29
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (NAPHTA) vp50 ≤ 110 kPa	3	F1	II	3+N2+ CMR+F	N	2	3		10	97	0,735	3	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	14; 29
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S (BENZENE HEART CUT) vp50 ≤ 110 kPa	3	F1	II	3+N2+ CMR+F	N	2	3		10	97	0,765	3	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	14; 29
1274	n-PROPANOL or PROPYL ALCOHOL, NORMAL	3	F1	II	3	N	2	2		10	97	0.8	3	yes	T2 [12)]	II B (II B1)	yes	PP, EX, A	1	
1274	n-PROPANOL or PROPYL ALCOHOL, NORMAL	3	F1	III	3	N	3	2			97	0.8	3	yes	T2 [12)]	II B (II B1)	yes	PP, EX, A	0	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1275	PROPIONALDEHYDE	3	F1	II	3+N3	C	2	2	3	50	95	0.81	2	yes	T4	II B (II B2)	yes	PP, EX, A	1	15; 23
1276	n-PROPYL ACETATE	3	F1	II	3+N3	N	2	2		10	97	0.88	3	yes	T1 [12)]	II A	yes	PP, EX, A	1	
1277	PROPYLAMINE (1-aminopropane)	3	FC	II	3+8	C	2	2	3	50	95	0.72	2	yes	T2 [12)]	II A	yes	PP, EP, EX, A	1	23
1278	1-CHLOROPROPANE (propyl chloride)	3	F1	II	3	C	2	2	3	50	95	0.89	2	yes	T1 [12)]	II A	yes	PP, EX, A	1	23
1279	1,2-DICHLOROPROPANE or PROPYL DICHLORIDE	3	F1	II	3+N2	C	2	2		45	95	1.16	2	yes	T1 [12)]	II A [8)]	yes	PP, EX, A	1	
1280	PROPYLENE OXIDE	3	F1	I	3+unst.+N3+ CMR	C	1	1			95	0.83	1	yes	T2 [12)]	II B (II B3)	yes	PP, EP, EX, TOX, A	1	2; 12; 31; 35
1282	PYRIDINE	3	F1	II	3+N3	N	2	2		10	97	0.98	3	yes	T1 [12)]	II A [8)]	yes	PP, EX, A	1	
1289	SODIUM METHYLATE SOLUTION in alcohol	3	FC	III	3+8	N	3	2			97	0.969	3	yes	T2 [12)]	II A	yes	PP, EP, EX, A	0	34
1294	TOLUENE	3	F1	II	3+N3	N	2	2		10	97	0.87	3	yes	T1 [12)]	II A	yes	PP, EX, A	1	
1296	TRIETHYLAMINE	3	FC	II	3+8+N3	C	2	2		50	95	0.73	2	yes	T3	II A [8)]	yes	PP, EP, EX, A	1	
1300	TURPENTINE SUBSTITUTE	3	F1	III	3+N2+F	N	3	3			97	0.78	3	yes	T3	II B[4)]	yes	PP, EX, A	0	
1301	VINYL ACETATE, STABILIZED	3	F1	II	3+unst.+N3	N	2	2		10	97	0.93	2	yes	T2 [12)]	II A	yes	PP, EX, A	1	3; 5; 16
1307	XYLENES (o- XYLENE)	3	F1	III	3+N2	N	3	3			97	0.88	3	yes	T1 [12)]	II A	yes	PP, EX, A	0	
1307	XYLENES (m- XYLENE)	3	F1	III	3+N2	N	3	3			97	0.86	3	yes	T1 [12)]	II A	yes	PP, EX, A	0	
1307	XYLENES (p- XYLENE)	3	F1	III	3+N2	N	3	3	2		97	0.86	3	yes	T1 [12)]	II A	yes	PP, EX, A	0	6: +17 ºC; 17
1307	XYLENES (mixture with melting point ≤ 0° C)	3	F1	II	3+N2	N	3	3			97		3	yes	T1 [12)]	II A	yes	PP, EX, A	1	
1307	XYLENES (mixture with melting point ≤ 0° C)	3	F1	III	3+N2	N	3	3			97		3	yes	T1 [12)]	II A	yes	PP, EX, A	0	
1307	XYLENES (mixture with 0° C < melting point < 13° C)	3	F1	III	3+N2	N	3	3	2		97		3	yes	T1 [12)]	II A	yes	PP, EX, A	0	6: +17 ºC; 17

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1541	ACETONE CYANOHYDRIN, STABILIZED	6.1	T1	I	6.1+unst. +N1	C	2	2		50	95	0.932	1	no			no	PP, EP, TOX, A	2	3
1545	ALLYL ISOTHIOCYANATE, STABILIZED	6.1	TF1	II	6.1+3+unst.	C	2	2		30	95	1.02	1	no	T4 [3]	II B[4]	yes	PP, EP, EX, TOX, A	2	2; 3
1547	ANILINE	6.1	T1	II	6.1+N1	C	2	2		25	95	1.02	2	no			no	PP, EP, TOX, A	2	
1578	CHLORONITROBENZENES, SOLID, MOLTEN (p-CHLORONITROBENZENE)	6.1	T2	II	6.1+N2+S	C	2	1	2	25	95	1.37	2	no	T1 [12]	II B (II B3[14])	yes	PP, EP, EX, TOX, A	2	7; 17; 26
1578	CHLORONITROBENZENES, SOLID, MOLTEN (p-CHLORONITROBENZENE)	6.1	T2	II	6.1+N2+S	C	2	1	4	25	95	1.37	2	no			no	PP, EP, TOX, A	2	7; 17; 20: +112ºC; 26
1591	o-DICHLOROBENZENE	6.1	T1	III	6.1+N1+S	C	2	2		25	95	1.32	2	no			no	PP, EP, TOX, A	0	
1593	DICHLOROMETHANE (methyl chloride)	6.1	T1	III	6.1	C	2	2	3	50	95	1.33	2	no			no	PP, EP, TOX, A	0	23
1594	DIETHYL SULPHATE	6.1	T1	II	6.1+N2 +CMR	C	2	2		25	95	1.18	2	no			no	PP, EP, TOX, A	2	
1595	DIMETHYL SULPHATE	6.1	TC1	I	6.1+8+N3+ CMR	C	2	2		25	95	1.33	1	no			no	PP, EP, TOX, A	2	
1604	ETHYLENEDIAMINE	8	CF1	II	8+3+N3	N	3	2			97	0.9	3	yes	T2 [12]	II A	yes	PP, EP, EX, A	1	6: +12 ºC; 17; 34
1605	ETHYLENE DIBROMIDE	6.1	T1	I	6.1+N2 +CMR	C	2	2		30	95	2.18	1	no			no	PP, EP, TOX, A	2	6: +14 ºC; 17
1648	ACETONITRILE (methyl cyanide)	3	F1	II	3	N	2	2		10	97	0.78	3	yes	T1 [12]	II A	yes	PP, EX, A	1	
1662	NITROBENZENE	6.1	T1	II	6.1+N2	C	2	2	2	25	95	1.21	2	no	T1 [12]	II B (II B1)	yes	PP, EP, EX, TOX, A	2	6: +10ºC; 17
1663	NITROPHENOLS	6.1	T2	III	6.1+N3+S	C	2	2	2	25	95		2	no	T1 [12]	II B (II B3[14])	yes	PP, EP, EX, TOX, A	0	7; 17

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1663	NITROPHENOLS	6.1	T2	III	6.1+N3+S	C	2	2	4	25	95		2	no			no	PP, EP, TOX, A	0	7; 17; 20: +65 ºC
1664	NITROTOLUENES, LIQUID (o-NITROTOLUENE)	6.1	T1	II	6.1+N2 +CMR+S	C	2	2		25	95	1.16	2	no			no	PP, EP, TOX, A	2	
1708	TOLUIDINES, LIQUID (o-TOLUIDINE)	6.1	T1	II	6.1+N1+CMR	C	2	2		25	95	1	2	no			no	PP, EP, TOX, A	2	
1708	TOLUIDINES, LIQUID (m-TOLUIDINE)	6.1	T1	II	6.1+N1	C	2	2		25	95	1.03	2	no			no	PP, EP, TOX, A	2	
1710	TRICHLOROETHYLENE	6.1	T1	III	6.1+N2 +CMR	C	2	2		50	95	1.46	2	no			no	PP, EP, TOX, A	0	15
1715	ACETIC ANHYDRIDE	8	CF1	II	8+3	N	2	3		10	97	1.08	3	yes	T2 [12)]	II A	yes	PP, EP, EX, A	1	34
1717	ACETYL CHLORIDE	3	FC	II	3+8	C	2	2	3	50	95	1.1	2	yes	T2 [12)]	II A [8)]	yes	PP, EP, EX, A	1	23
1718	BUTYL ACIDE PHOSPHATE	8	C3	III	8+N3	N	4	3			97	0.98	3	yes			no	PP, EP	0	34
1719	CAUSTIC ALKALI LIQUID, N.O.S.	8	C5	II	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 30; 34 *see 3.2.3.3
1719	CAUSTIC ALKALI LIQUID, N.O.S.	8	C5	III	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 30; 34 *see 3.2.3.3
1738	BENZYL CHLORIDE	6.1	TC1	II	6.1+8+3+N3+ CMR+S	C	2	2		25	95	1.1	2	no	T1 [12)]	II A [8)]	yes	PP, EP, EX, TOX, A	2	
1742	BORON TRIFLUORIDE ACETIC ACID COMPLEX, LIQUID	8	C3	II	8	N	4	2			97	1.35	3	yes			no	PP, EP	0	34
1750	CHLORACETIC ACID SOLUTION	6.1	TC1	II	6.1+8+N1	C	2	2	2	25	95	1.58	2	no	T1 [12)]	II A	yes	PP, EP, EX, TOX, A	2	7; 17
1750	CHLORACETIC ACID SOLUTION	6.1	TC1	II	6.1+8+N1	C	2	1	4	25	95	1.58	2	no			no	PP, EP, TOX, A	2	7; 17; 20: +111°C; 26
1760	CORROSIVE LIQUID, N.O.S.	8	C9	I	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1760	CORROSIVE LIQUID, N.O.S.	8	C9	II	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
1760	CORROSIVE LIQUID, N.O.S.	8	C9	III	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
1760	CORROSIVE LIQUID, N.O.S. (SODIUM MERCAPTOBENZOTHIAZOLE, 50% AQUEOUS SOLUTION)	8	C9	II	8+N1+F	C	2	2		40	95	1.25	2	yes			no	PP, EP	0	
1760	CORROSIVE LIQUID, N.O.S. (FATTY ALCOHOL, C_{12}-C_{14})	8	C9	III	8+F	N	4	3			97	0.89	3	yes			no	PP, EP	0	34
1760	CORROSIVE LIQUID, N.O.S. (ETHYLENEDIAMINE-TETRAACETIC ACID, TETRASODIUM SALT, 40% AQUEOUS SOLUTION)	8	C9	III	8+N2	N	4	3			97	1.28	3	yes			no	PP, EP	0	34
1764	DICHLOROACETIC ACID	8	C3	II	8+N1	N	3	3			97	1.56	2	yes	T1 [12)]	II A	yes	PP, EP, EX, A	0	6:+13 °C; 17
1778	FLUOROSILICIC ACID	8	C1	II	8+N3	N	2	3		10	97		3	yes			no	PP, EP	0	34
1779	FORMIC ACID with more than 85% acid by mass	8	CF1	II	8+3+N3	N	2	3		10	97	1.22	3	yes	T1 [12)]	II A	yes	PP, EP, EX, A	1	6: +12 ºC; 17; 34
1780	FUMARYL CHLORIDE	8	C3	II	8+N3	N	2	3		10	97	1.41	3	yes			no	PP, EP	0	8; 34
1783	HEXAMETHYLENEDIAMINE SOLUTION	8	C7	II	8+N3	N	3	2	2		97		3	yes	T4 [3)]	II A	yes	PP, EP, EX, A	0	7; 17; 34
1783	HEXAMETHYLENEDIAMINE SOLUTION	8	C7	III	8+N3	N	3	2	2		97		3	yes	T3	II A	yes	PP, EP, EX, A	0	7; 17; 34
1789	HYDROCHLORIC ACID	8	C1	II	8	N	2	3		10	97		3	yes			no	PP, EP	0	34
1789	HYDROCHLORIC ACID	8	C1	III	8	N	4	3			97		3	yes			no	PP, EP	0	34
1805	PHOSPHORIC ACID, SOLUTION, WITH MORE THAN 80% (VOLUME) ACID	8	C1	III	8	N	4	3	2		95	> 1,6	3	yes			no	PP, EP	0	7; 17; 22; 34

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1805	PHOSPHORIC ACID, SOLUTION, WITH 80% (VOLUME) ACID, OR LESS	8	C1	III	8	N	4	3			97	1,00 - 1,6	3	yes			no	PP, EP	0	22; 34
1814	POTASSIUM HYDROXIDE SOLUTION	8	C5	II	8+N3	N	4	2			97		3	yes			no	PP, EP	0	30; 34
1814	POTASSIUM HYDROXIDE SOLUTION	8	C5	III	8+N3	N	4	2			97		3	yes			no	PP, EP	0	30; 34
1823	SODIUM HYDROXIDE, SOLID, MOLTEN	8	C6	II	8+N3	N	4	1	4		95	2.13	3	yes			no	PP, EP	0	7; 17; 34
1824	SODIUM HYDROXIDE SOLUTION	8	C5	II	8+N3	N	4	2			97		3	yes			no	PP, EP	0	30; 34
1824	SODIUM HYDROXIDE SOLUTION	8	C5	III	8+N3	N	4	2			97		3	yes			no	PP, EP	0	30; 34
1830	SULPHURIC ACID with more than 51% acid	8	C1	II	8+N3	N	4	3			97	1,4 - 1,84	3	yes			no	PP, EP	0	8; 22; 30; 34
1831	SULPHURIC ACID, FUMING	8	CT1	I	8+6.1	C	2	2		50	95	1.94	1	no			no	PP, EP, TOX, A	2	8
1832	SULPHURIC ACID, SPENT	8	C1	II	8	N	4	3			97		3	yes			no	PP, EP	0	8; 30; 34
1846	CARBON TETRACHLORIDE	6.1	T1	II	6.1+N2+S	C	2	2	3	50	95	1.59	2	no			no	PP, EP, TOX, A	2	23
1848	PROPIONIC ACID with not less than 10% and less than 90% acid by mass	8	C3	III	8+N3	N	3	3			97	0.99	3	yes			no	PP, EP	0	34
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	1	14; *see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	14; 44 *see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	1	14; *see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	14; 44 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3)]	II B[4)]	yes	*	0	14; *see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	14; 44 *see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	1	*see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	44 *see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	1	*see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	44 *see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	0	*see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	44 *see 3.2.3.3
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	1	29; 43
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 43; 44

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	1	29
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+CMR+F+ (N1, N2, N3)	C	1	1			95		1	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2	3	50	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	23; 29; 38
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	III	3+CMR+F+(N 1, N2, N3)	C	2	2	3	50	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	0	23; 29; 38; 44
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2		50	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	29
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2		50	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2		35	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	29

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1863	FUEL, AVIATION, TURBINE ENGINE WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	III	3+CMR+F+ (N1, N2, N3)	C	2	2		35	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
1888	CHLOROFORM	6.1	T1	III	6.1+N2+CMR	C	2	2	3	50	95	1.48	2	no			no	PP, EP, TOX, A	0	23
1897	TETRACHLOROETHYLENE	6.1	T1	III	6.1+N2+S	C	2	2		50	95	1.62	2	no			no	PP, EP, TOX, A	0	
1912	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2	2F		2.1	G	1	1			91		1	no	T1 [12]	II A[8]	yes	PP, EX, A	1	2; 31
1915	CYCLOHEXANONE	3	F1	III	3	N	3	2			97	0.95	3	yes	T2 [12]	II A	yes	PP, EX, A	0	
1917	ETHYL ACRYLATE, STABILIZED	3	F1	II	3+unst.+N3	C	2	2		40	95	0.92	1	yes	T2 [12]	II B (II B1)	yes	PP, EX, A	1	3; 5
1918	ISOPROPYLBENZENE (cumene)	3	F1	III	3+N2	N	3	3			97	0.86	3	yes	T2 [12]	II A[8]	yes	PP, EX, A	0	
1919	METHYL ACRYLATE, STABILIZED	3	F1	II	3+unst.+N3	C	2	2	3	50	95	0.95	1	yes	T2 [12]	II B (II B1)	yes	PP, EX, A	1	3; 5; 23
1920	NONANES	3	F1	III	3+N2+F	N	3	3			97	0,70 - 0,75	3	yes	T3	II A	yes	PP, EX, A	0	
1922	PYRROLIDINE	3	FC	II	3+8	C	2	2		50	95	0.86	2	yes	T2 [12]	II A[7]	yes	PP, EP, EX, A	1	
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.	2	2F		2.1 + CMR	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A, EP, TOX	1	2; 31
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A0)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A01)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A02)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE A1)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE B)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE B1)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE B2)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., (MIXTURE C)	2	2F		2.1	G	1	1			91		1	no	T4 [3]	II B[4]	yes	PP, EX, A	1	2; 31
1969	ISOBUTANE (contains less than 0.1% 1.3-butadiene)	2	2F		2.1	G	1	1			91		1	no	T2 [1), 12)]	II A[7]	yes	PP, EX, A	1	2; 31
1969	ISOBUTANE (with 0.1% or more 1.3-butadiene)	2	2F		2.1+ CMR	G	1	1			91		1	no	T2 [1), 12)]	II A	yes	PP, EP, EX, TOX, A	1	2; 31
1972	METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID, with high methane content	2	3F		2.1	G	1	1	1		95		1	no	T1 [12)]	IIA	yes	PP, EX, A	1	2; 31; 42
1978	PROPANE	2	2F		2.1	G	1	1			91		1	no	T1 [12)]	II A	yes	PP, EX, A	1	2; 31
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1+ (N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	no	T4 [3]	II B[4]	yes	PP, EP, EX, TOX, A	2	27; 29; *see 3.2.3.3
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1+ (N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	no	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no	T4 [3]	II B[4]	yes	PP, EP, EX, TOX, A	2	27; 29; *see 3.2.3.3
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4]	yes	PP, EP, EX, TOX, A	2	27; 29; *see 3.2.3.3
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4]	yes	PP, EP, EX, TOX, A	0	27; 29; *see 3.2.3.3
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	27; 29; 44 *see 3.2.3.3
1987	ALCOHOLS, N.O.S. (tert-BUTANOL 90% (MASS)/METHANOL 10% (MASS) MIXTURE)	3	F1	II	3	N	2	2		10	97		3	yes	T1 [12]	II A	yes	PP, EX, A	1	
1987	ALCOHOLS, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	1	14; 27; 29 *see 3.2.3.3
1987	ALCOHOLS, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	14; 27; 29; 44*see 3.2.3.3
1987	ALCOHOLS, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	0	14; 27 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1987	ALCOHOLS, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	14; 27; 44 *see 3.2.3.3
1987	ALCOHOLS, N.O.S. (CYCLOHEXANOL)	3	F1	III	3+N3+F	N	3	3	2		95	0.95	3	yes	T3	II A	yes	PP, EX, A	0	7; 17
1987	ALCOHOLS, N.O.S. (CYCLOHEXANOL)	3	F1	III	3+N3+F	N	3	3	4		95	0.95	3	yes			no	PP	0	7; 17; 20: +46 ºC
1989	ALDEHYDES, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	1	14; 27; 29 *see 3.2.3.3
1989	ALDEHYDES, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	14; 27; 29; 44 *see 3.2.3.3
1989	ALDEHYDES, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	0	14; 27 *see 3.2.3.3
1989	ALDEHYDES, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	14; 27; 44 *see 3.2.3.3
1991	CHLOROPRENE, STABILIZED	3	FT1	I	3+6.1+unst.+CMR	C	2	2	3	50	95	0.96	1	no	T2 [12)]	II B (II B3)	yes	PP, EP, EX, TOX, A	2	3; 5; 23
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	FT1	I	3+6.1+ (N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	no	T4 [3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	27; 29 *see 3.2.3.3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	FT1	I	3+6.1+ (N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S	3	FT1	I	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no	T4 [3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	27; 29 *see 3.2.3.3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S	3	FT1	I	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1992	FLAMMABLE LIQUID, TOXIC, N.O.S	3	FT1	II	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4]	yes	PP, EP, EX, TOX, A	2	27; 29 *see 3.2.3.3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S	3	FT1	II	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S	3	FT1	III	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4]	yes	PP, EP, EX, TOX, A	0	27; 29 *see 3.2.3.3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S	3	FT1	III	3+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	27; 29; 44 *see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3]	II B[4]	yes	*	1	14; *see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	14; 44*see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3]	II B[4]	yes	*	1	14; *see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	14; 44 *see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3]	II B[4]	yes	*	0	14; *see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	0	14; 44 *see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	I	3+(N1, N2, N3, CMR, F)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	1	*see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	I	3+(N1, N2, N3, CMR, F)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	44*see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	II	3+(N1, N2, N3, CMR, F)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	1	*see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	II	3+(N1, N2, N3, CMR, F)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	44 *see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	III	3+(N1, N2, N3, CMR, F)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	0	*see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	III	3+(N1, N2, N3, CMR, F)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	0	44 *see 3.2.3.3
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+(N1, N2, N3, CMR, F)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+(N1, N2, N3, CMR, F)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+(N1, N2, N3, CMR, F)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+(N1, N2, N3, CMR, F)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	III	3+(N1, N2, N3, CMR, F)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	0	29

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	III	3+(N1, N2, N3, CMR, F)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	II	3+(N1, N2, N3, CMR, F)	C	2	2	3	50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	23; 29; 38
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	II	3+(N1, N2, N3, CMR, F)	C	2	2	3	50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	23; 29; 38; 44
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	III	3+(N1, N2, N3, CMR, F)	C	2	2	3	50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	0	23; 29; 38
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	III	3+(N1, N2, N3, CMR, F)	C	2	2	3	50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	23; 29; 38; 44
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	II	3+(N1, N2, N3, CMR, F)	C	2	2		50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	II	3+(N1, N2, N3, CMR, F)	C	2	2		50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	III	3+(N1, N2, N3, CMR, F)	C	2	2		50	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	29
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	III	3+(N1, N2, N3, CMR, F)	C	2	2		50	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	II	3+(N1, N2, N3, CMR, F)	C	2	2		35	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	1	29
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	II	3+(N1, N2, N3, CMR, F)	C	2	2		35	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	III	3+(N1, N2, N3, CMR, F)	C	2	2		35	95		2	yes	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	29
1993	FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	III	3+(N1, N2, N3, CMR, F)	C	2	2		35	95		2	yes	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
1993	FLAMMABLE LIQUID, N.O.S. (CYCLOHEXANONE/ CYCLOHEXANOL MIXTURE)	3	F1	III	3+F	N	3	3			97	0,95	3	yes	T3	II A	yes	PP, EX, A	0	
1999	TARS, LIQUID, including road oils, and cutback bitumens	3	F1	III	3+S	N	4	3	2		97		3	yes	T3	II A[7)]	yes	PP, EX, A	0	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2014	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)	5.1	OC1	II	5.1+8+unst.	C	2	2		35	95	1.2	2	yes			no	PP, EP	0	3; 33
2021	CHLOROPHENOLS, LIQUID (2-CHLOROPHENOL)	6.1	T1	III	6.1+N2	C	2	2		25	95	1.23	2	no	T1 [12)]	II A[7)]	yes	PP, EP, EX, TOX, A	0	6: +10 ºC; 17
2022	CRESYLIC ACID	6.1	TC1	II	6.1+8+3+S	C	2	2		25	95	1.03	2	no	T1 [12)]	II A[7)]	yes	PP, EP, EX, TOX, A	2	6: +16 ºC; 17
2023	EPICHLORHYDRINE	6.1	TF1	II	6.1+3+N3	C	2	2		35	95	1.18	2	no	T2 [12)]	II B (II B3)	yes	PP, EP, EX, TOX, A	2	5
2031	NITRIC ACID, other than red fuming, with more than 70% acid	8	CO1	I	8+5.1+N3	N	2	3		10	97	1,41-1,48	3	yes			no	PP, EP	0	34
2031	NITRIC ACID, other than red fuming with at least 65% but not more than 70% acid	8	CO1	II	8+5.1+N3	N	2	3		10	97	1,39-1,41	3	yes			no	PP, EP	0	34
2031	NITRIC ACID, other than red fuming, with less than 65% acid	8	CO1	II	8+N3	N	2	3		10	97	1,02-1,39	3	yes			no	PP, EP	0	34
2032	NITRIC ACID, RED FUMING	8	COT	I	8+5.1+6.1+N3	C	2	2		50	95	1,48-1.51	1	no			no	PP, EP, TOX, A	2	
2045	ISOBUTYRALDEHYDE (ISOBUTYL ALDEHYDE)	3	F1	II	3+N3	C	2	2	3	50	95	0.79	2	yes	T4	II A[7)]	yes	PP, EX, A	1	15; 23
2046	CYMENES	3	F1	III	3+N2+F	N	3	3			97	0.88	3	yes	T2 [12)]	II A[7)]	yes	PP, EX, A	0	
2047	DICHLOROPROPENES (2,3-DICHLOROPROP-1-ENE)	3	F1	II	3+N2+CMR	C	2	2		45	95	1.2	2	yes	T1 [12)]	II A[7)]	yes	PP, EP, EX, TOX, A	1	
2047	DICHLOROPROPENES (MIXTURES of 2,3-DICHLOROPROP-1-ENE and 1,3-DICHLOROPROPENE)	3	F1	II	3+N1+CMR	C	2	2		45	95	1.23	2	yes	T2[1), 12)]	II A[7)]	yes	PP, EP, EX, TOX, A	1	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2047	DICHLOROPROPENES (MIXTURES of 2,3-DICHLOROPROP-1-ENE and 1,3-DICHLOROPROPENE)	3	F1	III	3+N1+CMR	C	2	2		45	95	1.23	2	yes	T2[1), 12)]	II A[7)]	yes	PP, EP, EX, TOX, A	0	
2047	DICHLOROPROPENES (1,3-DICHLOROPROPENE)	3	F1	III	3+N1+CMR	C	2	2		40	95	1.23	2	yes	T2[1), 12)]	II A[7)]	yes	PP, EP, EX, TOX, A	0	
2048	DICYCLOPENTADIENE	3	F1	III	3+N2+F	N	3	3	2		95	0.94	3	yes	T1 [12)]	II A	yes	PP, EX, A	0	7; 17
2050	DIISOBUTYLENE, ISOMERIC COMPOUNDS	3	F1	II	3+N2+F	N	2	3		10	97	0.72	3	yes	T3[2)]	II A[7)]	yes	PP, EX, A	1	
2051	2-DIMETHYLAMINO ETHANOL	8	CF1	II	8+3+N3	N	3	2			97	0.89	3	yes	T3	II A[7)]	yes	PP, EP, EX, A	1	34
2053	METHYL ISOBUTYL CARBINOL	3	F1	III	3	N	3	2			97	0.81	3	yes	T2 [12)]	II A	yes	PP, EX, A	0	
2054	MORPHOLINE	8	CF1	I	8+3+N3	N	3	2			97	1	3	yes	T3	II A	yes	PP, EP, EX, A	1	34
2055	STYRENE MONOMER, STABILIZED	3	F1	III	3+unst.+N3	N	3	2			97	0.91	3	yes	T1 [12)]	II A	yes	PP, EX, A	0	3; 5; 16
2056	TETRAHYDROFURAN	3	F1	II	3	N	2	2		10	97	0.89	3	yes	T3	II B (II B1)	yes	PP, EX, A	1	
2057	TRIPROPYLENE	3	F1	II	3 + N1	C	2	2		10	97	0.744	2	yes	T3	II A	yes	PP, EX, A	1	
2057	TRIPROPYLENE	3	F1	III	3 + N1	C	2	2			97	0.73	2	yes	T3	II A	yes	PP, EX, A	0	
2078	TOLUENE DIISOCYANATE (and isomeric mixtures) (2,4- TOLUENE DIISOCYANATE)	6.1	T1	II	6.1+N2+S	C	2	2	2	25	95	1.22	2	no	T1 [12)]	II B (II B3[14)])	yes	PP, EP, EX, TOX, A	2	2; 7; 8; 17
2078	TOLUENE DIISOCYANATE (and isomeric mixtures) (2,4- TOLUENE DIISOCYANATE)	6.1	T1	II	6.1+N2+S	C	2	1	4	25	95	1.22	2	no			no	PP, EP, TOX, A	2	2; 7; 8; 17; 20: +112°C; 26
2079	DIETHYLENETRIAMINE	8	C7	II	8+N3	N	4	2			97	0.96	3	yes			no	PP, EP	0	34
2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2	3A		2.2	G	1	1	1		95		1	yes			no	PP	0	31,39
2205	ADIPONITRILE	6.1	T1	III	6.1	C	2	2		25	95	0.96	2	no	T4	II B (II B3[14)])	yes	PP, EP, EX, TOX, A	0	6: 6°C; 17

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2206	ISOCYANATES, TOXIC, N.O.S. (4‑CHLOROPHENYL ISOCYANATE)	6.1	T1	II	6.1+S	C	2	2	4	25	95	1.25	2	no			no	PP, EP, TOX, A	2	7; 17
2209	FORMALDEHYDE SOLUTION with not less than 25% formaldehyde	8	C9	III	8+N3	N	4	2			97	1.09	3	yes			no	PP, EP	0	15; 34
2215	MALEIC ANHYDRIDE, MOLTEN	8	C3	III	8+N3	N	3	3	2		95	0.93	3	yes	T2 [12)]	II B[4)]	yes	PP, EP, EX, A	0	7; 17; 25; 34
2215	MALEIC ANHYDRIDE, MOLTEN	8	C3	III	8+N3	N	3	1	4		95	0.93	3	yes			no	PP, EP	0	7; 17; 20: +88 ºC; 25; 34
2218	ACRYLIC ACID, STABILIZED	8	CF1	II	8+3+unst.+N1	C	2	2	4	30	95	1.05	1	yes	T2 [12)]	II B (II B1)	yes	PP, EP, EX, A	1	3; 4; 5; 17
2227	n-BUTYL METHACRYLATE, STABILIZED	3	F1	III	3+unst.+N3+F	C	2	2		25	95	0.9	1	yes	T3	II A	yes	PP, EX, A	0	3; 5
2238	CHLOROTOLUENES (m-CHLOROTOLUENE)	3	F1	III	3+N2+S	C	2	2		30	95	1.08	2	yes	T1 [12)]	II A[7)]	yes	PP, EX, A	0	
2238	CHLOROTOLUENES (o-CHLOROTOLUENE)	3	F1	III	3+N2+S	C	2	2		30	95	1.08	2	yes	T1 [12)]	II A[7)]	yes	PP, EX, A	0	
2238	CHLOROTOLUENES (p-CHLOROTOLUENE)	3	F1	III	3+N2+S	C	2	2		30	95	1.07	2	yes	T1 [12)]	II A[7)]	yes	PP, EX, A	0	6: +11 ºC; 17
2241	CYCLOHEPTANE	3	F1	II	3+N2	N	2	3		10	97	0.81	3	yes	T4 [3)]	II A[7)]	yes	PP, EX, A	1	
2247	n-DECANE	3	F1	III	3+F	C	2	2		30	95	0.73	2	yes	T4	II A	yes	PP, EX, A	0	
2248	DI-n-BUTYLAMINE	8	CF1	II	8+3+N3	N	3	2				0.76	3	yes	T3	II A[7)]	yes	PP, EP, EX, A	1	34
2259	TRIETHYLENETETRAMINE	8	C7	II	8+N2	N	3	3			97	0.98	3	yes	T2 [12)]	II B (II B3[14)])	yes	PP, EP, EX, A	0	6: 16°C; 17; 34
2263	DIMETHYLCYCLOHEXANES (cis-1,4- DIMETHYL-CYCLOHEXANE)	3	F1	II	3	C	2	2		35	95	0.78	2	yes	T4 [3)]	II A[7)]	yes	PP, EX, A	1	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2263	DIMETHYLCYCLOHEXANES (trans-1,4- DIMETHYL-CYCLOHEXANE)	3	F1	II	3	C	2	2		35	95	0.76	2	yes	T4 [3)]	II A[7)]	yes	PP, EX, A	1	
2264	N,N-DIMETHYL-CYCLOHEXYLAMINE	8	CF1	II	8+3+N2	N	3	3			97	0.85	3	yes	T3	II B[4)]	yes	PP, EP, EX, A	1	34
2265	N,N-DIMETHYLFORMAMIDE	3	F1	III	3+CMR	N	2	3	3	10	97	0.95	3	yes	T2 [12)]	II A	yes	PP, EP, EX, TOX, A	0	
2266	DIMETHYL-N-PROPYLAMINE	3	FC	II	3+8	C	2	2	3	50	95	0.72	2	yes	T4	II A[7)]	yes	PP, EP, EX, A	1	23
2276	2-ETHYLHEXYLAMINE	3	FC	III	3+8+N3	N	3	2			97	0.79	3	yes	T3	II A[7)]	yes	PP, EP, EX, A	0	34
2278	n-HEPTENE	3	F1	II	3+N3	N	2	2		10	97	0.7	3	yes	T3	II B[4)] (II B1)	yes	PP, EX, A	1	
2280	HEXAMETHYLENEDIAMINE, SOLID, MOLTEN	8	C8	III	8+N3	N	3	3	2		95	0.83	3	yes	T3	II B (II B3[14)])	yes	PP, EP, EX, A	0	7; 17; 34
2280	HEXAMETHYLENEDIAMINE, SOLID, MOLTEN	8	C8	III	8+N3	N	3	3	4		95	0.83	3	yes			no	PP, EP	0	7; 17; 20: +66 ºC; 34
2282	HEXANOLS	3	F1	III	3+N3	N	3	2			97	0.83	3	yes	T3	II A	yes	PP, EX, A	0	
2286	PENTAMETHYLHEPTANE	3	F1	III	3+F	N	3	3			97	0.75	3	yes	T2 [12)]	II A[7)]	yes	PP, EX, A	0	
2288	ISOHEXENES	3	F1	II	3+unst.+N3	C	2	2	3	50	95	0.735	2	yes	T2 [12)]	II B[4)]	yes	PP, EX, A	1	3; 23
2289	ISOPHORONEDIAMINE	8	C7	III	8+N2	N	3	3			97	0.92	3	yes	T2 [12)]	II A[7)]	yes	PP, EP, EX, A	0	6: 14°C; 17; 34
2302	5-METHYLHEXAN-2-ONE	3	F1	III	3	N	3	2			97	0.81	3	yes	T1 [12)]	II A	yes	PP, EX, A	0	
2303	ISOPROPENYLBENZENE	3	F1	III	3+N2+F	N	3	3			97	0.91	3	yes	T2 [12)]	II B (II B1)	yes	PP, EX, A	0	
2309	OCTADIENE (1,7-OCTADIENE)	3	F1	II	3+N2	N	2	3		10	97	0.75	3	yes	T3	II B (II B3)	yes	PP, EX, A	1	
2311	PHENETIDINES	6.1	T1	III	6.1	C	2	2		25	95	1.07	2	no			no	PP, EP, TOX, A	0	6: +7 ºC; 17

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2312	PHENOL, MOLTEN	6.1	T1	II	6.1+N3+S	C	2	2	4	25	95	1.07	2	no	T1 [12)]	II A[8)]	yes	PP, EP, EX, TOX, A	2	7; 17
2312	PHENOL, MOLTEN	6.1	T1	II	6.1+N3+S	C	2	2	4	25	95	1.07	2	no			no	PP, EP, TOX, A	2	7; 17; 20: +67 ºC
2320	TETRAETHYLENEPENTAMINE	8	C7	III	8+N2	N	4	3			97	1	3	yes			no	PP, EP	0	34
2321	TRICHLOROBENZENES, LIQUID (1,2,4-TRICHLOROBENZENE)	6.1	T1	III	6.1+N1+S	C	2	2	2	25	95	1.45	2	no	T1 [12)]	II A[7)]	yes	PP, EP, EX, TOX, A	0	7; 17
2321	TRICHLOROBENZENES, LIQUID (1,2,4-TRICHLOROBENZENE)	6.1	T1	III	6.1+N1+S	C	2	1	4	25	95	1.45	2	no			no	PP, EP, TOX, A	0	7; 17; 20: +95 ºC; 26
2323	TRIETHYL PHOSPHITE	3	F1	III	3	N	3	2			97	0.8	3	yes	T3	II B[4)]	yes	PP, EX, A	0	
2324	TRIISOBUTYLENE	3	F1	III	3+N1+F	C	2	2		35	95	0.76	2	yes	T2 [12)]	II B[4)]	yes	PP, EX, A	0	
2325	1,3,5-TRIMETHYLBENZENE	3	F1	III	3+N1	C	2	2		35	95	0.87	2	yes	T1 [12)]	II A[7)]	yes	PP, EX, A	0	
2333	ALLYL ACETATE	3	FT1	II	3+6.1	C	2	2		40	95	0.93	2	no	T2 [12)]	II A[7)]	yes	PP, EP, EX, TOX, A	2	
2348	BUTYL ACRYLATES, STABILIZED (n- BUTYL ACRYLATE, STABILIZED)	3	F1	III	3+unst.+N3	C	2	2		30	95	0.9	1	yes	T3	II B (II B1)	yes	PP, EX, A	0	3; 5
2350	BUTYL METHYL ETHER	3	F1	II	3	N	2	2		10	97	0.74	3	yes	T4 [3)]	II B[4)]	yes	PP, EX, A	1	
2356	2-CHLOROPROPANE	3	F1	I	3	C	2	2	3	50	95	0.86	2	yes	T1 [12)]	II A	yes	PP, EX, A	1	23
2357	CYCLOHEXYLAMINE	8	CF1	II	8+3+N3	N	3	2			97	0.86	3	yes	T3	II A	yes	PP, EP, EX, A	1	34
2362	1,1-DICHLOROETHANE	3	F1	II	3+N2	C	2	2	3	50	95	1.17	2	yes	T2 [12)]	II A	yes	PP, EX, A	1	23
2370	1-HEXENE	3	F1	II	3+N3	N	2	2		10	97	0.67	3	yes	T3	II B[4)]	yes	PP, EX, A	1	
2381	DIMÉTHYL DISULPHIDE	3	FT1	II	3+6.1	C	2	2		40	95	1.063	2	yes	T2 [12)]	II A	yes	PP, EP, EX, TOX, A	2	
2382	DIMETHYLHYDRAZINE, SYMMETRICAL	6.1	TF1	I	6.1+3+CMR	C	2	2		50	95	0.83	1	no	T4 [3)]	II C[5)]	yes	PP, EP, EX, TOX, A	2	
2383	DIPROPYLAMINE	3	FC	II	3+8+N3	C	2	2		35	95	0.74	2	yes	T3	II A	yes	PP, EP, EX, A	1	
2397	3-METHYLBUTAN-2-ONE	3	F1	II	3	N	2	2		10	97	0.81	3	yes	T1 [12)]	II A[7)]	yes	PP, EX, A	1	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2398	METHYL tert-BUTYL ETHER	3	F1	II	3	N	2	2		10	97	0.74	3	yes	T1 [12)]	II A	yes	PP, EX, A	1	
2404	PROPIONITRILE	3	FT1	II	3+6.1	C	2	2		45	95	0.78	2	no	T1[9), 12)]	II A[7)]	yes	PP, EP, EX, TOX, A	2	
2414	THIOPHENE	3	F1	II	3+N3+S	N	2	3		10	97	1.06	3	yes	T2 [12)]	II A	yes	PP, EX, A	1	
2430	ALKYLPHENOLS, SOLID, N.O.S. (NONYLPHENOL, ISOMERIC MIXTURE, MOLTEN)	8	C4	II	8+N1+F	N	3	1	2		95	0.95	2	yes	T2 [12)]	II A [7)]	yes	PP, EP, EX, A	0	7; 17
2430	ALKYLPHENOLS, SOLID, N.O.S. (NONYLPHENOL, ISOMERIC MIXTURE, MOLTEN)	8	C4	II	8+N1+F	N	3	2	4		95	0.95	2	yes			no	PP, EP	0	7; 17; 20: +125 °C
2432	N,N-DIETHYLANILINE	6.1	T1	III	6.1+N2	C	2	2		25	95	0.93	2	no			no	PP, EP, TOX, A	0	
2448	SULPHUR, MOLTEN	4.1	F3	III	4.1+S	N	4	1	4		95	2.07	3	yes			no	PP, EP, TOX*, A	0	* Toximeter for H2S; 7; 17; 20: +150ºC; 28; 32
2458	HEXADIENES	3	F1	II	3+N3	N	2	2		10	97	0.72	3	yes	T4 [3)]	II A[7)]	yes	PP, EX, A	1	
2477	METHYL ISOTHIOCYANATE	6.1	TF1	I	6.1+3+N1	C	2	2	2	35	95	1,07[11)]	1	no	T4 [3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	7; 17
2485	n-BUTYL ISOCYANATE	6.1	TF1	I	6.1+3	C	2	2		35	95	0.89	1	no	T2 [12)]	II A	yes	PP, EP, EX, TOX, A	2	
2486	ISOBUTYL ISOCYANATE	6.1	TF1	I	6.1+3	C	2	2		40	95		1	no	T4 [3)]	II A	yes	PP, EP, EX, TOX, A	2	
2487	PHENYL ISOCYANATE	6.1	TF1	I	6.1+3	C	2	2		25	95	1.1	1	no	T1 [12)]	II A	yes	PP, EP, EX, TOX, A	2	
2490	DICHLOROISOPROPYL ETHER	6.1	T1	II	6.1	C	2	2		25	95	1.11	2	no			no	PP, EP, TOX, A	2	
2491	ETHANOLAMINE or ETHANOLAMINE SOLUTION	8	C7	III	8+N3	N	3	2			97	1.02	3	yes	T2 [12)]	II A[7)]	yes	PP, EP, EX, A	0	6: 14°C; 17; 34
2493	HEXAMETHYLENEIMINE	3	FC	II	3+8+N3	N	3	2			97	0.88	3	yes	T3 [2)]	II A	yes	PP, EP, EX, A	1	34

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2496	PROPIONIC ANHYDRIDE	8	C3	III	8+N3	N	4	3			97	1.02	3	yes			no	PP, EP	0	34
2518	1,5,9-CYCLODODECATRIENE	6.1	T1	III	6.1+F	C	2	2		25	95	0.9	2	no			no	PP, EP, TOX, A	0	
2527	ISOBUTYL ACRYLATE, STABILIZED	3	F1	III	3+unst.	C	2	2		30	95	0.89	1	yes	T2 [12)]	II B[9)]	yes	PP, EX, A	0	3; 5
2528	ISOBUTYL ISOBUTYRATE	3	F1	III	3+N3	N	3	2			97	0.86	3	yes	T2 [12)]	II A	yes	PP, EX, A	0	
2531	METHACRYLIC ACID, STABILIZED	8	C3	II	8+unst.+N3	C	2	2	4	25	95	1.02	1	yes	T2 [12)]	II A	yes	PP, EP, EX, A	0	3; 4; 5; 7; 17
2564	TRICHLOROACETIC ACID SOLUTION	8	C3	II	8+N1	C	2	2	2	25	95	1,62[11)]	2	yes	T1 [12)]	II A[7)]	yes	PP, EP, EX, A	0	7; 17; 22
2564	TRICHLOROACETIC ACID SOLUTION	8	C3	III	8+N1	C	2	2		25	95	1,62[11)]	2	yes			no	PP, EP	0	22
2574	TRICRESYL PHOSPHATE with more than 3% ortho isomer	6.1	T1	II	6.1+N1+S	C	2	2		25	95	1.18	2	no			no	PP, EP, TOX, A	2	
2579	PIPERAZINE, MOLTEN	8	C8	III	8+N2	N	3	3	2		95	0.9	3	yes			no	PP, EP	0	7; 17; 34
2582	FERRIC CHLORIDE SOLUTION	8	C1	III	8	N	4	3			97	1.45	3	yes			no	PP, EP	0	22; 30; 34
2586	ALKYLSULPHONIC ACIDS, LIQUID or ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	8	C3	III	8	N	4	3			97		3	yes			no	PP, EP	0	34
2608	NITROPROPANES	3	F1	III	3	N	3	2			97	1	3	yes	T2 [12)]	II B[7)] (II B2)	yes	PP, EX, A	0	
2615	ETHYL PROPYL ETHER	3	F1	II	3	N	2	2		10	97	0.73	3	yes	T4 [3)]	II A[7)]	yes	PP, EX, A	1	
2618	VINYLTOLUENES, STABILIZED	3	F1	III	3+unst.+N2+F	C	2	2		25	95	0.92	1	yes	T1 [12)]	II A	yes	PP, EX, A	0	3; 5
2651	4,4'-DIAMINO-DIPHENYLMETHANE	6.1	T2	III	6.1+N2+ CMR+S	C	2	2	2	25	95	1	2	no			no	PP, EP, TOX, A	0	7; 17

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2672	AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15°C in water, with more than 10% but not more than 35% ammonia (more than 25% but not more than 35% ammonia)	8	C5	III	8+N1	C	2	2	1	50	95	0,88 [10] – 0,96 [10]	2	yes			no	PP, EP	0	
2672	AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15°C in water, with more than 10% but not more than 35% ammonia (not more than 25% ammonia)	8	C5	III	8+N3	N	2	2		10	95	0,88 [10] – 0,96 [10]	2	yes			no	PP, EP	0	34
2683	AMMONIUM SULPHIDE SOLUTION	8	CFT	II	8+3+6.1	C	2	2		50	95		2	no	T4 [3]	II B [4]	yes	PP, EP, EX, TOX, A	2	15; 16
2693	BISULPHITES, AQUEOUS SOLUTION, N.O.S.	8	C1	III	8	N	4	3			97		3	yes			no	PP, EP	0	27; 34
2709	BUTYLBENZENES	3	F1	III	3+N1+F	N	2	3		35	97	0.87	2	yes	T2 [12]	II A [7]	yes	PP, EX, A	0	41
2709	BUTYLBENZENES (n-BUTYLBENZENE)	3	F1	III	3+N1+F	N	3	3			97	0.87	2	yes	T2 [12]	II A	yes	PP, EX, A	0	41
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S. (2-AMINOBUTANE)	3	FC	II	3+8+N1	C	2	2	3	50	95	0.72	2	yes	T4 [3]	II A [7]	yes	PP, EP, EX, A	1	23
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	I	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	II	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	III	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2754	N-ETHYLTOLUIDINES (N-ETHYL-o-TOLUIDINE)	6.1	T1	II	6.1+F	C	2	2		25	95	0.94	2	no			no	PP, EP, TOX, A	2	
2754	N-ETHYLTOLUIDINES (N-ETHYL-m-TOLUIDINE)	6.1	T1	II	6.1+F	C	2	2		25	95	0.94	2	no			no	PP, EP, TOX, A	2	
2754	N-ETHYLTOLUIDINES (N-ETHYL-o-TOLUIDINE and N-ETHYL-m-TOLUIDINE MIXTURES)	6.1	T1	II	6.1+F	C	2	2		25	95	0.94	2	no			no	PP, EP, TOX, A	2	
2754	N-ETHYLTOLUIDINES (N-ETHYL-p-TOLUIDINE)	6.1	T1	II	6.1+F	C	2	2	2	25	95	0.94	2	no			no	PP, EP, TOX, A	2	7; 17
2785	4-THIAPENTANAL (3-MÉTHYLMERCAPTO-PROPIONALDÉHYDE)	6.1	T1	III	6.1	C	2	2		25	95	1.04	2	no			no	PP, EP, TOX, A	0	
2789	ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass	8	CF1	II	8+3	N	2	3	2	10	95	1,05 with 100% acid	3	yes	T1 [12)]	II A[7)]	yes	PP, EP, EX, A	1	7; 17; 34
2790	ACETIC ACID SOLUTION, not less than 50% but not more than 80% acid, by mass	8	C3	II	8	N	2	3		10	97		3	yes			no	PP, EP	0	34
2790	ACETIC ACID SOLUTION, more than 10% and less than 50% acid, by mass	8	C3	III	8	N	2	3		10	97		3	yes			no	PP, EP	0	34
2796	BATTERY FLUID, ACID	8	C1	II	8+N3	N	4	3			97	1,00 - 1,84	3	yes			no	PP, EP	0	8; 22; 30; 34
2796	SULPHURIC ACID with not more than 51% acid	8	C1	II	8+N3	N	4	3			97	1,00 - 1,41	3	yes			no	PP, EP	0	8; 22; 30; 34
2797	BATTERY FLUID, ALKALI	8	C5	II	8+N3	N	4	3			97	1,00 - 2,13	3	yes			no	PP, EP	0	22; 30; 34
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	I	6.1+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	II	6.1+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	III	6.1+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no			no	PP, EP, TOX, A	0	27; 29 *see 3.2.3.3
2811	TOXIC SOLID, ORGANIC, N.O.S. (1,2,3-TRICHLOROBENZENE, MOLTEN)	6.1	T2	III	6.1+S	C	2	2	2	25	95		2	no	T4 [3)]	II A[7)]	yes	PP, EP, EX, TOX, A	0	7; 17; 22
2811	TOXIC SOLID, ORGANIC, N.O.S. (1,2,3-TRICHLOROBENZENE, MOLTEN)	6.1	T2	III	6.1+S	C	2	1	4	25	95		2	no			no	PP, EP, TOX, A	0	7; 17; 20: +92 ºC; 22; 26
2811	TOXIC SOLID, ORGANIC, N.O.S. (1,3,5-TRICHLOROBENZENE, MOLTEN)	6.1	T2	III	6.1+S	C	2	2	2	25	95		2	no	T4 [3)]	II A[7)]	yes	PP, EP, EX, TOX, A	0	7; 17; 22
2811	TOXIC SOLID, ORGANIC, N.O.S. (1,3,5-TRICHLOROBENZENE, MOLTEN)	6.1	T2	III	6.1+S	C	2	1	4	25	95		2	no			no	PP, EP, TOX, A	0	7; 17; 20: +92 ºC; 22; 26
2815	N-AMINOETHYL PIPERAZINE	8	C7	III	8+N2	N	4	3			97	0.98	3	yes			no	PP, EP	0	34
2820	BUTYRIC ACID	8	C3	III	8+N3	N	2	3		10	97	0.96	3	yes			no	PP, EP	0	34
2829	CAPROIC ACID	8	C3	III	8+N3	N	4	3			97	0.92	3	yes			no	PP, EP	0	34
2831	1,1,1-TRICHLOROETHANE	6.1	T1	III	6.1+N2	C	2	2	3	50	95	1.34	2	no			no	PP, EP, TOX, A	0	23
2850	PROPYLENE TETRAMER	3	F1	III	3+N1+F	N	4	3			97	0.76	2	yes			no	PP	0	
2874	FURFURYL ALCOHOL	6.1	T1	III	6.1+N3	C	2	2		25	95	1.13	2	no			no	PP, EP, TOX, A	0	
2904	PHENOLATES, LIQUID	8	C9	III	8	N	4	2			97	1,13-1,18	3	yes			no	PP, EP	0	34

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S. (2- PROPANOL AND DODECYLDIMETHYL-AMMONIUM CHLORIDE, AQUEOUS SOLUTION)	8	CF1	II	8+3+F	N	3	3			97	0.95	3	yes	T3	II A	yes	PP, EP, EX, A	1	34;
2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S. (AQUEOUS SOLUTION OF HEXADECYLTRIMETHYL-AMMONIUM CHLORIDE (50%) AND ETHANOL (35%))	8	CF1	II	8+3+F	N	2	3		10	95	0.9	3	yes	T2 [12)]	II B	yes	PP, EP, EX, A	1	6: +7 ºC; 17; 34;
2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S. (AQUEOUS SOLUTION OF HEXADECYLTRIMETHYL-AMMONIUM CHLORIDE (50%) AND ETHANOL (35%))	8	CF1	II	8+3+F	N	2	3		10	95	0,9	3	yes	T2 [12)]	II B (II B3)	yes	PP, EP, EX, A	1	6: +7 ºC; 17; 34; 44
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	I	8+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	II	8+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	III	8+6.1+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no			no	PP, EP, TOX, A	0	27; 29 *see 3.2.3.3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	I	3+8+(N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	yes	T4 [3)]	II B[4)]	yes	*	1	27; 29 *see 3.2.3.3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	I	3+8+(N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	27; 29; 44 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	I	3+8+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	yes	T4 [3]	II B[4]	yes	*	1	27; 29 *see 3.2.3.3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	I	3+8+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	yes	T4 [3]	II B[4] (II B3)	yes	*	1	27; 29; 44 *see 3.2.3.3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	II	3+8+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	yes	T4 [3]	II B[4]	yes	*	1	27; 29 *see 3.2.3.3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	II	3+8+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	yes	T4 [3]	II B[4] (II B3)	yes	*	1	27; 29; 44 *see 3.2.3.3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	III	3+8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	0	27; 34 *see 3.2.3.3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	III	3+8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	0	27; 34 *see 3.2.3.3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S. (AQUEOUS SOLUTION OF DIALKYL-(C_8-C_{18})-DIMETHYLAMMONIUM CHLORIDE AND 2-PROPANOL)	3	FC	II	3+8+F	C	2	2		50	95	0.88	2	yes	T2 [12]	II A	yes	PP, EP, EX, A	1	
2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC1	I	6.1+8+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC1	II	6.1+8+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF1	I	6.1+3+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no	T4 [3]	II B[4]	yes	PP, EP, EX, TOX, A	2	27; 29 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF1	I	6.1+3+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF1	II	6.1+3+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	27; 29 *see 3.2.3.3
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF1	II	6.1+3+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
2935	ETHYL-2-CHLORO-PROPIONATE	3	F1	III	3	C	2	2		30	95	1.08	2	yes	T4 [3)]	II A	yes	PP, EX, A	0	
2947	ISOPROPYL CHLOROACETATE	3	F1	III	3	C	2	2		30	95	1.09	2	yes	T4 [3)]	II A	yes	PP, EX, A	0	
2966	THIOGLYCOL	6.1	T1	II	6.1	C	2	2		25	95	1.12	2	no			no	PP, EP, TOX, A	2	
2983	ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, with not more than 30% ethylene oxide	3	FT1	I	3+6.1+unst.	C	1	1	3		95	0.85	1	no	T2 [12)]	II B (II B3)	yes	PP, EP, EX, TOX, A	2	2; 3; 12; 31; 35
2984	HYDROGEN PEROXIDE AQUEOUS SOLUTION with not less than 8%, but less than 20% hydrogen peroxide (stabilized as necessary)	5.1	O1	III	5.1+unst.	C	2	2		35	95	1.06	2	yes			no	PP	0	3; 33
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., MOLTEN, (ALKYLAMINE (C_{12} to C_{18}))	9	M7	III	9+F	N	4	3	2		95	0.79	3	yes			no	PP	0	7; 17
3079	METHACRYLONITRILE, STABILIZED	6.1	TF1	I	6.1+3+unst.+ N3	C	2	2		45	95	0.8	1	no	T1 [12)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	3; 5
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9	M6	III	9+(N1, N2, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	22; 27 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BILGE WATER)	9	M6	III	9+N2+F	N	4	3			97		3	yes			no	PP	0	
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE; LIQUID, N.O.S. (HEAVY HEATING OIL)	9	M6	III	9+CMR (N1, N2, F or S)	N	2	3		10	97		3	yes			no	PP	0	
3092	1-METHOXY-2-PROPANOL	3	F1	III	3	N	3	2			97	0.92	3	yes	T3	II B (II B1)	yes	PP, EX, A	0	
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C_2-C_{12} homologues)	8	C3	II	8+N3	N	4	3			97	0.95	3	yes			no	PP, EP	0	34
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C_2-C_{12} homologues)	8	C3	III	8+N3	N	4	3			97	0.95	3	yes			no	PP, EP	0	34
3175	SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S., MOLTEN, having a flash-point up to 60 °C (2- PROPANOL AND DIALKYL-(C_{12} to C_{18})-DIMETHYLAMMONIUM CHLORIDE)	4.1	F1	II	4.1	N	3	3	4		95	0.86	3	yes	T2 [12)]	II A[7)]	yes	PP, EX, A	1	7; 17
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point	3	F2	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	95		*	yes	T4 [3)]	II B[4)]	yes	*	0	7; 17; 27 *see 3.2.3.3
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point	3	F2	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	95		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	7; 17; 27; 44*see 3.2.3.3
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point (CARBON BLACK REEDSTOCK) (PYROLYSIS OIL)	3	F2	III	3+F	N	3	3	2		95		3	yes	T1 [12)]	II B	yes	PP, EX, A	0	7; 17

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point (PYROLYSIS OIL A)	3	F2	III	3+F	N	3	3	2		95		3	yes	T1 [12)]	II B	yes	PP, EX, A	0	7; 17
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point (RESIDUAL OIL)	3	F2	III	3+F	N	3	3	2		95		3	yes	T1 [12)]	II B	yes	PP, EX, A	0	7; 17
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point (MIXTURE OF CRUDE NAPHTHALINE)	3	F2	III	3+F	N	3	3	2		95		3	yes	T1 [12)]	II B	yes	PP, EX, A	0	7; 17
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point (CREOSOTE OIL)	3	F2	III	3+N1+F	C	2	2	2	10	95		2	yes	T2 [12)]	II B	yes	PP, EX, A	0	7; 17
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point (Low QI Pitch)	3	F2	III	3+N2+CMR+S	N	3	1	4		95	1,1-1,3	3	yes	T2 [12)]	II B	yes	PP, EP, EX, TOX, A	0	7; 17
3257	ELEVATED TEMPERATURE LIQUID, N.O.S. at or above 100 °C and below its flash-point (including molten metals, molten salts, etc.)	9	M9	III	9+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	95		*	yes			no	*	0	7; 17; 20:+115 ºC; 22; 24; 25; 27 *see 3.2.3.3
3257	ELEVATED TEMPERATURE LIQUID, N.O.S. at or above 100 °C and below its flash-point (including molten metals, molten salts, etc.)	9	M9	III	9+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	95		*	yes			no	*	0	7; 17; 20:+225 ºC; 22; 24; 27 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3257	ELEVATED TEMPERATURE LIQUID, N.O.S. at or above 100°C and below its flash-point (including molten metals, molten salts, etc.)	9	M9	III	9+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	95		*	yes			no	*	0	7; 17; 20:+250°C; 22; 24; 27 *see 3.2 3.3
3259	AMINES, SOLID, CORROSIVE, N.O.S. (MONOALKYL-(C_{12} to C_{18})-AMINE ACETATE, MOLTEN)	8	C8	III	8	N	4	3	2		95	0.87	3	yes			no	PP, EP	0	7; 17; 34
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	C1	I	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	C1	II	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	C1	III	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (AQUEOUS SOLUTION OF PHOSPHORIC ACID AND NITRIC ACID)	8	C1	I	8	N	2	3		10	97		3	yes			no	PP, EP	0	34
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (AQUEOUS SOLUTION OF PHOSPHORIC ACID AND NITRIC ACID)	8	C1	II	8	N	4	3			97		3	yes			no	PP, EP	0	34
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (AQUEOUS SOLUTION OF PHOSPHORIC ACID AND NITRIC ACID)	8	C1	III	8	N	4	3			97		3	yes			no	PP, EP	0	34
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	I	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	II	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	III	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	I	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	II	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	III	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	I	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	II	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	III	8+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27; 34 *see 3.2.3.3
3271	ETHERS, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	1	14, 27; 29 *see 3.2.3.3
3271	ETHERS, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	1	14, 27; 29; 44 *see 3.2.3.3
3271	ETHERS, N.O.S. (tert- AMYL-METHYL ETHER)	3	F1	II	3+N1	C	2	2	3	50	95	0.77	2	yes	T2 [12)]	II B[4)]	yes	PP, EX, A	1	
3271	ETHERS, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	0	14, 27 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3271	ETHERS, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	14; 27; 44 *see 3.2.3.3
3272	ESTERS, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T2 [12)]	II B[4)]	yes	*	1	14, 27; 29 *see 3.2.3.3
3272	ESTERS, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T2 [12)]	II B[4)] (II B3)	yes	*	1	14, 27; 29; 44 *see 3.2.3.3
3272	ESTERS, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	0	14, 27 *see 3.2.3.3
3272	ESTERS, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	14; 27; 44 *see 3.2.3.3
3276	NITRILES, TOXIC, LIQUID, N.O.S. (2-METHYLGLUTARONITRILE)	6.1	T1	II	6.1	C	2	2		10	95	0.95	2	no			no	PP, EP, TOX, A	2	
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	I	3+6.1+8+(N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	no	T4 [3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	27; 29 *see 3.2.3.3
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	I	3+6.1+8+(N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	I	3+6.1+8+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no	T4 [3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	27; 29 *see 3.2.3.3
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	I	3+6.1+8+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	II	3+6.1+8+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	27; 29 *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	II	3+6.1+8+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	2	27; 29; 44 *see 3.2.3.3
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	I	6.1+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	II	6.1+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	III	6.1+(N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no			no	PP, EP, TOX, A	0	27; 29 *see 3.2.3.3
3287	TOXIC LIQUID, INORGANIC, N.O.S. (SODIUM DICHROMATE SOLUTION)	6.1	T4	III	6.1+CMR	C	2	2		30	95	1.68	2	no			no	PP, EP, TOX, A	0	
3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S. BOILING POINT > 115 °C	6.1	TC3	I	6.1+8+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		1	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S. BOILING POINT > 115 °C	6.1	TC3	II	6.1+8+ (N1, N2, N3, CMR, F or S)	C	2	2	*	*	95		2	no			no	PP, EP, TOX, A	2	27; 29 *see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3]	II B[4]	yes	*	1	14; *see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	I	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	14; 44 *see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3]	II B[4]	yes	*	1	14; *see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	II	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	14; 44 *see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4[3]	II B[4]	yes	*	0	14; *see 3.2.3.3

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	III	3+(N1, N2, N3, CMR, F)	*	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	0	14; 44*see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	I	3+CMR+(N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	1	*see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	I	3+CMR+(N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	44 *see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	II	3+CMR+(N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	1	*see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	II	3+CMR+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	1	44 *see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	III	3+CMR+(N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4]	yes	*	0	*see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE	3	F1	III	3+CMR+ (N1, N2, N3)	C	*	*	*	*	*		*	yes	T4 [3]	II B[4] (II B3)	yes	*	0	44 *see 3.2.3.3
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+CMR+ (N1, N2, N3, F)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	I	3+CMR+(N1, N2, N3)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+CMR+ (N1, N2, N3, F)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	II	3+CMR+(N1, N2, N3)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	III	3+CMR+ (N1, N2, N3, F)	C	1	1			95		1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	0	29
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT ≤ 60 °C	3	F1	III	3+CMR+(N1, N2, N3)	C	1	1			95		1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	II	3+CMR+ (N1, N2, N3, F)	C	2	2	3	50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	23; 29; 38
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	II	3+CMR+(N1, N2, N3)	C	2	2	3	50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	23; 29; 38; 44
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	III	3+CMR+ (N1, N2, N3, F)	C	2	2	3	50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	0	23; 29; 38
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 60 °C < INITIAL BOILING POINT ≤ 85 °C	3	F1	III	3+CMR+(N1, N2, N3)	C	2	2	3	50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	23; 29; 38; 44
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	II	3+CMR+ (N1, N2, N3, F)	C	2	2		50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	II	3+CMR+(N1, N2, N3)	C	2	2		50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	III	3+CMR+ (N1, N2, N3, F)	C	2	2		50	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	0	29
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE 85 °C < INITIAL BOILING POINT ≤ 115 °C	3	F1	III	3+CMR+(N1, N2, N3)	C	2	2		50	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115°C	3	F1	II	3+CMR+ (N1, N2, N3, F)	C	2	2		35	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	29
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115°C	3	F1	II	3+CMR+(N1, N2, N3)	C	2	2		35	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	1	29; 44
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115 °C	3	F1	III	3+CMR+ (N1, N2, N3, F)	C	2	2		35	95		2	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	0	29
3295	HYDROCARBONS, LIQUID, N.O.S. WITH MORE THAN 10% BENZENE INITIAL BOILING POINT > 115°C	3	F1	III	3+CMR+(N1, N2, N3)	C	2	2		35	95		2	yes	T4 [3]	II B[4] (II B3)	yes	PP, EP, EX, TOX, A	0	29; 44
3295	HYDROCARBONS, LIQUID, N.O.S. CONTAINING ISOPRENE AND PENTADIENE, STABILIZED	3	F1	I	3+inst.+ N2+CMR	C	2	2	3	50	95	0,678	1	yes	T4[3]	II B[4]	yes	PP, EP, EX, TOX, A	1	3; 27
3295	HYDROCARBONS, LIQUID, N.O.S. CONTAINING ISOPRENE AND PENTADIENE, STABILIZED	3	F1	I	3+inst.+N2+CMR	C	2	2	3	50	95	0,678	1	yes	T4 [3]	II B[4] (II B3)	yes	PP, EX, A	1	3; 27; 44

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3295	HYDROCARBONS, LIQUID, N.O.S. (1-OCTEN)	3	F1	II	3+N2+F	N	2	3		10	97	0,71	3	yes	T3	II B[4)]	yes	PP, EX, A	1	14
3295	HYDROCARBONS, LIQUID, N.O.S. (POLYCYCLIC AROMATIC HYDOCARBONS MIXTURE)	3	F1	III	3+CMR+F	N	2	3	3	10	97	1,08	3	yes	T1 [12)]	II A	yes	PP, EP, EX, TOX, A	0	14
3412	FORMIC ACID with not less than 10% but not more than 85% acid by mass	8	C3	II	8+N3	N	2	3		10	97	1.22	3	yes	T1 [12)]	II A	yes	PP, EP, EX, A	0	6: +12 °C; 17; 34
3412	FORMIC ACID with not less than 5% but less than 10% acid by mass	8	C3	III	8	N	2	3		10	97	1.22	3	yes	T1 [12)]	II A	yes	PP, EP, EX, A	0	6: +12 °C; 17; 34
3426	ACRYLAMIDE, SOLUTION	6.1	T1	III	6.1	C	2	2		30	95	1.03	2	no			no	PP, EP, TOX, A	0	3; 5; 16
3429	CHLOROTOLUIDINES, LIQUID	6.1	T1	III	6.1+S	C	2	2		25	95	1.15	2	no	T1 [12)]	II A[7)]	yes	PP, EP, EX, TOX, A	0	6: +6 ºC; 17;
3446	NITROTOLUENES, SOLID, MOLTEN (p-NITROTOLUENE)	6.1	T2	II	6.1+N2+S	C	2	2	2	25	95	1.16	2	no	T2 [12)]	II B (II B3[14)])	yes	PP, EP, EX, TOX, A	2	7; 17
3446	NITROTOLUENES, SOLID, MOLTEN (p-NITROTOLUENE)	6.1	T2	II	6.1+N2+S	C	2	1	4	25	95	1.16	2	no			no	PP, EP, TOX, A	2	7; 17; 20: +88 ºC; 26
3451	TOLUIDINES, SOLID, MOLTEN (p-TOLUIDINE)	6.1	T2	II	6.1+N1	C	2	2	2	25	95	1.05	2	no	T1 [12)]	II A[8)]	yes	PP, EP, EX, TOX, A	2	7; 17
3451	TOLUIDINES, SOLID, MOLTEN (p-TOLUIDINE)	6.1	T2	II	6.1+N1	C	2	2	4	25	95	1.05	2	no			no	PP, EP, TOX, A	2	7; 17; 20: +60 ºC
3455	CRESOLS, SOLID, MOLTEN	6.1	TC2	II	6.1+8+N3	C	2	2	2	25	95	1,03 - 1,05	2	no	T1 [12)]	II A[8)]	yes	PP, EP, EX, TOX, A	2	7; 17
3455	CRESOLS, SOLID, MOLTEN	6.1	TC2	II	6.1+8+N3	C	2	2	4	25	95	1,03 - 1,05	2	no			no	PP, EP, TOX, A	2	7; 17; 20: +66 ºC
3463	PROPIONIC ACID with not less than 90% acid by mass	8	CF1	II	8+3+N3	N	3	3			97	0.99	3	yes	T1 [12)]	II A[7)]	yes	PP, EP, EX, A	1	34

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3475	ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 10% but not more than 90% ethanol	3	F1	II	3+N2+CMR+F	N	2	3	3	10	97	0.69 – 0.78 [10)]	3	yes	T3	II A	yes	PP, EP, EX, TOX, A	1	
3475	ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 90% ethanol	3	F1	II	3+N2+CMR+F	N	2	3	3	10	97	0.78 – 0.79 [10)]	3	yes	T2 [12)]	II B (II B1)	yes	PP, EP, EX, TOX, A	1	
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	I	3+6.1+(N1, N2, N3, CMR, F)	C	*	*	*	*	95		1	no	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	14; 27; *see 3.2.3.3
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	I	3+6.1+(N1, N2, N3, CMR, F)	C	*	*	*	*	95		1	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	2	14; 27; 44 * see 3.2.3.3
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	II	3+6.1+(N1, N2, N3, CMR, F)	C	*	*	*	*	95		2	no	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	2	14; 27; *see 3.2.3.3
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	II	3+6.1+(N1, N2, N3, CMR, F)	C	*	*	*	*	95		2	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	2	14; 27; 44 * see 3.2.3.3
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	III	3+6.1+(N1, N2, N3, CMR, F)	C	*	*	*	*	95		2	no	T4[3)]	II B[4)]	yes	PP, EP, EX, TOX, A	0	14; 27; *see 3.2.3.3
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	III	3+6.1+(N1, N2, N3, CMR, F)	C	*	*	*	*	95		2	no	T4 [3)]	II B[4)] (II B3)	yes	PP, EP, EX, TOX, A	0	14; 27; 44 * see 3.2.3.3
9000	AMMONIA, ANHYDROUS, DEEPLY REFRIGERATED	2	3TC		2.1+2.3+8+N1	G	1	1	1; 3		95		1	no	T1 [12)]	II A	yes	PP, EP, EX, TOX, A	2	1; 2; 31

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UN No. or substance identification No.	Name and description	Class	Classification code	Packing group	Dangers	Type of tank vessel	Cargo tank design	Cargo tank type	Cargo tank equipment	Opening pressure of the pressure relief valve/high velocity vent valve, in kPa	Maximum degree of filling in %	Relative density at 20 °C	Type of sampling device	Pump room below deck permitted	Temperature class	Explosion group	Anti-explosion protection required	Equipment required	Number of cones/blue lights	Additional requirements/Remarks
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
9001	SUBSTANCES WITH A FLASH-POINT ABOVE 60 °C handed over for carriage or carried at a TEMPERATURE WITHIN A RANGE OF 15K BELOW THEIR FLASH-POINT OR SUBSTANCES WITH A FLASH-POINT > 60 °C, HEATED TO LESS THAN 15 K FROM THE FLASH-POINT	3	F4		3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)]	yes	*	0	27 *see 3.2.3.3
9001	SUBSTANCES WITH A FLASH-POINT ABOVE 60 °C handed over for carriage or carried at a TEMPERATURE WITHIN A RANGE OF 15K BELOW THEIR FLASH-POINT OR SUBSTANCES WITH A FLASH-POINT > 60 °C, HEATED TO LESS THAN 15 K FROM THE FLASH-POINT	3	F4		3+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes	T4 [3)]	II B[4)] (II B3)	yes	*	0	27; 44 *see 3.2.3.3
9002	SUBSTANCES HAVING A SELF-IGNITION TEMPERATURE ≤ 200 °C, N.O.S.	3	F5		3+(N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	yes	T4	II B[4)]	yes	*	0	*see 3.2.3.3
9002	SUBSTANCES HAVING A SELF-IGNITION TEMPERATURE ≤ 200 °C, N.O.S.	3	F5		3+(N1, N2, N3, CMR, F or S)	C	1	1	*	*	95		1	yes	T4	II B[4)] (II B3)	yes	*	0	44 *see 3.2.3.3
9003	SUBSTANCES WITH A FLASH-POINT ABOVE 60 °C BUT NOT MORE THAN 100 °C or SUBSTANCES WHERE 60° C < flash−point ≤ 100° C, which are not affected to another class	9			9+(N1, N2, N3, CMR, F or S)	*	*	*	*	*	*		*	yes			no	*	0	27 *see 3.2.3.3

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UN No. or substance identification No.	Name and description	Class	Classification code	Packing group	Dangers	Type of tank vessel	Cargo tank design	Cargo tank type	Cargo tank equipment	Opening pressure of the pressure relief valve/high velocity vent valve, in kPa	Maximum degree of filling in %	Relative density at 20 °C	Type of sampling device	Pump room below deck permitted	Temperature class	Explosion group	Anti-explosion protection required	Equipment required	Number of cones/blue lights	Additional requirements/Remarks
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
9003	SUBSTANCES WITH A FLASH-POINT ABOVE 60 °C BUT NOT MORE THAN 100 °C or SUBSTANCES WHERE 60° C < flash−point ≤ 100 °C, which are not affected to another class (ETHYLENE GLYCOL MONOBUTYL ETHER)	9			9+N3+F	N	4	3			97	0.9	3	yes			no	PP	0	
9003	SUBSTANCES WITH A FLASH-POINT ABOVE 60 °C BUT NOT MORE THAN 100 °C or SUBSTANCES WHERE 60° C < flash−point ≤ 100 °C, which are not affected to another class (2-ETHYLHEXYLACRYLATE)	9			9+N3+F	N	4	3			97	0.89	3	yes			no	PP	0	3; 5; 16;
9004	DIPHENYLMETHANE- 4.4'-DIISOCYANATE	9			S	N	2	3	4	10	95	1,21[11)]	3	yes			no	PP	0	7; 8; 17; 19
9005	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S, MOLTEN	9			9+(N2, N3, CMR, F or S)	*	*	*	*	*	95		*	yes			no	*	0	*see 3.2.3.3
9006	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9			9+(N2, N3, CMR, F or S)	*	*	*	*	*	97		*	yes			no	*	0	*see 3.2.3.3

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Notes related to Table C

1) The ignition temperature has not been determined in accordance with a standardized determination procedure; therefore, provisional assignment has been made to temperature class T2 which is considered safe.

2) The ignition temperature has not been determined in accordance with a standardized determination procedure; therefore, provisional assignment has been made to temperature class T3 which is considered safe.

3) The ignition temperature has not been determined in accordance with a standardized determination procedure; therefore, provisional assignment has been made to temperature class T4 which is considered safe.

4) The maximum experimental safe gap (MESG) has not been measured in accordance with a standardized determination procedure; therefore, assignment has been made to explosion group II B which is considered safe.

5) The maximum experimental safe gap (MESG) has not been measured in accordance with a standardized determination procedure; therefore, assignment has been made to explosion group II C which is considered safe.

6) (*Deleted*)

7) The maximum experimental safe gap (MESG) has not been measured in accordance with a standardized determination procedure; therefore, assignment has been made to the explosion group which is considered safe.

8) The maximum experimental safe gap (MESG) has not been measured in accordance with a standardized determination procedure; therefore, assignment has been made to the explosion group in compliance with IEC 60079-20-1.

9) Assignment in accordance with IMO IBC Code.

10) Relative density at 15 °C.

11) Relative density at 25 °C.

12) This temperature class does not apply for the selection of explosion protected installations and equipment. The surface temperature of explosion protected installations and equipment shall not exceed 200 °C.

13) (*Deleted*)

14) No maximum experimental safe gap (MESG) has been determined in accordance with a standardized determination procedure; thus, the substance is provisionally assigned to explosion group II B3, which is considered to be safe.

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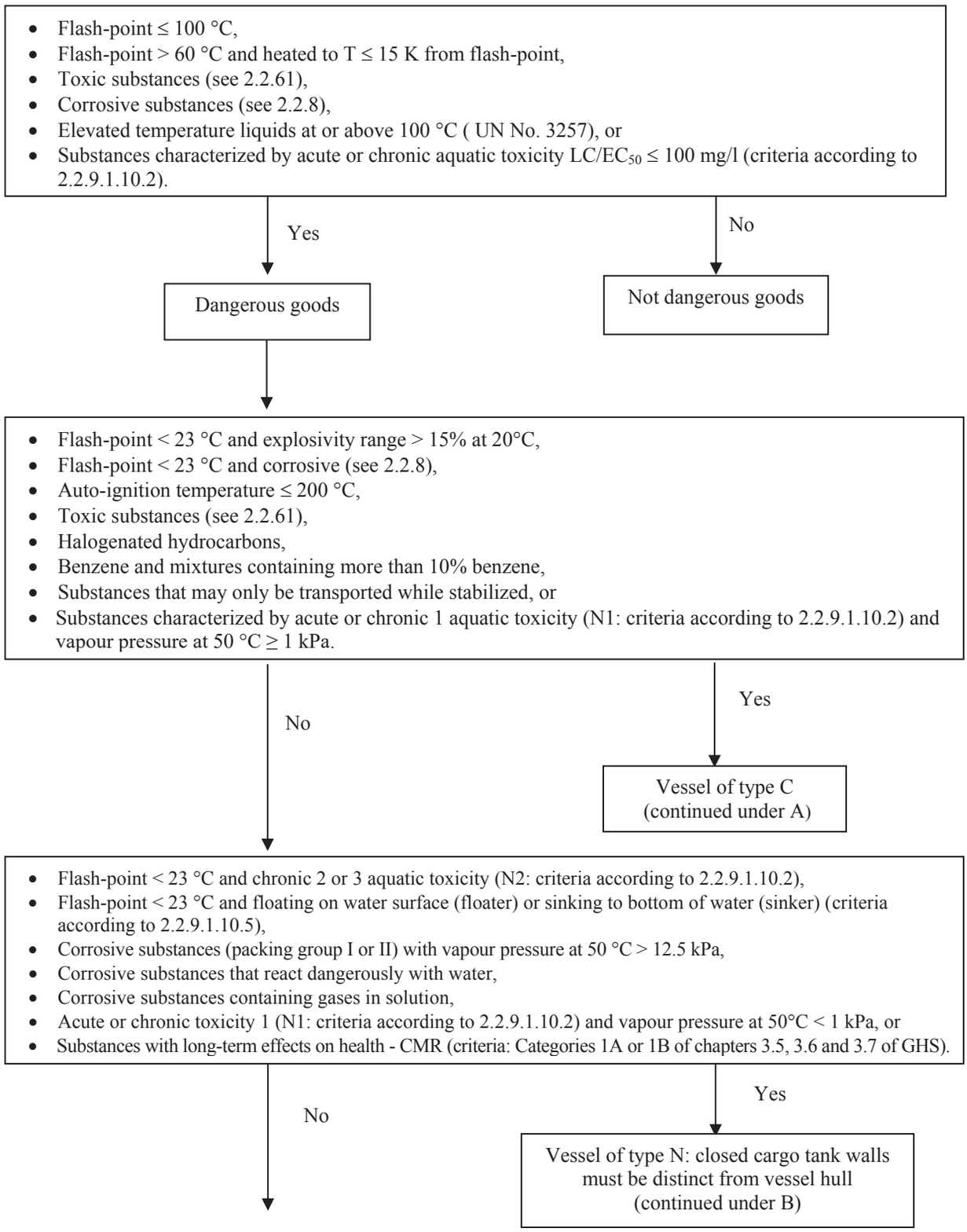
3.2.3.3 ***Flowchart, schemes and criteria for determining applicable special requirements (columns (6) to (20) of Table C)***

Flowchart for classification of liquids of Classes 3, 6.1, 8 and 9 for carriage in tanks in inland navigation



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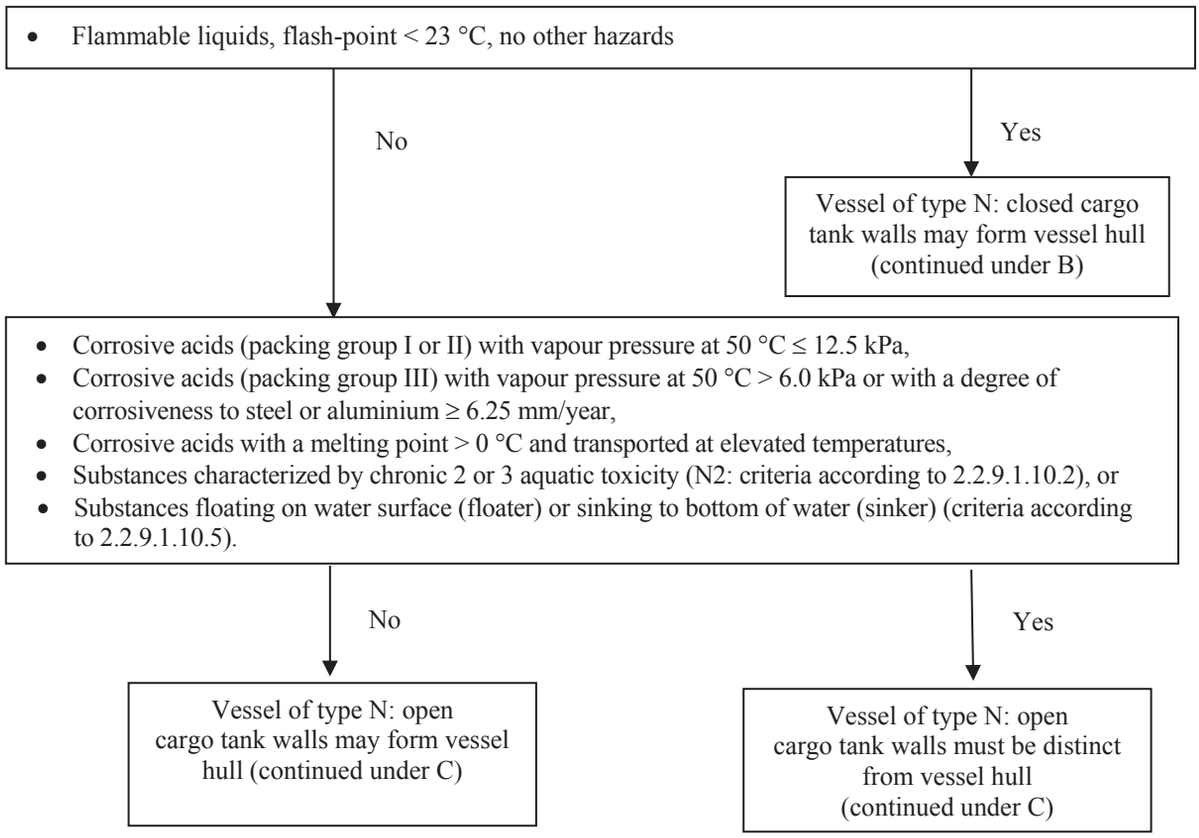

Elevated temperature substances

Irrespective of the above classifications, for substances that must be transported at elevated temperatures, the type of cargo tank shall be determined on the basis of the transport temperature, using the following table:

Maximum transport temperature T in °C	Type N	Type C
T ≤ 80	Integral cargo tank	Integral cargo tank
80 < T ≤ 115	Independent cargo tank, remark 25	Independent cargo tank, remark 26
T > 115	Independent cargo tank	Independent cargo tank

Remark 25 = remark No. 25 in column (20) of the list of substances contained in Chapter 3.2, Table C.

Remark 26 = remark No. 26 in column (20) of the list of substances contained in Chapter 3.2, Table C.

Scheme A: Criteria for cargo tank equipment in vessels of type C

Cargo tank equipment	Cargo tank internal pressure at liquid temperature of 30 °C and gaseous phase temperature of 37.8 °C > 50 kPa	Cargo tank internal pressure at liquid temperature of 30 °C and gaseous phase temperature of 37.8 °C > 50 kPa	Cargo tank internal pressure unknown, owing to absence of certain data
With refrigeration (No. 1 in column (9))	Refrigerated		
Pressure tank (400 kPa)	Non-refrigerated	Cargo tank internal pressure at 50 °C > 50 kPa without water spraying	Boiling point ≤ 60°C
Pressure relief valve/high velocity vent valve opening pressure: 50 kPa, with water-spraying system (No. 3 in column (9))		Cargo tank internal pressure at 50 °C > 50 kPa with water spraying	60 °C < boiling point ≤ 85°C
Pressure relief valve/high velocity vent valve opening pressure as calculated, but at least 10 kPa		Cargo tank internal pressure at 50 °C ≤ 50 kPa	
Pressure relief valve/high velocity vent valve opening pressure: 50 kPa			85 °C < boiling point ≤ 115°C
Pressure relief valve/high velocity vent valve opening pressure: 35 kPa			Boiling point > 115°C

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Scheme B: Criteria for equipment of vessels of type N with closed cargo tanks

Cargo tank equipment	Class 3, flash-point < 23°C				Corrosive substances	CMR substances
Pressure tank (400 kPa)	175 kPa ≤ $P_{d\ 50}$ < 300 kPa without refrigeration					
Pressure relief valve/high velocity vent valve opening pressure: 50 kPa	175 kPa ≤ $P_{d\ 50}$ < 300 kPa, with refrigeration (No. 1 in column (9))	110 kPa ≤ $P_{d\ 50}$ < 175 kPa without water spraying				
Pressure relief valve/high velocity vent valve opening pressure: 10 kPa			110 kPa ≤ $P_{d\ 50}$ < 150 kPa with water spraying (No. 3 in column (9))	$P_{d\ 50}$ < 110 kPa	Packing group I or II with $P_{d\ 50}$ > 12.5 kPa or reacting dangerously with water or with gases in solution	Pressure relief valve/high velocity vent valve opening pressure: 10 kPa; with water spraying when vapour pressure > 10 kPa (calculation of the vapour pressure according to the formula for column 10, except that v_a = 0.03)

Scheme C: Criteria for equipment of vessels of type N with open cargo tanks

Cargo tank equipment	Classes 3 and 9	Flammable substances	Corrosive substances
With flame-arrester	23°C ≤ flash-point ≤ 60°C	Flash-point > 60 °C carried while heated to ≤ 15 K below flash-point or Flash-point > 60 °C, at or above their flash-point	Acids, transported while heated or flammable substances
Without flame-arrester	60 °C < flash-point ≤ 100 °C or elevated temperature substances of Class 9		Non-flammable substances

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Column (9): Cargo tank equipment for substances transported in a molten state

- **Possibility of heating the cargo (number 2 in column (9))**

  A possibility of heating the cargo shall be required on board:

  - When the melting point of the substance to be transported is + 15 °C or greater,

    or

  - When the melting point of the substance to be transported is greater than 0 °C but less than + 15 °C and the outside temperature is no more than 4 K above the melting point. In column (20), reference shall be made to remark 6 with the temperature derived as follows: melting point + 4 K

- **Heating system on board (number 4 in column (9))**

  A cargo heating system shall be required on board:

  - For substances that must not be allowed to solidify owing to the possibility of dangerous reactions on reheating, and

  - For substances that must be maintained at a guaranteed temperature not less than 15 K below their flash-point

Column (10): Determination of opening pressure of high-velocity vent valve in kPa

For vessels of type C, the opening pressure of the high-velocity vent valve shall be determined on the basis of the internal pressure of the tanks, rounded up to the nearest 5 kPa

To calculate the internal pressure, the following formula shall be used:

$$P_{\max} = P_{Ob\max} + \frac{k \cdot v_a \left(P_0 - P_{Da}\right)}{v_a - \alpha \cdot \delta_t + \alpha \cdot \delta_t \cdot v_a} - P_0$$

$$k = \frac{T_{D\max}}{T_a}$$

In this formula:

P_{max}	:	Maximum internal pressure in kPa
P_{Obmax}	:	Absolute vapour pressure at maximum liquid surface temperature in kPa
P_{Da}	:	Absolute vapour pressure at filling temperature in kPa
P_0	:	Atmospheric pressure in kPa
v_a	:	Free relative volume at filling temperature compared with cargo tank volume
α	:	Cubic expansion coefficient in K^{-1}
δ_t	:	Average temperature increase of the liquid due to heating in K
T_{Dmax}	:	Maximum gaseous phase temperature in K
T_a	:	Filling temperature in K
k	:	Temperature correction factor
t_{Ob}	:	Maximum liquid surface temperature in °C

In the formula, the following basic data are used:

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P_{Obmax} : At 50 °C and 30 °C

P_{Da} : At 15 °C

P_0 : 101.3 kPa

v_a : 5% = 0.05

δ_t : 5 K

T_{Dmax} : 323 K and 310.8 K

T_a : 288 K

t_{Ob} : 50 °C and 30 °C

Column (11): Determination of maximum degree of filling of cargo tanks

If, in accordance with the provisions under A above:

- Type G is required: 91%; however, in the case of deeply refrigerated substances: 95%
- Type C is required: 95%
- Type N is required: 97%; however, in the case of substances in a molten state and of flammable liquids with 175 kPa $\leq P_{v50} <$ 300 kPa: 95%

Column (12): Relative density of substance at 20 °C

These data are provided for information only.

Column (13): Determination of type of sampling device

1 = *closed*:	−	Substances to be transported in pressure cargo tanks
	−	Substances with T in column (3b) and assigned to packing group I
	−	Stabilized substances to be transported under inert gas
2 = *partly closed*:	−	All other substances for which type C is required
3 = *open:*	−	All other substances

Column (14): Determination of whether a pump-room is permitted below deck

No	−	All substances with T in column (3b) with the exception of substances of Class 2
Yes	−	All other substances

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Column (15): Determination of temperature class

Flammable substances shall be assigned to a temperature class on the basis of their auto-ignition point:

Temperature class	Auto-ignition temperature T of flammable liquids and gases in °C
T1	T > 450
T2	300 < T ≤ 450
T3	200 < T ≤ 300
T4	135 < T ≤ 200
T5	100 < T ≤ 135
T6	85 < T ≤ 100

When anti-explosion protection is required and the auto-ignition temperature is not known, reference shall be made to temperature class T4, considered safe.

Column (16): Determination of explosion group

Flammable substances shall be assigned to an explosion group on the basis of their maximum experimental safe gaps. The maximum experimental safe gaps shall be determined in accordance with standard IEC 60079-20-1.

The different explosion groups are as follows:

Explosion group	Maximum experimental safe gap in mm
II A	> 0.9
II B	≥ 0.5 to ≤ 0.9
II C	< 0.5

When anti-explosion protection is required and the relevant data are not provided, reference shall be made to explosion group II B, considered safe.

Column (17): Determination of whether anti-explosion protection is required

Yes
- For substances with a flash-point ≤ 60 °C
- For substances that must be transported while heated to a temperature of less than 15 °C below their flash-point
- For substances that must be transported while heated to a temperature of 15 °C or more below their flash-point and where in column (9) (cargo tank equipment) only a possibility of cargo heating (2) and no cargo-heating system on board (4) is required
- For flammable gases

No
- For all other substances

Column (18): Determination of whether personal protective equipment, escape devices, portable gas detectors, portable toximeters or ambient-air-dependent breathing apparatus is required

- PP: For all substances of Classes 1 to 9;
- EP: For all substances
  - of Class 2 with letter T or letter C in the classification code indicated in column (3b),
  - of Class 3 with letter T or letter C in the classification code indicated in column (3b),
  - of Class 4.1,
  - of Class 6.1, and
  - of Class 8,
  - CMR substances of Category 1A or 1B according to chapters 3.5, 3.6 and 3.7 of GHS;

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- EX: For all substances for which anti-explosion protection is required;
- TOX: For all substances of Class 6.1,

  For all substances of other classes with T in column (3b),

  For CMR substances of Category 1A or 1B according to chapters 3.5, 3.6 and 3.7 of GHS;
- A: For all substances for which EX or TOX is required

Column (19): Determination of the number of cones or blue lights

For all substances of Class 2 with letter F in the classification code indicated in column (3b):	1 cone/light
For all substances of Classes 3 to 9 with letter F in the classification code indicated in column (3b) and assigned to packing group I or II:	1 cone/light
For all substances of Class 2 with letter T in the classification code indicated in column (3b)	2 cones/lights
For all substances of Classes 3 to 9 with letter T in the classification code indicated in column (3b) and assigned to packing group I or II:	2 cones/lights

Column (20): Determination of additional requirements and remarks

***Remark 1*:** Reference shall be made in column (20) to remark 1 for transport of UN No. 1005 AMMONIA, ANHYDROUS.

***Remark 2*:** Reference shall be made in column (20) to remark 2 for stabilized substances that react with oxygen and for gases for which danger 2.1 is mentioned in column 5.

***Remark 3*:** Reference shall be made in column (20) to remark 3 for substances that must be stabilized.

***Remark 4*:** Reference shall be made in column (20) to remark 4 for substances that must not be allowed to solidify owing to the possibility of dangerous reactions on reheating.

***Remark 5*:** Reference shall be made in column (20) to remark 5 for substances liable to polymerization.

***Remark 6*:** Reference shall be made in column (20) to remark 6 for substances liable to crystallization and for substances for which a heating system or possibility of heating is required and the vapour pressure of which at 20 ºC is greater than 0.1 kPa.

***Remark 7*:** Reference shall be made in column (20) to remark 7 for substances with a melting point of + 15 ºC or greater.

***Remark 8*:** Reference shall be made in column (20) to remark 8 for substances that react dangerously with water.

***Remark 9*:** Reference shall be made in column (20) to remark 9 for transport of UN No. 1131 CARBON DISULPHIDE.

***Remark 10*:** *No longer used*.

***Remark 11*:** Reference shall be made in column (20) to remark 11 for transport of UN No. 1040 ETHYLENE OXIDE WITH NITROGEN.

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***Remark 12*:** Reference shall be made in column (20) to remark 12 for transport of UN No. 1280 PROPYLENE OXIDE and UN No. 2983 ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE.

***Remark 13*:** Reference shall be made in column (20) to remark 13 for transport of UN No. 1086 VINYL CHLORIDE, STABILIZED.

***Remark 14*:** Reference shall be made in column (20) to remark 14 for mixtures or N.O.S. entries which are not clearly defined and for which type N is stipulated under the classification criteria.

***Remark 15*:** Reference shall be made in column (20) to remark 15 for substances that react dangerously with alkalis or acids such as sodium hydroxide or sulphuric acid.

***Remark 16*:** Reference shall be made in column (20) to remark 16 for substances that may react dangerously to local overheating.

***Remark 17*:** Reference shall be made in column (20) to remark 17 for substances when reference is made to remark 4, 6 or 7.

***Remark 18*:** *No longer used*.

***Remark 19*:** Reference shall be made in column (20) to remark 19 for substances that must under no circumstances come into contact with water.

***Remark 20*:** Reference shall be made in column (20) to remark 20 for substances the transport temperature of which must not exceed a maximum temperature in combination with the cargo tank materials. Reference shall be made to this maximum permitted temperature immediately after the number 20.

***Remark 21*:** *No longer used*.

***Remark 22*:** Reference shall be made in column (20) to remark 22 for substances for which a range of values or no value of the density is indicated in column (12).

***Remark 23*:** Reference shall be made in column (20) to remark 23 for substances the internal pressure of which at 30 ºC is less than 50 kPa and which are transported with water spraying.

***Remark 24*:** Reference shall be made in column (20) to remark 24 for transport of UN No. 3257 ELEVATED TEMPERATURE LIQUID, N.O.S.

***Remark 25*:** Reference shall be made in column (20) to remark 25 for substances that must be transported while heated in a type 3 cargo tank.

***Remark 26*:** Reference shall be made in column (20) to remark 26 for substances that must be transported while heated in a type 2 cargo tank.

***Remark 27*:** Reference shall be made in column (20) to remark 27 for substances for which the reference N.O.S. or a generic reference is made in column (2).

***Remark 28*:** Reference shall be made in column (20) to remark 28 for transport of UN No. 2448 SULPHUR, MOLTEN.

***Remark 29*:** Reference shall be made in column (20) to remark 29 for substances for which the vapour pressure or boiling point is indicated in column (2).

***Remark 30*:** Reference shall be made in column (20) to remark 30 for transport of UN Nos. 1719, 1794, 1814, 1819, 1824, 1829, 1830, 1832, 1833, 1906, 2240, 2308, 2583, 2584, 2677, 2679, 2681, 2796, 2797, 2837 and 3320 under the entries for which open type N is required.

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***Remark 31*:** Reference shall be made in column (20) to remark 31 for transport of substances of Class 2 and UN Nos. 1280 PROPYLENE OXIDE and 2983 ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE of Class 3.

***Remark 32*:** Reference shall be made in column (20) to remark 32 for transport of UN No. 2448 SULPHUR, MOLTEN of Class 4.1.

***Remark 33*:** Reference shall be made in column (20) to remark 33 for transport of UN Nos. 2014 and 2984 HYDROGEN PEROXIDE, AQUEOUS SOLUTION of Class 5.1.

***Remark 34*:** Reference shall be made in column (20) to remark 34 for transport of substances for which hazard 8 is mentioned in column (5) and type N in column (6).

***Remark 35*:** Reference shall be made in column (20) to remark 35 for substances for which complete refrigeration may cause dangerous reactions in the event of compression. This is also applicable if the refrigeration is partly done by compression.

***Remark 36*:** *No longer used.*

***Remark 37*:** Reference shall be made in column (20) to remark 37 for substances for which the cargo storage system must be capable of resisting the full vapour pressure of the cargo at the upper limits of the ambient design temperatures, whatever the system adopted for the boil-off gas.

***Remark 38*:** Reference shall be made in column (20) to remark 38 for mixtures with an initial boiling point above 60 ºC or under or equal to 85 °C in accordance with ASTMD 86-01.

Remark 39: Reference shall be made in column (20) to remark 39 for the carriage of UN No. 2187 CARBON DIOXIDE, REFRIGERATED LIQUID of Class 2.

***Remark 40*:** *No longer used.*

Remark 41: Reference shall be made in column (20) to remark 41 for UN No. 2709 BUTYLBENZENES (n-BUTYLBENZENE).

***Remark 42**:* Reference shall be made in column (20) to remark 42 for UN No. 1038 ETHYLENE, REFRIGERATED LIQUID and for UN No. 1972 METHANE REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID, with high methane content.

Remark 43: Reference shall be made in column (20) to remark 43 for all packing group I entries with letter F (flammable) in the classification code indicated in column (3b), and with letter F (floater) in column (5), Dangers.

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3.2.4 Modalities for the application of section 1.5.2 on special authorizations concerning transport in tank vessels

3.2.4.1 Model special authorization under section 1.5.2

Special authorization
under 1.5.2 of ADN

Under 1.5.2 of ADN, the transport in tank vessels of the substance specified in the annex to this special authorization shall be authorized in the conditions referred to therein.

Before transporting the substance, the carrier shall be required to have it added to the list referred to in 1.16.1.2.5 of ADN by a recognized classification society.

This special authorization shall be valid .....
(places and/or routes of validity)

It shall be valid for two years from the date of signature, unless it is repealed at an earlier date.

Issuing State: .....

Competent authority: .....

Date: .....

Signature: .....

3.2.4.2 Application form for special authorizations under section 1.5.2

For applications for special authorizations, please answer the following questions and points.* Data are used for administrative purposes only and are treated confidentially.

Applicant

.....
(Name) (Company)

.....

( ) .....

.....
(Address)

Summary of the application

Authorization for transport in tank vessels of ..... as a substance of Class .....

Annexes
(with brief description)

Application made:

At: .....

Date: .....

Signature: .....

(of the person responsible for the data)

* *For questions not relevant to the subject of the application, write "not applicable".*

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1. General data on the dangerous substance

1.1 Is it a pure substance □, a mixture □, a solution □ ?

1.2 Technical name (if possible ADN nomenclature or possibly the IBC Code).

1.3 Synonym.

1.4 Trade name.

1.5 Structure formula and, for mixtures, composition and/or concentration.

1.6 Hazard class and, where applicable classification code, packing group.

1.7 UN No. or substance identification number (if known).

2. Physico-chemical properties

2.1 State during transport (e.g. gas, liquid, molten, ...).

2.2 Relative density of liquid at 20 ° C or at the transport temperature if the substance is to be heated or refrigerated during transport.

2.3 Transport temperature (for substances heated or refrigerated during transport).

2.4 Melting point or range ..... °C.

2.5 Boiling point or range ..... °C.

2.6 Vapour pressure at 15 °C ....., 20 °C ....., 30 °C ....., 37.8 °C ....., 50 °C ....., (for liquefied gases, vapour pressure at 70 °C .....), (for permanent gases, filling pressure at 15 °C .....).

2.7 Cubic expansion coefficient ….. K^{-1}

2.8 Solubility in water at 20 °C
Saturation concentration …… mg/l

or

Miscibility with water at 15 °C

□ Complete □ partial □ none
(If possible, in the case of solutions and mixtures, indicate concentration)

2.9 Colour.

2.10 Odour.

2.11 Viscosity ….. mm^2/s.

2.12 Flow time (ISO 2431-1996) .....s.

2.13 Solvent separation test ..... .

2.14 pH of the substance or aqueous solution (indicate concentration).

2.15 Other information.

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3. Technical safety properties

3.1 Auto-ignition temperature in accordance with IEC 60079-20-1:2010, EN 14522:2005, DIN 51 794:2003 in ºC; where applicable, indicate the temperature class in accordance with IEC 60079-20-1:2010.

3.2 Flash-point

For flash-points up to 175 °C

Closed-cup test methods - non-equilibrium procedure

Abel method: EN ISO 13736:2008

Abel-Pensky method: DIN 51755–1:1974 or NF M T60-103:1968

Pensky-Martens method: EN ISO 2719:2012

Luchaire apparatus: French standard NF T60-103:1968

Tag method: ASTM D56-05(2010)

Closed-cup test methods – equilibrium procedure

Rapid equilibrium procedure: EN ISO 3679:2004; ASTM D3278-96 (2011)

Closed-cup equilibrium procedure: EN ISO 1523:2002+AC1:2006; ASTM D3941-90 (2007)

For flash-points above 175 °C

In addition to the above-mentioned methods, the following open-cup test method may be applied:

Cleveland method: EN ISO 2592:2002; ASTM D92-12.

3.3 Explosion limits:

Determination of upper and lower explosion limits in accordance with EN 1839:2012.

3.4 Maximum safe gap in accordance with IEC 60079-20-1:2010 in mm.

3.5 Is the substance stabilized during transport? If so, provide data on the stabilizer:

.....

3.6 Decomposition products in the event of combustion on contact with air or under the influence of an external fire:

3.7 Is the substance fire intensifying?

3.8 Abrasion (corrosion) ..... mm/year.

3.9 Does the substance react with water or moist air by releasing flammable or toxic gases? Yes/No. Gases released: .....

3.10 Does the substance react dangerously in any other way?

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3.11 Does the substance react dangerously when reheated?
Yes/no

4. Physiological hazards

4.1 LD_{50} and/or LC_{50} value. Necrosis value (where applicable, other toxicity criteria in accordance with 2.2.61.1 of ADN).

CMR properties according to Categories 1A and 1B of chapters 3.5, 3.6 and 3.7 of GHS.

4.2 Does decomposition or reaction produce substances posing physiological hazards? (Indicate which substances where known)

4.3 Environmental properties (see 2.4.2.1 of ADN)

Acute toxicity:

LC_{50} 96 hr for fish ..... mg/l

EC_{50} 48 hr for crustacea ..... mg/l

E_rC_{50} 72 hr for algae ..... mg/l

Chronic toxicity:

NOEC ..... mg/l

BCF ..... mg/l or log K_{ow} .....

Easily biodegradable ..... yes/no

5. Data on hazard potential

5.1 What specific damage is to be expected if the hazard characteristics produce their effect?

- Combustion
- Injury
- Corrosion
- Intoxication in the event of dermal absorption
- Intoxication in the event of absorption by inhalation
- Mechanical damage
- Destruction
- Fire
- Abrasion (corrosion to metals)
- Environmental pollution

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6. Data on the transport equipment

6.1 Are particular loading requirements envisaged/necessary (what are they)?

7. Transport of dangerous substances in tanks

7.1 With which materials is the substance to be carried compatible?

8. Technical safety requirements

8.1 Taking into account the current state of science and technology, what safety measures are necessary in the light of the hazards posed by the substance or liable to arise in the course of the transport process as a whole?

8.2 Additional safety measures

- Use of stationary or mobile techniques to measure flammable gases and flammable liquid vapours.

- Use of stationary or mobile techniques (toximeters) to measure concentrations of toxic substances.

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3.2.4.3 Criteria for assignment of substances

A. Columns (6), (7) and (8): Determination of the type of tank vessel

1. Gases (criteria according to 2.2.2 of ADN)

–	Without refrigeration:	type G	pressure
–	With refrigeration:	type G	refrigerated

2. Halogenated hydrocarbons

Substances that may only be transported in a stabilized state

Toxic substances (see 2.2.61.1 of ADN)

Flammable (flash-point < 23 ºC) and corrosive substances (see 2.2.8 of ADN)

Substances with an auto-ignition temperature ≤ 200 ºC

Substances with a flash-point < 23 ºC and an explosivity range > 15% at 20 ºC

Benzene and mixtures of non-toxic and non-corrosive substances containing more than 10% benzene

Environmentally hazardous substances, aquatic toxicity category Acute 1 or Chronic 1 (group N1 in accordance with 2.2.9.1.10.2 of ADN) and vapour pressure at 50 °C ≥ 1 kPa

– Cargo tank internal pressure > 50 kPa at the following temperatures: liquid 30 ºC, gaseous phase 37.8 ºC

●	Without refrigeration:	type C	pressure (400 kPa)
●	With refrigeration:	type C	refrigerated

– Cargo tank internal pressure ≤ 50 kPa at the following temperatures: liquid 30 ºC, gaseous phase 37.8 ºC but with cargo tank internal pressure > 50 kPa at 50 ºC

●	Without water spraying:	type C	pressure (400 kPa)
●	With water spraying:	type C	with pressure relief valve/high velocity vent valve opening pressure of 50 kPa

– Cargo tank internal pressure ≤ 50 kPa at the following temperatures: liquid 30 ºC, gaseous phase 37.8 ºC

with cargo tank internal pressure ≤ 50 kPa at 50 ºC	type C	with pressure relief valve/high velocity vent valve opening pressure as calculated, but at least 10 kPa

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2.1 Mixtures for which type C is required in accordance with the criteria referred to in 2 above but for which certain data are lacking

In cases where the internal pressurization of the tank cannot be calculated owing to a lack of data, the following criteria may be used

– Initial boiling point ≤ 60 ºC	type C	(400 kPa)
– 60 ºC < initial boiling point ≤ 85 ºC	type C	with pressure relief valve/high velocity vent valve opening pressure of 50 kPa and with water spraying
– 85 ºC < initial boiling point ≤ 115 ºC	type C	with pressure relief valve/high velocity vent valve opening pressure of 50 kPa
– 115 ºC < initial boiling point	type C	with pressure relief valve/high velocity vent valve opening pressure of 35 kPa

3. Substances which are flammable only (see 2.2.3 of ADN)

– Flash-point < 23 ºC with 175 kPa ≤ Pv 50 < 300 kPa		
• Without refrigeration:	closed type N	pressure (400 kPa)
• With refrigeration:	closed type N	refrigerated with pressure relief valve/high velocity vent valve opening pressure of 50 kPa
– Flash-point < 23 ºC with 150 kPa ≤ Pv 50 < 175 kPa:	closed type N	with pressure relief valve/high velocity vent valve opening pressure of 50 kPa
– Flash-point < 23 ºC with 110 kPa ≤ Pv 50 < 150 kPa		
• Without water spraying:	closed type N	with pressure relief valve/high velocity vent valve opening pressure of 50 kPa
• With water spraying:	closed type N	with pressure relief valve/high velocity vent valve opening pressure of 10 kPa
– Flash-point < 23 ºC with Pv 50 < 110 kPa:	closed type N	with pressure relief valve/high velocity vent valve opening pressure of 10 kPa
– Flash-point ≥ 23 ºC but ≤ 60 ºC:	open type N	with flame-arrester

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– Substances with a flash-point > 60 ºC heated to less than 15 K from the flash-point, N.O.S. (...):	open type N	with flame-arrester
– Substances with a flash-point > 60 ºC heated to or above the flash-point, N.O.S. (...):	open type N	with flame-arrester

4. Corrosive substances (see 2.2.8 of ADN)

– **Corrosive substances liable to produce corrosive vapours**		
● Substances assigned to packing group I or II in the list of substances and having a vapour pressure[2] greater than 12.5 kPa (125 mbar) at 50 ºC or	closed type N	cargo tank walls must be distinct from vessel hull; pressure relief valve/high velocity vent valve opening pressure of 10 kPa
● Substances liable to react dangerously with water (for example acid chlorides)		
● Substances containing gases in solution		
– **Corrosive acids:**		
● Substances assigned to packing group I or II in the list of substances and having a vapour pressure[2] of 12.5 kPa (125 mbar) or less at 50 ºC or	open type N	cargo tank walls must be distinct from vessel hull
● Substances assigned to packing group III in the list of substances and having a vapour pressure[2] of > 6.0 kPa (60 mbar) at 50 ºC or	open type N	cargo tank walls must be distinct from vessel hull
● Substances assigned to packing group III in the list of substances because of their degree of corrosiveness to steel or aluminium or	open type N	cargo tank walls must be distinct from vessel hull
● Substances with a melting point greater than 0 ºC and transported at elevated temperatures	open type N	cargo tank walls must be distinct from vessel hull
● Flammable substances	open type N	with flame-arresters
● Elevated temperature substances	open type N	with flame-arresters
● Non-flammable substances	open type N	without flame-arresters

[2] *If the data are available, the sum of the partial pressures of the dangerous substances may be used in place of the vapour pressure.*

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–	**All other corrosive substances:**		
	● Flammable substance	open type N	with flame-arresters
	● Non-flammable substances	open type N	without flame-arresters
5.	**Environmentally hazardous substances (see 2.2.9.1 of ADN)**		
	● Aquatic toxicity Acute 1 or Chronic 1 (group N1 in accordance with 2.2.9.1.10.2) and vapour pressure below 1 kPa at 50 °C	closed type N	cargo tank walls must be distinct from vessel hull
	● Chronic 2 and 3 (group N2 in accordance with 2.2.9.1.10.2)	open type N	cargo tank walls must be distinct from vessel hull
	● Acute 2 and 3 (group N3 in accordance with 2.2.9.1.10.2)	open type N	_____
6.	**Substances of Class 9, UN No. 3257**	open type N	independent cargo tanks

7. Substances of Class 9, Identification No. 9003

Flash-point > 60 ºC and ≤ 100 ºC: open type N _____

8. Substances that must be transported at elevated temperatures

For substances that must be transported at elevated temperatures, the type of cargo tank shall be determined on the basis of the transport temperature, using the following table:

Maximum transport temperature T in °C	Type N	Type C
T ≤ 80	2	2
80 < T ≤ 115	1 + remark 25	1 + remark 26
T > 115	1	1

1 = cargo tank type: independent tank

2 = cargo tank type: integral tank

Remark 25 = remark No. 25 in column (20) of the list of substances contained in Chapter 3.2, Table C.

Remark 26 = remark No. 26 in column (20) of the list of substances contained in Chapter 3.2, Table C.

9. Substances with long-term effects on health - CMR substances (Categories 1A and 1B in accordance with the criteria of chapters 3.5, 3.6 and 3.7 of GHS[3]), provided that they are already assigned to Classes 2 to 9 by virtue of other criteria

C carcinogenic

M mutagenic

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[3] *Since there is no official international list of CMR substances of Categories 1A and 1B, pending the availability of such a list, the list of CMR substances of Categories 1A and 1B in Regulation (EC) No 1272/2008 of the European Parliament and of the Council, as amended, shall apply.*

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R	toxic to reproduction		
		closed type N	cargo tank walls must be distinct from vessel hull; pressure relief valve/high velocity vent valve opening pressure of at least 10 kPa, with water-spray system, if the internal pressurization of the tank is more than 10 kPa (calculation of the vapour pressure according to the formula for column 10, except that $v_a = 0.03$)

10. Substances that float on the water surface ('floaters') or sink to the bottom of the water ('sinkers') (criteria according to 2.2.9.1.10.5) provided that they are already assigned to Classes 3 to 9 and that type N is required on that basis

	open type N	cargo tank walls must be distinct from vessel hull

B. Column (9): Determination of cargo tank equipment

(1) Refrigeration system

Determined in accordance with A.

(2) Possibility of heating the cargo

A possibility of heating the cargo shall be required:

- When the melting point of the substance to be transported is + 15 ºC or greater, or
- When the melting point of the substance to be transported is greater than 0 °C but less than + 15 °C and the outside temperature is no more than 4 K above the melting point. In column (20), reference shall be made to remark 6 with the temperature derived as follows: melting point + 4 K.

(3) Water-spray system

Determined in accordance with A.

(4) Cargo heating system on board

- For substances that must not be allowed to solidify owing to the possibility of dangerous reactions on reheating, and
- For substances that must be maintained at a guaranteed temperature of not less than 15 K below their flash-point.

C. Column (10): Determination of opening pressure of high-velocity vent valve in kPa

For vessels of type C, the opening pressure of the high-velocity vent valve shall be determined on the basis of the internal pressure of the tanks, rounded up to the nearest 5 kPa.

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To calculate the internal pressure, the following formula shall be used:

$$P_{\max} = P_{Ob\max} + \frac{k \cdot v_a \left(P_0 - P_{Da}\right)}{v_a - \alpha \cdot \delta_t + \alpha \cdot \delta_t \cdot v_a} - P_o$$

$$k = \frac{T_{D\max}}{T_a}$$

In this formula:

P_{max} : Maximum internal pressure in kPa

P_{Obmax} : Absolute vapour pressure at maximum liquid surface temperature in kPa

P_{Da} : Absolute vapour pressure at filling temperature in kPa

P_0 : Atmospheric pressure in kPa

v_a : Free relative volume at filling temperature compared with cargo tank volume

α : Cubic expansion coefficient in K^{-1}

δ_t : Average temperature increase of the liquid due to heating in K

T_{Dmax} : Maximum gaseous phase temperature in K

T_a : Filling temperature in K

k : Temperature correction factor

t_{Ob} : Maximum liquid surface temperature in °C

In the formula, the following basic data are used:

P_{Obmax} : At 50 °C and 30 °C

P_{Da} : At 15 °C

P_0 : 101.3 kPa

v_a : 5% = 0.05

δ_t : 5 K

T_{Dmax} : 323 K and 310.8 K

T_a : 288 K

t_{Ob} : 50 °C and 30 °C

D. Column (11): Determination of maximum degree of filling of cargo tanks

If, in accordance with the provisions under A above:

–	Type G is required:	91%	however, in the case of deeply refrigerated substances: 95%
–	Type C is required:	95%	
–	Type N is required:	97%	however, in the case of substances in a molten state and of flammable liquids with 175 kPa $\leq P_{v50} <$ 300 kPa: 95%.

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E. Column (13): Determination of type of sampling device

1 = *closed*:	-	Substances to be transported in pressure cargo tanks
	-	Substances with T in column (3b) and assigned to packing group I
	-	Stabilized substances to be transported under inert gas.
2 = *partly closed*:	-	All other substances for which type C is required
3 = *open*:	-	All other substances

F. Column (14): Determination of whether a pump-room is permitted below deck

No	-	All substances with letter T in the classification code indicated in column (3b) with the exception of substances of Class 2.
Yes	-	All other substances

G. Column (15): Determination of temperature class

Flammable substances shall be assigned to a temperature class on the basis of their auto-ignition point:

Temperature class	Auto-ignition temperature T of flammable liquids and gases in °C
T1	$T > 450$
T2	$300 < T \leq 450$
T3	$200 < T \leq 300$
T4	$135 < T \leq 200$
T5	$100 < T \leq 135$
T6	$85 < T \leq 100$

When anti-explosion protection is required and the auto-ignition temperature is not known, reference shall be made to temperature class T4, considered safe.

H. Column (16): Determination of explosion group

Flammable substances shall be assigned to an explosion group on the basis of their maximum experimental safe gaps. The maximum experimental safe gaps shall be determined in accordance with standard IEC 60079-20-1.

The different explosion groups are as follows:

Explosion group	Maximum experimental safe gap in mm
II A	> 0.9
II B	≥ 0.5 to ≤ 0.9
II C	< 0.5

When anti-explosion protection is required and the relevant data are not provided, reference shall be made to explosion group II B, considered safe.

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I. Column (17): Determination of whether anti-explosion protection is required

Yes	- For substances with a flash-point ≤ 60 °C
	- For substances that must be transported while heated to a temperature of less than 15 K below their flash-point
	- For substances that must be transported while heated to a temperature of 15 K or more below their flash-point and where in column (9) (cargo tank equipment) only a possibility of cargo heating (2) and no cargo-heating system on board (4) is required
	- For flammable gases
No	- For all other substances

J. Column (18): Determination of whether personal protective equipment, escape devices, portable gas detectors, portable toximeters or ambient-air-dependent breathing apparatus is required

- PP: For all substances of Classes 1 to 9;
- EP: For all substances
  - of Class 2 with letter T or letter C in the classification code indicated in column (3b);
  - of Class 3 with letter T or letter C in the classification code indicated in column (3b);
  - of Class 4.1;
  - of Class 6.1;
  - of Class 8; and

  for CMR substances of Category 1A or 1B according to chapters 3.5, 3.6 and 3.7 of GHS; *
- EX: For all substances for which anti-explosion protection is required;
- TOX: For all substances of Class 6.1;

  For all substances of other classes with T in column (3b);

  For CMR substances of Category 1A or 1B according to chapters 3.5, 3.6 and 3.7 of GHS;[3]
- A: For all substances for which EX or TOX is required.

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[3] *Since there is no official international list of CMR substances of Categories 1A and 1B, pending the availability of such a list, the list of CMR substances of Categories 1A and 1B in Regulation (EC) No 1272/2008 of the European Parliament and of the Council, as amended, shall apply.*

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K. Column (19): Determination of the number of cones or blue lights

For all substances of Class 2 with letter F in the classification code indicated in column (3b):	1 cone/light
For all substances of Classes 3 to 9 with letter F in the classification code indicated in column (3b) and assigned to packing group I or II:	1 cone/light
For all substances of Class 2 with letter T in the classification code indicated in column (3b):	2 cones/lights
For all substances of Classes 3 to 9 with letter T in the classification code indicated in column (3b) and assigned to packing group I or II:	2 cones/lights

L. Column (20): Determination of additional requirements and remarks

***Remark 1*:** Reference shall be made in column (20) to remark 1 for transport of UN No. 1005 AMMONIA, ANHYDROUS.

***Remark 2*:** Reference shall be made in column (20) to remark 2 for stabilized substances that react with oxygen and for gases for which danger 2.1 is mentioned in column (5).

***Remark 3*:** Reference shall be made in column (20) to remark 3 for substances that must be stabilized.

***Remark 4*:** Reference shall be made in column (20) to remark 4 for substances that must not be allowed to solidify owing to the possibility of dangerous reactions on reheating.

***Remark 5*:** Reference shall be made in column (20) to remark 5 for substances liable to polymerization.

***Remark 6*:** Reference shall be made in column (20) to remark 6 for substances liable to crystallization and for substances for which a heating system or possibility of heating is required and the vapour pressure of which at 20 ºC is greater than 0.1 kPa.

***Remark 7*:** Reference shall be made in column (20) to remark 7 for substances with a melting point of + 15 ºC or greater.

***Remark 8*:** Reference shall be made in column (20) to remark 8 for substances that react dangerously with water.

***Remark 9*:** Reference shall be made in column (20) to remark 9 for transport of UN No. 1131 CARBON DISULPHIDE.

***Remark 10*:** *No longer used*.

***Remark 11*:** Reference shall be made in column (20) to remark 11 for transport of UN No. 1040 ETHYLENE OXIDE WITH NITROGEN.

***Remark 12*:** Reference shall be made in column (20) to remark 12 for transport of UN No. 1280 PROPYLENE OXIDE and UN No. 2983 ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE.

***Remark 13*:** Reference shall be made in column (20) to remark 13 for transport of UN No. 1086 VINYL CHLORIDE, STABILIZED.

***Remark 14*:** Reference shall be made in column (20) to remark 14 for mixtures or N.O.S. entries which are not clearly defined and for which type N is stipulated under the classification criteria.

***Remark 15*:** Reference shall be made in column (20) to remark 15 for substances that react dangerously with alkalis or acids such as sodium hydroxide or sulphuric acid.

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***Remark 16*:** Reference shall be made in column (20) to remark 16 for substances that may react dangerously to local overheating.

***Remark 17*:** Reference shall be made in column (20) to remark 17 for substances when reference is made to remark 4, 6 or 7.

***Remark 18*:** *No longer used*.

***Remark 19*:** Reference shall be made in column (20) to remark 19 for substances that must under no circumstances come into contact with water.

***Remark 20*:** Reference shall be made in column (20) to remark 20 for substances the transport temperature of which must not exceed a maximum temperature in combination with the cargo tank materials. Reference shall be made to this maximum permitted temperature immediately after the number 20.

***Remark 21*:** *No longer used*.

***Remark 22*:** Reference shall be made in column (20) to remark 22 for substances for which a range of values or no value of the density is indicated in column (12).

***Remark 23*:** Reference shall be made in column (20) to remark 23 for substances the internal pressure of which at 30 ºC is less than 50 kPa and which are transported with water spraying.

***Remark 24*:** Reference shall be made in column (20) to remark 24 for transport of UN No. 3257 ELEVATED TEMPERATURE LIQUID, N.O.S.

***Remark 25*:** Reference shall be made in column (20) to remark 25 for substances that must be transported while heated in a type 3 cargo tank.

***Remark 26*:** Reference shall be made in column (20) to remark 26 for substances that must be transported while heated in a type 2 cargo tank.

***Remark 27*:** Reference shall be made in column (20) to remark 27 for substances for which the reference N.O.S. or a generic reference is made in column (2).

***Remark 28*:** Reference shall be made in column (20) to remark 28 for transport of UN No. 2448 SULPHUR, MOLTEN.

***Remark 29*:** Reference shall be made in column (20) to remark 29 for substances for which the vapour pressure or boiling point is indicated in column (2).

***Remark 30*:** Reference shall be made in column (20) to remark 30 for transport of UN Nos. 1719, 1794, 1814, 1819, 1824, 1829, 1830, 1832, 1833, 1906, 2240, 2308, 2583, 2584, 2677, 2679, 2681, 2796, 2797, 2837 and 3320 under the entries for which open type N is required.

***Remark 31*:** Reference shall be made in column (20) to remark 31 for transport of substances of Class 2 and UN Nos. 1280 PROPYLENE OXIDE and 2983 ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE of Class 3.

***Remark 32*:** Reference shall be made in column (20) to remark 32 for transport of UN No. 2448 SULPHUR, MOLTEN of Class 4.1.

***Remark 33*:** Reference shall be made in column (20) to remark 33 for transport of UN Nos. 2014 and 2984 HYDROGEN PEROXIDE, AQUEOUS SOLUTION of Class 5.1.

***Remark 34*:** Reference shall be made in column (20) to remark 34 for transport of substances for which hazard 8 is mentioned in column (5) and type N in column (6).

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***Remark 35*:** Reference shall be made in column (20) to remark 35 for substances for which complete refrigeration may cause dangerous reactions in the event of compression. This is also applicable if the refrigeration is partly done by compression.

***Remark 36*:** *No longer used.*

***Remark 37*:** Reference shall be made in column (20) to remark 37 for substances for which the cargo storage system must be capable of resisting the full vapour pressure of the cargo at the upper limits of the ambient design temperatures, whatever the system adopted for the boil-off gas.

***Remark 38*:** Reference shall be made in column (20) to remark 38 for mixtures with an initial boiling point above 60 ºC or under or equal to 85 °C in accordance with ASTMD 86-01.

Remark 39: Reference shall be made in column (20) to remark 39 for the carriage of UN No. 2187 CARBON DIOXIDE, REFRIGERATED LIQUID of Class 2.

Remark 40: *No longer used.*

Remark 41: Reference shall be made in column (20) to remark 41 for UN No. 2709 BUTYLBENZENES (n-BUTYLBENZENE).

Remark 42: Reference shall be made in column (20) to remark 42 for UN No. 1038 ETHYLENE, REFRIGERATED LIQUID and for UN No. 1972 METHANE REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID, with high methane content.

Remark 43: Reference shall be made in column (20) to remark 43 for all packing group I entries with letter F (flammable) in the classification code indicated in column (3b), and with letter F (floater) in column (5), Dangers.

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PART 4

Provisions concerning the use of packagings, tanks and bulk cargo transport units

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CHAPTER 4.1

GENERAL PROVISIONS

4.1.1 Packagings and tanks shall be used in accordance with the requirements of one of the international Regulations, bearing in mind the indications given in the list of substances of these international Regulations, namely:

– For packagings (including IBCs and large packagings): columns (9a) and (9b) of Chapter 3.2, Table A of RID or ADR, or the list of substances in Chapter 3.2 of the IMDG Code or the ICAO Technical Instructions;

– For portable tanks: columns (10) and (11) of Chapter 3.2, Table A of RID or ADR or the list of substances in the IMDG Code;

– For RID or ADR tanks: columns (12) and (13) of Chapter 3.2, Table A of RID or ADR.

4.1.2 The requirements to be implemented are as follows:

– For packagings (including IBCs and large packagings): Chapter 4.1 of RID, ADR, the IMDG Code or the ICAO Technical Instructions;

– For portable tanks: Chapter 4.2 of RID, ADR or the IMDG Code;

– For RID or ADR tanks: Chapter 4.3 of RID or ADR, and, where applicable, sections 4.2.5 or 4.2.6 of the IMDG Code;

– For fibre-reinforced plastics tanks: Chapter 4.4 of ADR;

– For vacuum-operated waste tanks: Chapter 4.5 of ADR.

– For mobile explosive manufacturing units (MEMUs): Chapter 4.7 of ADR.

4.1.3 For carriage in bulk of solids in vehicles, wagons, containers or bulk containers, the following requirements of the international Regulations shall be complied with:

– Chapter 4.3 of the IMDG Code; or

– Chapter 7.3 of ADR, taking account of indications in columns (10) or (17) of Table A of Chapter 3.2 of ADR, except that sheeted vehicles and containers are not allowed;

– Chapter 7.3 of RID, taking account of indications in columns (10) or (17) of Table A of Chapter 3.2 of RID, except that sheeted wagons and containers are not allowed.

4.1.4 Only packagings and tanks which meet the requirements of Part 6 of ADR or RID may be used.

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PART 5

Consignment procedures

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CHAPTER 5.1

GENERAL PROVISIONS

5.1.1 Application and general provisions

This Part sets forth the provisions for dangerous goods consignments relative to marking, labelling, and documentation, and, where appropriate, authorisation of consignments and advance notifications.

5.1.2 Use of overpacks

5.1.2.1 (a) Unless marks and labels required in Chapter 5.2, except 5.2.1.3 to 5.2.1.6, 5.2.1.7.2 to 5.2.1.7.8 and 5.2.1.10, representative of all dangerous goods in the overpack are visible, the overpack shall be:

(i) marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high. The mark shall be in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise; and

(ii) labelled and marked with the UN number and other marks, as required for packages in Chapter 5.2 except 5.2.1.3 to 5.2.1.6, 5.2.1.7.2 to 5.2.1.7.8 and 5.2.1.10, for each item of dangerous goods contained in the overpack. Each applicable mark or label only needs to be applied once.

Labelling of overpacks containing radioactive material shall be in accordance with 5.2.2.1.11.

(b) Orientation arrows illustrated in 5.2.1.10 shall be displayed on two opposite sides of overpacks containing packages which shall be marked in accordance with 5.2.1.10.1, unless the marks remains visible.

5.1.2.2 Each package of dangerous goods contained in an overpack shall comply with all applicable provisions of ADN. The intended function of each package shall not be impaired by the overpack.

5.1.2.3 Each package bearing package orientation marks as prescribed in 5.2.1.10 and which is overpacked or placed in a large packaging shall be oriented in accordance with such marks.

5.1.2.4 The prohibitions on mixed loading also apply to these overpacks.

5.1.3 Empty uncleaned packagings (including IBCs and large packagings), tanks, MEMUs, vehicles, wagons and containers for carriage in bulk

5.1.3.1 Empty uncleaned packagings (including IBCs and large packagings), tanks (including tank-vehicles, tank-wagons, battery-vehicles, battery-wagons, demountable tanks, portable tanks, tank-containers, MEGCs, MEMUs), vehicles, wagons and containers for carriage in bulk having contained dangerous goods of the different classes other than Class 7, shall be marked and labelled as if they were full.

NOTE: *For documentation, see Chapter 5.4.*

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5.1.3.2 Containers, tanks, IBCs, as well as other packagings and overpacks, used for the carriage of radioactive material shall not be used for the storage or carriage of other goods unless decontaminated below the level of 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm^2 for all other alpha emitters.

5.1.4 Mixed packing

When two or more dangerous goods are packed within the same outer packaging, the package shall be labelled and marked as required for each substance or article. If the same label is required for different goods, it only needs to be applied once.

5.1.5 General provisions for Class 7

5.1.5.1 ***Approval of shipments and notification***

5.1.5.1.1 *General*

In addition to the approval of package designs described in Chapter 6.4 of ADR, multilateral shipment approval is also required in certain circumstances (5.1.5.1.2 and 5.1.5.1.3). In some circumstances it is also necessary to notify competent authorities of a shipment (5.1.5.1.4).

5.1.5.1.2 *Shipment approvals*

Multilateral approval shall be required for:

(a) the shipment of Type B(M) packages not conforming with the requirements of 6.4.7.5 of ADR or designed to allow controlled intermittent venting;

(b) the shipment of Type B(M) packages containing radioactive material with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower;

(c) the shipment of packages containing fissile materials if the sum of the criticality safety indexes of the packages in a single vessel, vehicle, wagon or container exceeds 50;

(d) radiation protection programmes for shipments by special use vessels in accordance with 7.1.4.14.7.3.7;

except that a competent authority may authorise carriage into or through its country without shipment approval, by a specific provision in its design approval (see 5.1.5.2.1).

5.1.5.1.3 *Shipment approval by special arrangement*

Provisions may be approved by a competent authority under which a consignment, which does not satisfy all of the applicable requirements of ADN may be carried under special arrangement (see 1.7.4).

5.1.5.1.4 *Notifications*

Notification to competent authorities is required as follows:

(a) Before the first shipment of any package requiring competent authority approval, the consignor shall ensure that copies of each applicable competent authority certificate applying to that package design have been submitted to the competent authority of the country of origin of the shipment and to the competent authority of each country through or into which the consignment is to be carried. The consignor is not required to await an acknowledgement from the competent authority, nor is the competent authority required to make such acknowledgement of receipt of the certificate;

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(b) For each of the following types of shipments:

(i) Type C packages containing radioactive material with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower;

(ii) Type B(U) packages containing radioactive material with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower;

(iii) Type B(M) packages;

(iv) Shipment under special arrangement.

The consignor shall notify the competent authority of the country of origin of the shipment and the competent authority of each country through or into which the consignment is to be carried. This notification shall be in the hands of each competent authority prior to the commencement of the shipment, and preferably at least 7 days in advance;

(c) The consignor is not required to send a separate notification if the required information has been included in the application for approval of shipment (see 6.4.23.2 of ADR);

(d) The consignment notification shall include:

(i) sufficient information to enable the identification of the package or packages including all applicable certificate numbers and identification marks;

(ii) information on the date of shipment, the expected date of arrival and proposed routeing;

(iii) the name(s) of the radioactive material(s) or nuclide(s);

(iv) descriptions of the physical and chemical forms of the radioactive material, or whether it is special form radioactive material or low dispersible radioactive material; and

(v) the maximum activity of the radioactive contents during carriage expressed in becquerels (Bq) with an appropriate SI prefix symbol (see 1.2.2.1). For fissile material, the mass of fissile material (or of each fissile nuclide for mixtures when appropriate) in grams (g), or multiples thereof, may be used in place of activity.

5.1.5.2 ***Certificates issued by the competent authority***

5.1.5.2.1 Certificates issued by the competent authority are required for the following:

(a) Designs for:

(i) special form radioactive material;

(ii) low dispersible radioactive material;

(iii) fissile material excepted under 2.2.7.2.3.5 (f);

(iv) packages containing 0.1 kg or more of uranium hexafluoride;

(v) packages containing fissile material unless excepted by 2.2.7.2.3.5 of the present Regulations or 6.4.11.2 or 6.4.11.3 of ADR;

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(vi) Type B(U) packages and Type B(M) packages;

(vii) Type C packages;

(b) Special arrangements;

(c) Certain shipments (see 5.1.5.1.2);

(d) Determination of the basic radionuclide values referred to in 2.2.7.2.2.1 for individual radionuclides which are not listed in Table 2.2.7.2.2.1 (see 2.2.7.2.2.2 (a));

(e) Alternative activity limits for an exempt consignment of instruments or articles (see 2.2.7.2.2.2 (b)).

The certificates shall confirm that the applicable requirements are met, and for design approvals shall attribute to the design an identification mark.

The certificates of approval for the package design and the shipment may be combined into a single certificate.

Certificates and applications for these certificates shall be in accordance with the requirements in 6.4.23 of ADR.

5.1.5.2.2 The consignor shall be in possession of a copy of each applicable certificate.

5.1.5.2.3 For package designs where it is not required that a competent authority issue a certificate of approval, the consignor shall, on request, make available for inspection by the competent authority, documentary evidence of the compliance of the package design with all the applicable requirements.

5.1.5.3 ***Determination of transport index (TI) and criticality safety index (CSI)***

5.1.5.3.1 The transport index (TI) for a package, overpack or container, or for unpackaged LSA-I or SCO-I, shall be the number derived in accordance with the following procedure:

(a) Determine the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, container, or unpackaged LSA-I and SCO-I. The value determined shall be multiplied by 100 and the resulting number is the transport index. For uranium and thorium ores and their concentrates, the maximum radiation level at any point 1 m from the external surface of the load may be taken as:

0.4 mSv/h	for ores and physical concentrates of uranium and thorium;
0.3 mSv/h	for chemical concentrates of thorium;
0.02 mSv/h	for chemical concentrates of uranium, other than uranium hexafluoride;

(b) For tanks, containers and unpackaged LSA-I and SCO-I, the value determined in step (a) above shall be multiplied by the appropriate factor from Table 5.1.5.3.1;

(c) The value obtained in steps (a) and (b) above shall be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero.

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Table 5.1.5.3.1: Multiplication factors for tanks, containers and unpackaged LSA-I and SCO-I

Size of load [a]	Multiplication factor
size of load ≤ 1 m^2	1
1 m^2 < size of load ≤ 5 m^2	2
5 m^2 < size of load ≤ 20 m^2	3
20 m^2 < size of load	10

[a] *Largest cross-sectional area of the load being measured.*

5.1.5.3.2 The transport index for each overpack, vessel or cargo transport unit shall be determined as either the sum of the TIs of all the packages contained, or by direct measurement of radiation level, except in the case of non-rigid overpacks for which the transport index shall be determined only as the sum of the TIs of all the packages.

5.1.5.3.3 The criticality safety index for each overpack or container shall be determined as the sum of the CSIs of all the packages contained. The same procedure shall be followed for determining the total sum of the CSIs in a consignment or aboard a vessel or cargo transport unit.

5.1.5.3.4 Packages, overpacks and containers shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 5.1.5.3.4 and with the following requirements:

(a) For a package, overpack or container, both the transport index and the surface radiation level conditions shall be taken into account in determining which is the appropriate category. Where the transport index satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, the package, overpack or container shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category;

(b) The transport index shall be determined following the procedures specified in 5.1.5.3.1 and 5.1.5.3.2;

(c) If the surface radiation level is greater than 2 mSv/h, the package or overpack shall be carried under exclusive use and under the provisions of 7.1.4.14.7.1.3 and 7.1.4.14.7.3.5 (a) as appropriate;

(d) A package carried under a special arrangement shall be assigned to category III-YELLOW except under the provisions of 5.1.5.3.5;

(e) An overpack or container which contains packages carried under special arrangement shall be assigned to category III-YELLOW except under the provisions of 5.1.5.3.5.

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Table 5.1.5.3.4: Categories of packages, overpacks and containers

Conditions		
Transport index	**Maximum radiation level at any point on external surface**	**Category**
0[a]	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1[a]	More than 0.005 mSv/h but not more than 0.5 mSv/h	II-YELLOW
More than 1 but not more than 10	More than 0.5 mSv/h but not more than 2 mSv/h	III-YELLOW
More than 10	More than 2 mSv/h but not more than 10 mSv/h	III-YELLOW [b]

[a] *If the measured TI is not greater than 0.05, the value quoted may be zero in accordance with 5.1.5.3.1(c).*
[b] *Shall also be carried under exclusive use except for containers (see Table D in 7.1.4.14.7.3.3).*

5.1.5.3.5 In all cases of international carriage of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the categorization shall be in accordance with the certificate of the country of origin of design.

5.1.5.4 ***Specific provisions for excepted packages of radioactive material of Class 7***

5.1.5.4.1 Excepted packages of radioactive material of Class 7 shall be legibly and durably marked on the outside of the packaging with:

(a) The UN number preceded by the letters "UN";

(b) An identification of either the consignor or consignee, or both; and

(c) The permissible gross mass if this exceeds 50 kg.

5.1.5.4.2 The documentation requirements of Chapter 5.4 do not apply to excepted packages of radioactive material of Class 7, except that:

(a) The UN number preceded by the letters "UN" and the name and address of the consignor and the consignee and, if relevant, the identification mark for each competent authority certificate of approval (see 5.4.1.2.5.1 (g)) shall be shown on a transport document such as a bill of lading, air waybill or CMR, CIM or CMNI consignment note;

(b) If relevant, the requirements of 5.4.1.2.5.1 (g), 5.4.1.2.5.3 and 5.4.1.2.5.4 shall apply;

(c) The requirements of 5.4.2 and 5.4.4 shall apply.

5.1.5.4.3 The requirements of 5.2.1.7.8 and 5.2.2.1.11.5 shall apply if relevant.

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5.1.5.5 ***Summary of approval and prior notification requirements***

NOTE 1*: Before first shipment of any package requiring competent authority approval of the design, the consignor shall ensure that a copy of the approval certificate for that design has been submitted to the competent authority of each country en route (see 5.1.5.1.4 (a)).*

NOTE 2*: Notification required if contents exceed 3 × 10³ A_1, or 3 × 10³ A_2, or 1000 TBq (see 5.1.5.1.4 (b)).*

NOTE 3*: Multilateral approval of shipment required if contents exceed 3 × 10³ A_1, or 3 × 10³ A_2, or 1000 TBq, or if controlled intermittent venting is allowed (see 5.1.5.1).*

NOTE 4*: See approval and prior notification provisions for the applicable package for carrying this material.*

Subject	UN Number	Competent authority approval required		Consignor required to notify the competent authorities of the country of origin and of the countries en route[a] before each shipment	Reference
		Country of origin	Countries en route[a]		
Calculation of unlisted A_1 and A_2 values	-	Yes	Yes	No	2.2.7.2.2.2 (a), 5.1.5.2.1 (d)
Excepted packages - package design - shipment	2908, 2909, 2910, 2911	 No No	 No No	 No No	-
LSA material[b] and SCO[b] Industrial packages types 1, 2 or 3, non fissile and fissile excepted - package design - shipment	2912, 2913, 3321, 3322	 No No	 No No	 No No	-
Type A packages,[b] non fissile and fissile excepted - package design - shipment	2915, 3332	 No No	 No No	 No No	-
Type B(U) packages,[b] non fissile and fissile excepted - package design - shipment	2916	 Yes No	 No No	 See Note 1 See Note 2	5.1.5.1.4 (b), 5.1.5.2.1 (a) 6.4.22.2 (ADR)
Type B(M) packages,[b] non fissile and fissile excepted - package design - shipment	2917	 Yes See Note 3	 Yes See Note 3	 No Yes	5.1.5.1.4 (b), 5.1.5.2.1 (a), 5.1.5.1.2. 6.4.22.3 (ADR)

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Subject	UN Number	Competent authority approval required		Consignor required to notify the competent authorities of the country of origin and of the countries en route[a] before each shipment	Reference
		Country of origin	Countries en route[a]		
Type C packages,[b] non fissile and fissile excepted	3323				5.1.5.1.4 (b), 5.1.5.2.1 (a) 6.4.22.2 (ADR)
- package design		Yes	No	See Note 1	
- shipment		No	No	See Note 2	
Packages for fissile material	2977, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3333	Yes[c]	Yes[c]	No	5.1.5.2.1 (a), 5.1.5.1.2, 6.4.22.4 (ADR)
- package design					
- shipment					
- sum of criticality safety indexes not more than 50		No[d]	No[d]	See Note 2	
- sum of criticality safety indexes greater than 50		Yes	Yes	See Note 2	
Special form radioactive material					1.6.6.4 (ADR), 5.1.5.2.1 (a) 6.4.22.5 (ADR)
- design	-	Yes	No	No	
- shipment	See Note 4	See Note 4	See Note 4	See Note 4	
Low dispersable radioactive material					5.1.5.2.1 (a), 6.4.22.5 (ADR)
- design	-	Yes	No	No	
- shipment	See Note 4	See Note 4	See Note 4	See Note 4	
Packages containing 0.1 kg or more of uranium hexafluoride					5.1.5.2.1 (a), 6.4.22.1 (ADR)
- design	-	Yes	No	No	
- shipment	See Note 4	See Note 4	See Note 4	See Note 4	
Special arrangement	2919, 3331				1.7.4.2, 5.1.5.2.1 (b), 5.1.5.1.4 (b)
- shipment		Yes	Yes	Yes	

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Subject	UN Number	Competent authority approval required		Consignor required to notify the competent authorities of the country of origin and of the countries en route[a] before each shipment	Reference
		Country of origin	Countries en route[a]		
Approved packages designs subjected to transitional measures	-	See 1.6.6	See 1.6.6	See Note 1	1.6.6.2, (ADR), 5.1.5.1.4 (b), 5.1.5.2.1 (a), 5.1.5.1.2. 6.4.22.9 (ADR)
Alternative activity limits for an exempt consignment of instruments or articles	-	Yes	Yes	No	5.1.5.2.1(e), 6.4.22.7 (ADR)
Fissile material excepted in accordance with 2.2.7.2.3.5 (f)	-	Yes	Yes	No	5.1.5.2.1 (a) (iii), 6.4.22.6 (ADR)

[a] *Countries from, through or into which the consignment is carried.*

[b] *If the radioactive contents are fissile material which is not excepted from the provisions for packages containing fissile material, then the provisions for fissile material packages apply (see 6.4.11 of ADR).*

[c] *Designs of packages for fissile material may also require approval in respect of one of the other items in the table.*

[d] *Shipments may, however, require approval in respect of one of the other items in the table.*

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CHAPTER 5.2

MARKING AND LABELLING

5.2.1 Marking of packages

NOTE 1*: For marks related to the construction, testing and approval of packagings, large packagings, pressure receptacles and IBCs, see Part 6 of ADR.*

NOTE 2: *In accordance with the GHS, a GHS pictogram not required by ADN should only appear in carriage as part of a complete GHS label and not independently (see GHS 1.4.10.4.4).*

5.2.1.1 Unless provided otherwise in ADN, the UN number corresponding to the dangerous goods contained, preceded by the letters “UN” shall be clearly and durably marked on each package. The UN number and the letters "UN" shall be at least 12 mm high, except for packages of 30 litres capacity or less or of 30 kg maximum net mass and for cylinders of 60 litres water capacity or less, when they shall be at least 6 mm in height and except for packages of 5 litres or 5 kg or less when they shall be of an appropriate size. In the case of unpackaged articles the mark shall be displayed on the article, on its cradle or on its handling, storage or launching device.

5.2.1.2 All package marks required by this Chapter:

(a) shall be readily visible and legible;

(b) shall be able to withstand open weather exposure without a substantial reduction in effectiveness.

5.2.1.3 Salvage packagings, including large salvage packagings, and salvage pressure receptacles shall additionally be marked with the word “**SALVAGE**”. The lettering of the "SALVAGE" mark shall be at least 12 mm high.

5.2.1.4 Intermediate bulk containers of more than 450 litres capacity and large packagings shall be marked on two opposite sides.

5.2.1.5 ***Additional provisions for goods of Class 1***

For goods of Class 1, packages shall, in addition, bear the proper shipping name as determined in accordance with 3.1.2. The mark, which shall be clearly legible and indelible, shall be in one or more languages, one of which must be French, German or English, unless any agreements concluded between the countries concerned in the transport operation provide otherwise.

5.2.1.6 ***Additional provisions for goods of Class 2***

Refillable receptacles shall bear the following particulars in clearly legible and durable characters:

(a) the UN number and the proper shipping name of the gas or mixture of gases, as determined in accordance with 3.1.2.

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In the case of gases classified under an N.O.S. entry, only the technical name[1] of the gas has to be indicated in addition to the UN number.

In the case of mixtures, not more than the two constituents which most predominantly contribute to the hazards have to be indicated;

(b) for compressed gases filled by mass and for liquefied gases, either the maximum filling mass and the tare of the receptacle with fittings and accessories as fitted at the time of filling, or the gross mass;

(c) the date (year) of the next periodic inspection.

These particulars can either be engraved or indicated on a durable information disk or label attached on the receptacle or indicated by an adherent and clearly visible mark such as by printing or by any equivalent process.

NOTE 1: *See also 6.2.2.7 of ADR.*

NOTE 2: *For non refillable receptacles, see 6.2.2.8 of ADR.*

5.2.1.7 ***Special marking provisions for radioactive material***

5.2.1.7.1 Each package shall be legibly and durably marked on the outside of the packaging with an identification of either the consignor or consignee, or both. Each overpack shall be legibly and durably marked on the outside of the overpack with an identification of either the consignor or consignee, or both unless these marks of all packages within the overpack are clearly visible.

5.2.1.7.2 For each package, other than excepted packages, the UN number preceded by the letters "UN" and the proper shipping name shall be legibly and durably marked on the outside of the packaging. The marking of excepted packages shall be as required by 5.1.5.4.1.

5.2.1.7.3 Each package of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the packaging.

5.2.1.7.4 Each package which conforms to:

(a) a Type IP-1 package, a Type IP-2 package or a Type IP-3 package design shall be legibly and durably marked on the outside of the packaging with "TYPE IP-1", "TYPE IP-2" or "TYPE IP-3" as appropriate;

(b) a Type A package design shall be legibly and durably marked on the outside of the packaging with "TYPE A";

(c) a Type IP-2 package, a Type IP-3 package or a Type A package design shall be legibly and durably marked on the outside of the packaging with the distinguishing sign used on vehicles in international road traffic[2] of the country of origin of design

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[1] *Instead of the proper shipping name or, if applicable, of the proper shipping name of the n.o.s. entry followed by the technical name, the use of the following names is permitted:*
- *for UN No. 1078 refrigerant gas, n.o.s: mixture F1, mixture F2, mixture F3;*
- *for UN No. 1060 methylacetylene and propadiene mixtures, stabilized: mixture P1, mixture P2;*
- *for UN No. 1965 hydrocarbon gas mixture, liquefied, n.o.s: mixture A or butane, mixture A01 or butane, mixture A02 or butane, mixture A0 or butane, mixture A1, mixture B1, mixture B2, mixture B, mixture C or propane.*
- *for UN No. 1010 Butadienes, stabilized: 1,2-Butadiene, stabilized, 1,3-Butadiene, stabilized .*

[2] *Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.*

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and either the name of the manufacturer or other identification of the packaging specified by the competent authority of the country of origin of design.

5.2.1.7.5 Each package which conforms to a design approved under one or more of paragraphs 5.1.5.2.1 of these Regulations, 1.6.6.2.1, 6.4.22.1 to 6.4.22.4 and 6.4.23.4 to 6.4.23.7 of ADR shall be legibly and durably marked on the outside of the package with the following information:

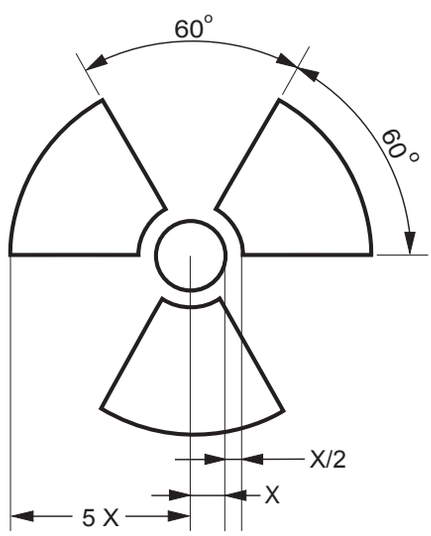
(a) the identification mark allocated to that design by the competent authority;

(b) a serial number to uniquely identify each packaging which conforms to that design;

(c) "Type B(U)", "Type B(M)" or "Type C", in the case of a Type B(U), Type B(M) or Type C package design.

5.2.1.7.6 Each package which conforms to a Type B(U), Type B(M) or Type C package design shall have the outside of the outermost receptacle which is resistant to the effects of fire and water plainly marked by embossing, stamping or other means resistant to the effects of fire and water with the trefoil symbol shown in the figure below.

Basic trefoil symbol with proportions based on a central circle of radius X. The minimum allowable size of X shall be 4 mm.



5.2.1.7.7 Where LSA-I or SCO-I material is contained in receptacles or wrapping materials and is carried under exclusive use as permitted by 4.1.9.2.4 of ADR, the outer surface of these receptacles or wrapping materials may bear the mark “RADIOACTIVE LSA-I” or “RADIOACTIVE SCO-I”, as appropriate.

5.2.1.7.8 In all cases of international carriage of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, marking shall be in accordance with the certificate of the country of origin of the design.

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5.2.1.8 ***Special marking provisions for environmentally hazardous substances***

5.2.1.8.1 Packages containing environmentally hazardous substances meeting the criteria of 2.2.9.1.10 shall be durably marked with the environmentally hazardous substance mark shown in 5.2.1.8.3 with the exception of single packagings and combination packagings where such single packagings or inner packagings of such combination packagings have:

- a quantity of 5 *l* or less for liquids; or

- a net mass of 5 kg or less for solids.

5.2.1.8.2 The environmentally hazardous substance mark shall be located adjacent to the marks required by 5.2.1.1. The requirements of 5.2.1.2 and 5.2.1.4 shall be met.

5.2.1.8.3 The environmentally hazardous substance mark shall be as shown in Figure 5.2.1.8.3.

Figure 5.2.1.8.3

Environmentally hazardous substance mark

The mark shall be in the form of a square set at an angle of 45° (diamond-shaped). The symbol (fish and tree) shall be black on white or suitable contrasting background. The minimum dimensions shall be 100 mm x 100 mm and the minimum width of the line forming the diamond shall be 2 mm. If the size of the package so requires, the dimensions/line thickness may be reduced, provided the mark remains clearly visible. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

NOTE: *The labelling provisions of 5.2.2 apply in addition to any requirement for packages to bear the environmentally hazardous substance mark.*

5.2.1.9 ***Lithium battery mark***

5.2.1.9.1 Packages containing lithium cells or batteries prepared in accordance with special provision 188 shall be marked as shown in Figure 5.2.1.9.2.

5.2.1.9.2 The mark shall indicate the UN number preceded by the letters “UN”, i.e. ‘UN 3090’ for lithium metal cells or batteries or ‘UN 3480’ for lithium ion cells or batteries. Where the lithium cells or batteries are contained in, or packed with, equipment, the UN number preceded by the letters “UN”, i.e. ‘UN 3091’ or ‘UN 3481’ as appropriate shall be indicated. Where a package contains lithium cells or batteries assigned to different UN numbers, all applicable UN numbers shall be indicated on one or more marks.

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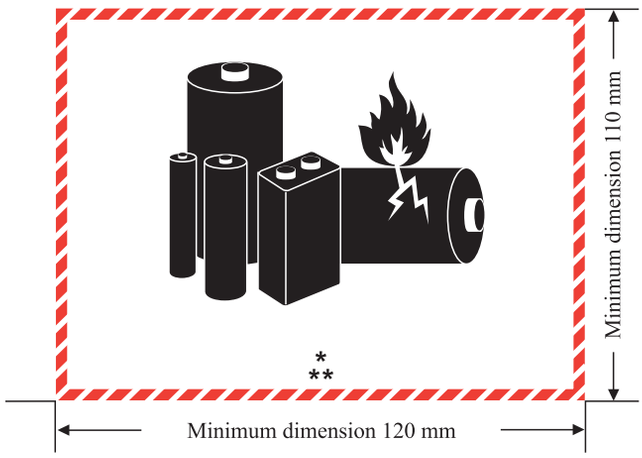
Figure 5.2.1.9.2



Lithium battery mark

* Place for UN number(s)

** Place for telephone number for additional information

The mark shall be in the form of a rectangle with hatched edging. The dimensions shall be a minimum of 120 mm wide x 110 mm high and the minimum width of the hatching shall be 5 mm. The symbol (group of batteries, one damaged and emitting flame, above the UN number for lithium ion or lithium metal batteries or cells) shall be black on white or suitable contrasting background. The hatching shall be red. If the size of the package so requires, the dimensions/line thickness may be reduced to not less than 105 mm wide x 74 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

5.2.1.10 ***Orientation arrows***

5.2.1.10.1 Except as provided in 5.2.1.10.2:

- combination packagings having inner packagings containing liquids;
- single packagings fitted with vents;
- cryogenic receptacles intended for the carriage of refrigerated liquefied gases; and
- machinery or apparatus containing liquid dangerous goods when it is required to ensure the liquid dangerous goods remain in their intended orientation (see special provision 301 of Chapter 3.3),

shall be legibly marked with package orientation arrows which are similar to the illustration shown below or with those meeting the specifications of ISO 780:1997. The orientation arrows shall appear on two opposite vertical sides of the package with the arrows pointing in the correct upright direction. They shall be rectangular and of a size that is clearly visible commensurate with the size of the package. Depicting a rectangular border around the arrows is optional.

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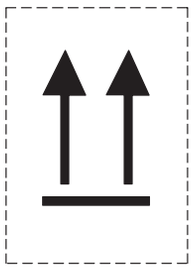
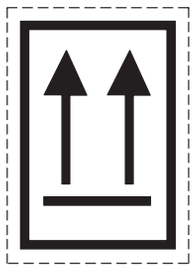
Figure 5.2.1.10.1.1 **Figure 5.2.1.10.1.2**



or



Two black or red arrows on white or suitable contrasting background.

The rectangular border is optional.

All features shall be in approximate proportion to those shown.

5.2.1.10.2 Orientation arrows are not required on:

(a) Outer packagings containing pressure receptacles except cryogenic receptacles;

(b) Outer packagings containing dangerous goods in inner packagings each containing not more than 120 ml, with sufficient absorbent material between the inner and outer packagings to completely absorb the liquid contents;

(c) Outer packagings containing Class 6.2 infectious substances in primary receptacles each containing not more than 50 ml;

(d) Type IP-2, type IP-3, type A, type B(U), type B(M) or type C packages containing Class 7 radioactive material;

(e) Outer packagings containing articles which are leak-tight in all orientations (e.g. alcohol or mercury in thermometers, aerosols, etc.); or

(f) Outer packagings containing dangerous goods in hermetically sealed inner packagings each containing not more than 500 ml.

5.2.1.10.3 Arrows for purposes other than indicating proper package orientation shall not be displayed on a package marked in accordance with this sub-section.

5.2.2 Labelling of packages

5.2.2.1 *Labelling provisions*

5.2.2.1.1 For each article or substance listed in Table A of Chapter 3.2, the labels shown in Column (5) shall be affixed unless otherwise provided for by a special provision in Column (6).

5.2.2.1.2 Indelible danger mark corresponding exactly to the prescribed models may be used instead of labels.

5.2.2.1.3 to 5.2.2.1.5 (*Reserved*)

5.2.2.1.6 Except as provided in 5.2.2.2.1.2, each label shall:

(a) be affixed to the same surface of the package, if the dimensions of the package allow; for packages of Class 1 and 7, near the mark indicating the proper shipping name;

(b) be so placed on the package that it is not covered or obscured by any part or attachment to the packaging or any other label or mark; and

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(c) be displayed next to each other when more than one label is required.

Where a package is of such an irregular shape or small size that a label cannot be satisfactorily affixed, the label may be attached to the package by a securely affixed tag or other suitable means.

5.2.2.1.7 Intermediate bulk containers of more than 450 litres capacity and large packages shall be labelled on two opposite sides.

5.2.2.1.8 (*Reserved*)

5.2.2.1.9 *Special provisions for the labelling of self-reactive substances and organic peroxides*

(a) the label conforming to model No. 4.1 also implies that the product may be flammable and hence no label conforming to model No. 3 is required. In addition, a label conforming to model No. 1 shall be applied for self-reactive substances Type B, unless the competent authority has permitted this label to be dispensed with for a specific packaging because test data have proven that the self-reactive substance in such a packaging does not exhibit explosive behaviour.

(b) the label conforming to model No. 5.2 also implies that the product may be flammable and hence no label conforming to model No. 3 is required. In addition, the following labels shall be applied:

(i) a label conforming to model No. 1 for organic peroxides type B, unless the competent authority has permitted this label to be dispensed with for a specific packaging because test data have proven that the organic peroxide in such a packaging does not exhibit explosive behaviour;

(ii) a label conforming to model No. 8 is required when Packing Group I or II criteria of Class 8 are met.

For self-reactive substances and organic peroxides mentioned by name, the labels to be affixed are indicated in the list found in 2.2.41.4 and 2.2.52.4 respectively.

5.2.2.1.10 *Special provisions for the labelling of infectious substances packages*

In addition to the label conforming to model No. 6.2, infectious substances packages shall bear any other label required by the nature of the contents.

5.2.2.1.11 *Special provisions for the labelling of radioactive material*

5.2.2.1.11.1 Except when enlarged labels are used in accordance with 5.3.1.1.3, each package, overpack and container containing radioactive material shall bear the labels conforming to the applicable models Nos. 7A, 7B or 7C, according to the appropriate category. Labels shall be affixed to two opposite sides on the outside of the package or overpack or on the outside of all four sides of a container or tank. In addition, each package, overpack and container containing fissile material, other than fissile material excepted under the provisions of 2.2.7.2.3.5 shall bear labels conforming to model No. 7E; such labels, where applicable, shall be affixed adjacent to the labels conforming to the applicable model Nos. 7A, 7B or 7C. Labels shall not cover the marks specified in 5.2.1. Any labels which do not relate to the contents shall be removed or covered.

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5.2.2.1.11.2 Each label conforming to the applicable model No. 7A, 7B or 7C shall be completed with the following information:

(a) *Contents*:

(i) except for LSA-I material, the name(s) of the radionuclide(s) as taken from Table 2.2.7.2.2.1, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides shall be listed to the extent the space on the line permits. The group of LSA or SCO shall be shown following the name(s) of the radionuclide(s). The terms "LSA-II","LSA-III", "SCO-I" and "SCO-II" shall be used for this purpose;

(ii) for LSA-I material, only the term "LSA-I" is necessary; the name of the radionuclide is not necessary;

(b) *Activity*: The maximum activity of the radioactive contents during carriage expressed in becquerels (Bq) with the appropriate SI prefix symbol (see 1.2.2.1). For fissile material, the total mass of fissile nuclides in units of grams (g), or multiples thereof, may be used in place of activity;

(c) For overpacks and containers the "contents" and "activity" entries on the label shall bear the information required in (a) and (b) above, respectively, totalled together for the entire contents of the overpack or container except that on labels for overpacks or containers containing mixed loads of packages containing different radionuclides, such entries may read "See Transport Documents";

(d) *Transport index (TI)*: The number determined in accordance with 5.1.5.3.1 and 5.1.5.3.2 (no transport index entry is required for category I-WHITE).

5.2.2.1.11.3 Each label conforming to the model No. 7E shall be completed with the criticality safety index (CSI) as stated in the certificate of approval applicable in the countries through or into which the consignment is carried and issued by the competent authority or as specified in 6.4.11.2 or 6.4.11.3 of ADR.

5.2.2.1.11.4 For overpacks and containers, the label conforming to model No. 7E shall bear the sum of the criticality safety indexes of all the packages contained therein.

5.2.2.1.11.5 In all cases of international carriage of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, labelling shall be in accordance with the certificate of the country of origin of design.

5.2.2.1.12 *Special provisions for the labelling of articles containing dangerous goods carried as UN Nos. 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 and 3548*

5.2.2.1.12.1 Packages containing articles or articles carried unpackaged shall bear labels according to 5.2.2.1 reflecting the hazards established according to 2.1.5, except that for articles that in addition contain lithium batteries, a lithium battery mark or a label conforming to model No. 9A is not required.

5.2.2.1.12.2 When it is required to ensure articles containing liquid dangerous goods remain in their intended orientation, orientation arrows meeting 5.2.1.10.1 shall be affixed and visible on at least two opposite vertical sides of the package or of the unpackaged article where possible, with the arrows pointing in the correct upright direction.

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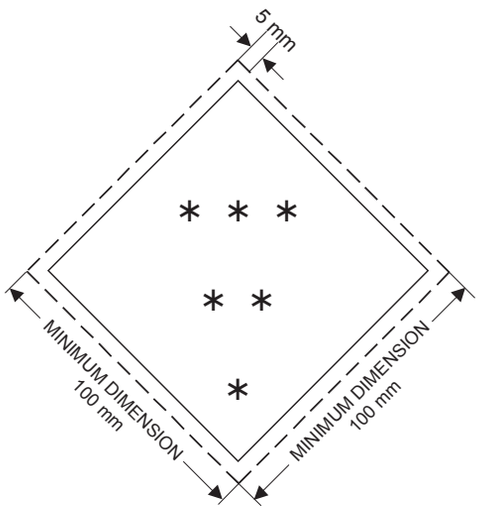
5.2.2.2 ***Provisions for labels***

5.2.2.2.1 Labels shall satisfy the provisions below and conform, in terms of colour, symbols and general format, to the models shown in 5.2.2.2.2. Corresponding models required for other modes of transport, with minor variations which do not affect the obvious meaning of the label, are also acceptable.

NOTE: *Where appropriate, labels in 5.2.2.2.2 are shown with a dotted outer boundary as provided for in 5.2.2.2.1.1. This is not required when the label is applied on a background of contrasting colour.*

5.2.2.2.1.1 Labels shall be configured as shown in Figure 5.2.2.2.1.1.

Figure 5.2.2.2.1.1



Class/division label

* *The class or for Classes 4.1, 4.2 and 4.3, the figure "4" or for Classes 6.1 and 6.2, the figure "6", shall be shown in the bottom corner.*

** *Additional text/numbers/symbol/letters shall (if mandatory) or may (if optional) be shown in this bottom half.*

*** *The class symbol or, for divisions 1.4, 1.5 and 1.6, the division number and for Model No 7E the word "FISSILE" shall be shown in this top half.*

5.2.2.2.1.1.1 Labels shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line.

5.2.2.2.1.1.2 The label shall be in the form of a square set at an angle of 45° (diamond-shaped). The minimum dimensions shall be 100 mm x 100 mm. There shall be a line inside the edge forming the diamond which shall be parallel and approximately 5 mm from the outside of that line to the edge of the label. The line inside the edge on the upper half of the label shall be the same colour as the symbol and the line inside the edge on the lower half of the label shall be the same colour as the class or division number in the bottom corner. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

5.2.2.2.1.1.3 If the size of the package so requires the dimensions may be reduced proportionally, provided the symbols and other elements of the label remain clearly visible. Dimensions for cylinders shall comply with 5.2.2.2.1.2.

5.2.2.2.1.2 Gas cylinders for Class 2 may, on account of their shape, orientation and securing mechanisms for carriage, bear labels representative of those specified in this section and the environmentally hazardous substance mark when appropriate, which have been reduced in

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size, according to the dimensions outlined in ISO 7225:2005, *"Gas cylinders - Precautionary labels"*, for display on the non-cylindrical part (shoulder) of such cylinders.

NOTE: *When the diameter of the cylinder is too small to permit the display of the reduced size labels on the non-cylindrical upper part of the cylinder, the reduced sized labels may be displayed on the cylindrical part.*

Notwithstanding the provisions of 5.2.2.1.6, labels and the environmentally hazardous substance mark (see 5.2.1.8.3) may overlap to the extent provided for by ISO 7225:2005. However, in all cases, the primary hazard label and the figures appearing on any label shall remain fully visible and the symbols recognizable.

Empty uncleaned pressure receptacles for gases of Class 2 may be carried with obsolete or damaged labels for the purposes of refilling or inspection as appropriate and the application of a new label in conformity with current regulations or for the disposal of the pressure receptacle.

5.2.2.2.1.3 With the exception of labels for Divisions 1.4, 1.5 and 1.6 of Class 1, the upper half of the label shall contain the pictorial symbol and the lower half shall contain:

(a) For Classes 1, 2, 3, 5.1, 5.2, 7, 8 and 9, the class number;

(b) For Classes 4.1, 4.2 and 4.3, the figure "4";

(c) For Classes 6.1 and 6.2, the figure "6".

However for label model No. 9A, the upper half of the label shall only contain the seven vertical stripes of the symbol and the lower half shall contain the group of batteries of the symbol and the class number.

Except for label model No. 9A, the label may include text such as the UN number or words describing the hazard (e.g. "flammable") in accordance with 5.2.2.2.1.5 provided the text does not obscure or detract from the other required label elements.

5.2.2.2.1.4 In addition, except for Divisions 1.4, 1.5 and 1.6, labels for Class 1 shall show in the lower half, above the class number, the division number and the compatibility group letter for the substance or article. Labels for Divisions 1.4, 1.5 and 1.6 shall show in the upper half the division number, and in the lower half the class number and the compatibility group letter.

5.2.2.2.1.5 On labels other than those for material of Class 7, the optional insertion of any text (other than the class number) in the space below the symbol shall be confined to particulars indicating the nature of the hazard and precautions to be taken in handling.

5.2.2.2.1.6 The symbols, text and numbers shall be clearly legible and indelible and shall be shown in black on all labels except for:

(a) the Class 8 label, where the text (if any) and class number shall appear in white;

(b) labels with entirely green, red or blue backgrounds where they may be shown in white;

(c) the Class 5.2 label, where the symbol may be shown in white; and

(d) labels conforming to model No. 2.1 displayed on cylinders and gas cartridges for liquefied petroleum gases, where they may be shown in the background colour of the receptacle if adequate contrast is provided.

5.2.2.2.1.7 All labels shall be able to withstand open weather exposure without a substantial reduction in effectiveness.

5.2.2.2.2 *Specimen labels*

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 1 hazard: Explosive substances or articles						
1	Divisions 1.1, 1.2, 1.3	Exploding bomb: black	Orange	1 (black)		** Place for division – to be left blank if explosive is the subsidiary hazard * Place for compatibility group – to be left blank if explosive is the subsidiary hazard
1.4	Division 1.4	1.4: black Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm)	Orange	1 (black)		* Place for compatibility group
1.5	Division 1.5	1.5: black Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm)	Orange	1 (black)		* Place for compatibility group
1.6	Division 1.6	1.6: black Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm)	Orange	1 (black)		* Place for compatibility group

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Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 2 hazard: Gases						
2.1	Flammable gases	Flame: black or white (except as provided for in 5.2.2.2.1.6 (d))	Red	2 (black or white) (except as provided for in 5.2.2.2.1.6 (d))		-
2.2	Non-flammable, non-toxic gases	Gas cylinder: black or white	Green	2 (black or white)		-
2.3	Toxic gases	Skull and crossbones: black	White	2 (black)		-
Class 3 hazard: Flammable liquids						
3	-	Flame: black or white	Red	3 (black or white)		-

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Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 4.1 hazard: Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives						
4.1	-	Flame: black	White with 7 vertical red stripes	4 (black)		-
Class 4.2 hazard: Substances liable to spontaneous combustion						
4.2	-	Flame: black	Upper half white, lower half red	4 (black)		-
Class 4.3 hazard: Substances which, in contact with water emit flammable gases						
4.3	-	Flame: black or white	Blue	4 (black or white)		-
Class 5.1 hazard: Oxidizing substances						
5.1	-	Flame over circle: black	Yellow	5.1 (black)		-

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Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 5.2 hazard: Organic peroxides						
5.2	-	Flame: black or white	Upper half red, lower half yellow	5.2 (black)		-
Class 6.1 hazard: Toxic substances						
6.1	-	Skull and crossbones: black	White	6 (black)		-
Class 6.2 hazard: Infectious substances						
6.2	-	Three crescents superimposed on a circle: black	White	6 (black)		The lower half of the label may bear the inscriptions: “INFECTIOUS SUBSTANCE” and “In the case of damage or leakage immediately notify Public Health Authority” in black colour

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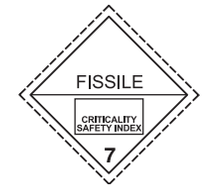
Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 7 hazard: Radioactive material						
7A	Category I – WHITE	Trefoil: black	White	7 (black)		Text (mandatory), black in lower half of label: “RADIOACTIVE” “CONTENTS ...” “ACTIVITY ...” One red vertical bar shall follow the word: “RADIOACTIVE”
7B	Category II – YELLOW	Trefoil: black	Upper half yellow with white border, lower half white	7 (black)		Text (mandatory), black in lower half of label: “RADIOACTIVE” “CONTENTS ...” “ACTIVITY ...” In a black outlined box: “TRANSPORT INDEX”; Two red vertical bars shall follow the word: “RADIOACTIVE”
7C	Category III – YELLOW	Trefoil: black	Upper half yellow with white border, lower half white	7 (black)		Text (mandatory), black in lower half of label: “RADIOACTIVE” “CONTENTS ...” “ACTIVITY ...” In a black outlined box: “TRANSPORT INDEX”. Three red vertical bars shall follow the word: “RADIOACTIVE”
7E	Fissile material	-	White	7 (black)		Text (mandatory): black in upper half of label: “FISSILE”; In a black outlined box in the lower half of label: “CRITICALITY SAFETY INDEX”

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Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 8 hazard: Corrosive substances						
8	-	Liquids, spilling from two glass vessels and attacking a hand and a metal: black	Upper half white, lower half black with white border	8 (white)		-
Class 9 hazard: Miscellaneous dangerous substances and articles, including environmentally hazardous substances						
9	-	7 vertical stripes in upper half: black	White	9 underlined (black)		-
9A	-	7 vertical stripes in upper half: black; battery group, one broken and emitting flame in lower half: black	White	9 underlined (black)		-

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CHAPTER 5.3

PLACARDING AND MARKING OF CONTAINERS, BULK CONTAINERS, MEGCs, MEMUs, TANK-CONTAINERS, PORTABLE TANKS, VEHICLES AND WAGONS

***NOTE 1**: For marking and placarding of containers, MEGCs, tank-containers and portable tanks for carriage in a transport chain including a maritime journey, see also 1.1.4.2.1. If the provisions of 1.1.4.2.1 (c) are applied, only 5.3.1.3 and 5.3.2.1.1 of this Chapter are applicable.*

***NOTE 2:** In accordance with the GHS, a GHS pictogram not required by ADN should only appear in carriage as part of a complete GHS label and not independently (see GHS 1.4.10.4.4).*

5.3.1 Placarding

5.3.1.1 *General provisions*

5.3.1.1.1 As and when required in this section, placards shall be affixed to the exterior surface of containers, bulk containers, MEGCs, MEMUs, tank-containers, portable tanks, vehicles and wagons. Placards shall correspond to the labels required in Column (5) and, where appropriate, Column (6) of Table A of Chapter 3.2 for the dangerous goods contained in the container, bulk container, MEGC, MEMU, tank-container, portable tank, vehicle or wagon and shall conform to the specifications given in 5.3.1.7. Placards shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line. The placards shall be weather-resistant and shall ensure durable marking throughout the entire journey.

5.3.1.1.2 For Class 1, compatibility groups shall not be indicated on placards if the vehicle or wagon or container or special compartments of MEMUs are carrying substances or articles belonging to two or more compatibility groups. Vehicles or wagons or containers or special compartments of MEMUs carrying substances or articles of different divisions shall bear only placards conforming to the model of the most dangerous division in the order:

1.1 (most dangerous), 1.5, 1.2, 1.3, 1.6, 1.4 (least dangerous).

When 1.5D substances are carried with substances or articles of Division 1.2, the vehicle, wagon or container shall be placarded as Division 1.1.

Placards are not required for the carriage of explosives of Division 1.4, Compatibility Group S.

5.3.1.1.3 For Class 7, the primary hazard placard shall conform to model No. 7D as specified in 5.3.1.7.2. This placard is not required for vehicles, wagons or containers carrying excepted packages and for small containers.

Where both Class 7 labels and placards would be required to be affixed to vehicles, wagons, containers, MEGCs, tank-containers or portable tanks, an enlarged label corresponding to the required label of model No. 7A, 7B or 7C may be displayed instead of placard No. 7D to serve both purposes. In that case, the dimensions shall be not less than 250 mm by 250 mm.

5.3.1.1.4 For Class 9 the placard shall correspond to the label model No. 9 as in 5.2.2.2.2; label model No. 9A shall not be used for placarding purposes.

5.3.1.1.5 Containers, MEGCs, MEMUs, tank-containers, portable tanks, vehicles or wagons containing goods of more than one class need not bear a subsidiary hazard placard if the

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hazard represented by that placard is already indicated by a primary or subsidiary hazard placard.

5.3.1.1.6 Placards which do not relate to the dangerous goods being carried, or residues thereof, shall be removed or covered.

5.3.1.1.7 When the placarding is affixed to folding panels, they shall be designed and secured so that they cannot unfold or come loose from the holder during carriage (especially as a result of impacts or unintentional actions).

5.3.1.2 ***Placarding of containers, bulk containers, MEGCs, tank-containers and portable tanks***

NOTE*: This subsection does not apply to swap-bodies, except tank swap bodies carried on vehicles bearing the orange markings stipulated in 5.3.2.*

The placards shall be affixed to both sides and at each end of the container, bulk container, MEGC, tank-container or portable tank and to two opposite sides in the case of flexible bulk containers.

When the tank-container or portable tank has multiple compartments and carries two or more dangerous goods, the appropriate placards shall be displayed along each side at the position of the relevant compartments and one placard of each model shown on each side at both ends. If all compartments have to bear the same placards, these placards need to be displayed only once along each side and at both ends of the tank container or portable tank.

5.3.1.3 ***Placarding of vehicles and wagons carrying containers, bulk containers, MEGCs, tank-containers or portable tanks***

NOTE: *This subsection does not apply to swap-bodies, except tank swap bodies carried on vehicles bearing the orange markings stipulated in 5.3.2.*

If the placards affixed to the containers, bulk containers, MEGCs, tank-containers or portable tanks are not visible from outside the carrying vehicles or wagons, the same placards shall also be affixed to both sides and at the rear of the vehicle or to both sides of the wagon. Otherwise, no placard need be affixed on the carrying vehicle or wagon.

5.3.1.4 ***Placarding of vehicles for carriage in bulk, wagons for carriage in bulk, tank-vehicles, tank-wagons, battery vehicles, battery-wagons, MEMUs, vehicles with demountable tanks and wagons with demountable tanks***

5.3.1.4.1 Placards shall be affixed to both sides and at the rear of the vehicle, or, for wagons, to both sides.

When the tank-vehicle, tank-wagon, the demountable tank carried on the vehicle or the demountable tank carried on the wagon has multiple compartments and carries two or more dangerous goods, the appropriate placards shall be displayed along each side at the position of the relevant compartments and (vehicles only) one placard of each model shown on each side at the rear of the vehicle. If all compartments have to bear the same placards, these placards need be displayed only once along each side and (vehicles only) at the rear of the vehicle.

Where more than one placard is required for the same compartment, these placards shall be displayed adjacent to each other.

NOTE: *When a tank semi-trailer is separated from its tractor to be loaded on board a ship or a vessel, placards shall also be displayed at the front of the semi-trailer.*

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5.3.1.4.2 MEMUs with tanks and bulk containers shall be placarded in accordance with 5.3.1.4.1 for the substances contained therein. For tanks with a capacity of less than 1 000 litres placards may be replaced by labels conforming to 5.2.2.2.

5.3.1.4.3 For MEMUs carrying packages containing substances or articles of Class 1 (other than of Division 1.4, Compatibility group S), placards shall be affixed to both sides and at the rear of the MEMU.

Special compartments for explosives shall be placarded in accordance with the provisions of 5.3.1.1.2. The last sentence of 5.3.1.1.2 does not apply.

5.3.1.5 ***Placarding of vehicles and wagons carrying packages only***

NOTE: *This sub-section applies also to vehicles or wagons carrying swap-bodies loaded with packages.*

5.3.1.5.1 For vehicles carrying packages containing substances or articles of Class 1 (other than of Division 1.4, Compatibility Group S), placards shall be affixed to both sides and at the rear of the vehicle.

5.3.1.5.2 For vehicles carrying radioactive material of Class 7 in packagings or IBCs (other than excepted packages), placards shall be affixed to both sides and at the rear of the vehicle.

NOTE: *If a vehicle carrying packages containing dangerous goods of classes other than Classes 1 and 7 is loaded on board a vessel for an ADN journey preceding a voyage by sea, placards shall be affixed to both sides and at the rear of the vehicle. Such placards may remain affixed to a vehicle for an ADN journey following a sea voyage.*

5.3.1.5.3 For wagons carrying packages, placards corresponding to the goods carried shall be affixed to both sides.

5.3.1.6 ***Placarding of empty tank-vehicles, tank-wagons, vehicles with demountable tanks, wagons with demountable tanks, battery-vehicles, battery-wagons, MEGCs, MEMUs, tank-containers, portable tanks and empty vehicles, wagons and containers for carriage in bulk***

5.3.1.6.1 Empty tank-vehicles, tank-wagons, vehicles with demountable tanks, wagons with demountable tanks, battery-vehicles, battery-wagons, MEGCs, MEMUs, tank-containers and portable tanks uncleaned and not degassed, and empty vehicles, wagons and containers for carriage in bulk, uncleaned, shall continue to display the placards required for the previous load.

5.3.1.7 ***Specifications for placards***

5.3.1.7.1 Except as provided in 5.3.1.7.2 for the Class 7 placard, and in 5.3.6.2 for the environmentally hazardous substance mark, a placard shall be configured as shown in Figure 5.3.1.7.1.

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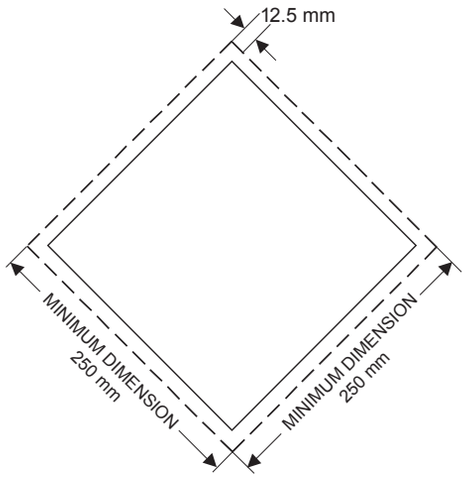
Figure 5.3.1.7.1



Placard (except for Class 7)

The placard shall be in the form of a square set at an angle of 45° (diamond-shaped). The minimum dimensions shall be 250 mm x 250 mm (to the edge of the placard). The line inside the edge shall be parallel and 12.5 mm from the outside of that line to the edge of the placard. The symbol and line inside the edge shall correspond in colour to the label for the class or division of the dangerous goods in question. The class or division symbol/numeral shall be positioned and sized in proportion to those prescribed in 5.2.2.2 for the corresponding class or division of the dangerous goods in question. The placard shall display the number of the class or division (and for goods in Class 1, the compatibility group letter) of the dangerous goods in question in the manner prescribed in 5.2.2.2 for the corresponding label, in digits not less than 25 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown. The deviations specified in 5.2.2.2.1, second sentence, 5.2.2.2.1.3, third sentence and 5.2.2.2.1.5 for danger labels also apply to placards.

5.3.1.7.2 The Class 7 placard shall be not less than 250 mm by 250 mm with a black line running 5 mm inside the edge and parallel with it and is otherwise as shown below (Model No. 7D). The number “7” shall not be less than 25 mm high. The background colour of the upper half of the placard shall be yellow and of the lower half white, the colour of the trefoil and the printing shall be black. The use of the word “RADIOACTIVE” in the bottom half is optional to allow the use of this placard to display the appropriate UN number for the consignment.

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Placard for radioactive material of Class 7

(No.7D)

Symbol (trefoil): black; Background: upper half yellow with white border, lower half white; The lower half shall show the word "RADIOACTIVE" or alternatively the appropriate UN Number and the figure "7" in the bottom corner.

5.3.1.7.3 For tanks with a capacity of not more than 3 m^3 and for small containers, placards may be replaced by labels conforming to 5.2.2.2. If these labels are not visible from outside the carrying vehicle or wagon, placards according to 5.3.1.7.1 shall also be affixed to both sides of the wagon or to both sides and at the rear of the vehicle.

5.3.1.7.4 For Classes 1 and 7, if the size and construction of the vehicle are such that the available surface area is insufficient to affix the prescribed placards, their dimensions may be reduced to 100 mm on each side. The dimensions of the placards to be affixed to wagons may be reduced to 150 mm by 150 mm. In this case, the upper dimensions prescribed for the trefoil, lines, figures and letters do not apply.

5.3.2 Orange-coloured plate marking

5.3.2.1 *General orange-coloured plate marking provisions*

5.3.2.1.1 Transport units carrying dangerous goods shall display two rectangular orange-coloured plates conforming to 5.3.2.2.1, set in a vertical plane. They shall be affixed one at the front and the other at the rear of the transport unit, both perpendicular to the longitudinal axis of the transport unit. They shall be clearly visible.

If a trailer containing dangerous goods is detached from its motor vehicle during carriage of dangerous goods, an orange-coloured plate shall remain affixed to the rear of the trailer. When tanks are marked in accordance with 5.3.2.1.3, this plate shall correspond to the most hazardous substance carried in the tank.

5.3.2.1.2 When a hazard identification number is indicated in Column (20) of Table A of Chapter 3.2 of ADR, tank-vehicles, battery vehicles or transport units having one or more tanks carrying dangerous goods shall in addition display on the sides of each tank, each tank compartment or each element of battery-vehicles, clearly visible and parallel to the longitudinal axis of the vehicle, orange-coloured plates identical with those prescribed in 5.3.2.1.1. These orange-coloured plates shall bear the hazard identification number and the UN number prescribed respectively in Columns (20) and (1) of Table A of Chapter 3.2 of ADR for each of the substances carried in the tank, in a compartment of the tank or in an element of a battery-vehicle.

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The provisions of this paragraph are also applicable to tank-wagons, battery-wagons and wagons with demountable tanks. In the latter case the hazard identification number to be used is that indicated in column (20) of table A of Chapter 3.2 of RID. For MEMUs these requirements shall only apply to tanks with a capacity of 1 000 litres or more and bulk containers.

5.3.2.1.3 For tank-vehicles or transport units having one or more tanks carrying substances with UN Nos. 1202, 1203 or 1223, or aviation fuel classed under UN Nos. 1268 or 1863, but no other dangerous substance, the orange-coloured plates prescribed in 5.3.2.1.2 need not be affixed if the plates affixed to the front and rear in accordance with 5.3.2.1.1 bear the hazard identification number and the UN number prescribed for the most hazardous substance carried, i.e. the substance with the lowest flashpoint.

5.3.2.1.4 When a hazard identification number is indicated in Column (20) of Table A of Chapter 3.2 of ADR, vehicles, containers and bulk containers carrying unpackaged solids or articles or packaged radioactive material with a single UN number required to be carried under exclusive use and no other dangerous goods shall in addition display on the sides of each vehicle, container or bulk container, clearly visible and parallel to the longitudinal axis of the vehicle, orange-coloured plates identical with those prescribed in 5.3.2.1.1. These orange-coloured plates shall bear the hazard identification number and the UN number prescribed respectively in Columns (20) and (1) of Table A of Chapter 3.2 of ADR for each of the substances carried in bulk in the vehicle, in the container or in the bulk container or for the packaged radioactive material when required to be carried under exclusive use in the vehicle or in the container.

The provisions of this paragraph are also applicable to wagons for carriage in bulk and full wagon loads comprising packages containing only one substance. In the latter case the hazard identification number to be used is that indicated in Column (20) of Table A of Chapter 3.2 of RID.

5.3.2.1.5 If the orange-coloured plates prescribed in 5.3.2.1.2 and 5.3.2.1.4 affixed to the containers, bulk containers, tank-containers, MEGCs or portable tanks are not clearly visible from outside the carrying vehicle or wagon, the same plates shall also be affixed to both sides of the vehicle or wagon.

***NOTE**: This paragraph need not be applied to the marking with orange coloured plates of closed and sheeted wagons or vehicles, carrying tanks with a maximum capacity of 3 000 litres.*

5.3.2.1.6 For transport units carrying only one dangerous substance and no non-dangerous substance, the orange-coloured plates prescribed in 5.3.2.1.2, 5.3.2.1.4 and 5.3.2.1.5 shall not be necessary provided that those displayed at the front and rear in accordance with 5.3.2.1.1 bear the hazard identification number and the UN number for that substance prescribed respectively in Columns (20) and (1) of Table A of Chapter 3.2 of ADR.

5.3.2.1.7 The requirements of 5.3.2.1.1 to 5.3.2.1.5 are also applicable to empty fixed or demountable tanks, battery-vehicles, tank-containers, portable tanks, MEGCs, tank-wagons, battery-wagons and wagons with demountable tanks, uncleaned, not degassed or not decontaminated, MEMUs, uncleaned as well as to empty vehicles, wagons and containers for carriage in bulk, uncleaned or not decontaminated.

5.3.2.1.8 Any orange-coloured plates which does not relate to dangerous goods carried, or residues thereof, shall be removed or covered. If plates are covered, the covering shall be total and remain effective after 15 minutes' engulfment in fire.

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5.3.2.2 ***Specifications for the orange-coloured plates***

5.3.2.2.1 The orange-coloured plates shall be reflectorized and shall be of 40 cm base and of 30 cm high; they shall have a black border of 15 mm wide. The material used shall be weather-resistant and ensure durable marking. The plate shall not become detached from its mount in the event of a 15 minutes' engulfment in fire. It shall remain affixed irrespective of the orientation of the vehicle or wagon. The orange-coloured plates may be separated in their middle with a black horizontal line of 15 mm thickness.

If the size and construction of the vehicle are such that the available surface area is insufficient to affix these orange-coloured plates, their dimensions may be reduced to a minimum of 300 mm for the base, 120 mm for the height and 10 mm for the black border. In this case, a different set of dimensions within the specified range may be used for the two orange-coloured plates specified in 5.3.2.1.1.

When reduced dimensions of orange-coloured plates are used for a packaged radioactive material carried under exclusive use, only the UN number is required and the size of the digits stipulated in 5.3.2.2.2 may be reduced to 65 mm in height and 10 mm in stroke thickness.

A non-reflectorized colour is permitted for wagons.

For containers carrying dangerous solid substances in bulk and for tank-containers, MEGCs and portable tanks, the plates prescribed in 5.3.2.1.2, 5.3.2.1.4 and 5.3.2.1.5 may be replaced by a self-adhesive sheet, by paint or by any other equivalent process.

This alternative marking shall conform to the specifications set in this sub-section except for the provisions concerning resistance to fire mentioned in 5.3.2.2.1 and 5.3.2.2.2.

NOTE*: The colour of the orange plates in conditions of normal use should have chromaticity coordinates lying within the area on the chromaticity diagram formed by joining the following coordinates*:

Chromaticity coordinates of points at the corners of the area on the chromaticity diagram				
x	0.52	0.52	0.578	0.618
y	0.38	0.40	0.422	0.38

Luminance factor of reflectorized colour: $\beta > 0.12$.
Luminance factor of non-reflectorized colour (wagons): $\beta \geq 0.22$
Reference centre E, standard illuminant C, normal incidence 45°, viewed at 0°.
Coefficient of reflex luminous intensity at an angle of illumination of 5°, viewed at 0.2°: not less than 20 candelas per lux per m^2 (not required for wagons).

5.3.2.2.2 The hazard identification number and the UN number shall consist of black digits 100 mm high and of 15 mm stroke thickness. The hazard identification number shall be inscribed in the upper part of the plate and the UN number in the lower part; they shall be separated by a horizontal black line, 15 mm in stroke width, extending from side to side of the plate at mid-height (see 5.3.2.2.3). The hazard identification number and the UN number shall be indelible and shall remain legible after 15 minutes engulfment in fire. Interchangeable numbers and letters on plates presenting the hazard identification number and the UN number shall remain in place during carriage and irrespective of the orientation of the wagon or vehicle.

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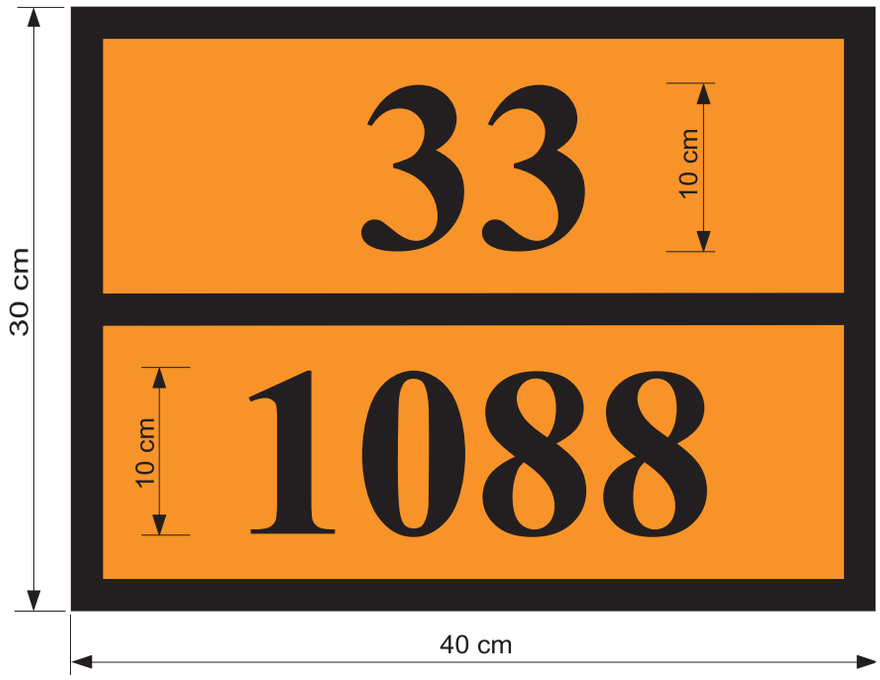
5.3.2.2.3 *Example of orange-coloured plate with hazard identification number and UN number*



Background orange.
Border, horizontal line and figures black, 15 mm thickness.

5.3.2.2.4 The permitted tolerances for dimensions specified in this sub-section are ± 10%.

5.3.2.2.5 When the orange-coloured plate is affixed to folding panels, they shall be designed and secured so that they cannot unfold or come loose from the holder during carriage (especially as a result of impacts or unintentional actions).

5.3.2.3 ***Meaning of hazard identification numbers***

5.3.2.3.1 The hazard identification number consists of two or three figures. In general, the figures indicate the following hazards:

2	Emission of gas due to pressure or to chemical reaction
3	Flammability of liquids (vapours) and gases or self-heating liquid
4	Flammability of solids or self-heating solid
5	Oxidizing (fire-intensifying) effect
6	Toxicity or risk of infection
7	Radioactivity
8	Corrosivity
9	Risk of spontaneous violent reaction

***NOTE**: The risk of spontaneous violent reaction within the meaning of figure 9 includes the possibility following from the nature of a substance of a risk of explosion, disintegration and polymerization reaction following the release of considerable heat or flammable and/or toxic gases.*

Doubling of a figure indicates an intensification of that particular hazard.

Where the hazard associated with a substance can be adequately indicated by a single figure, this is followed by zero.

The following combinations of figures, however, have a special meaning: 22, 323, 333, 362, 382, 423, 44, 446, 462, 482, 539, 606, 623, 642, 823, 842, 90 and 99 (see 5.3.2.3.2 below).

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If a hazard identification number is prefixed by the letter "X", this indicates that the substance will react dangerously with water. For such substances, water may only be used by approval of experts.

For substances of Class 1, the classification code in accordance with Column (3b) of Table A of Chapter 3.2, shall be used as the hazard identification number. The classification code consists of:

– the division number in accordance with 2.2.1.1.5; and

– the compatibility group letter in accordance with 2.2.1.1.6.

5.3.2.3.2 The hazard identification numbers listed in Column (20) of Table A of Chapter 3.2 of ADR or RID have the following meanings:

20	asphyxiant gas or gas with no subsidiary hazard
22	refrigerated liquefied gas, asphyxiant
223	refrigerated liquefied gas, flammable
225	refrigerated liquefied gas, oxidizing (fire-intensifying)
23	flammable gas
238	gas, flammable corrosive
239	flammable gas, which can spontaneously lead to violent reaction
25	oxidizing (fire-intensifying) gas
26	toxic gas
263	toxic gas, flammable
265	toxic gas, oxidizing (fire-intensifying)
268	toxic gas, corrosive
28	gas, corrosive
285	gas, corrosive, oxidizing
30	flammable liquid (flashpoint between 23 °C and 60 °C, inclusive) or flammable liquid or solid in the molten state with a flashpoint above 60 °C, heated to a temperature equal to or above its flashpoint, or self-heating liquid
323	flammable liquid which reacts with water, emitting flammable gases
X323	flammable liquid which reacts dangerously with water, emitting flammable gases[1]
33	highly flammable liquid (flashpoint below 23 °C)
333	pyrophoric liquid
X333	pyrophoric liquid which reacts dangerously with water[1]
336	highly flammable liquid, toxic
338	highly flammable liquid, corrosive
X338	highly flammable liquid, corrosive, which reacts dangerously with water[1]
339	highly flammable liquid which can spontaneously lead to violent reaction
36	flammable liquid (flashpoint between 23 °C and 60 °C, inclusive), slightly toxic, or self-heating liquid, toxic
362	flammable liquid, toxic, which reacts with water, emitting flammable gases
X362	flammable liquid, toxic, which reacts dangerously with water, emitting flammable gases[1]
368	flammable liquid, toxic, corrosive
38	flammable liquid (flashpoint between 23 °C and 60 °C, inclusive), slightly corrosive or self-heating liquid, corrosive
382	flammable liquid, corrosive, which reacts with water, emitting flammable gases
X382	flammable liquid, corrosive, which reacts dangerously with water, emitting flammable gases[1]
39	flammable liquid, which can spontaneously lead to violent reaction

[1] *Water not to be used except by approval of experts.*

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40	flammable solid, or self-reactive substance, or self-heating substance, or polymerizing substance
423	solid which reacts with water, emitting flammable gases, or flammable solid which reacts with water, emitting flammable gases or self-heating solid which reacts with water, emitting flammable gases
X423	solid which reacts dangerously with water, emitting flammable gases, or flammable solid which reacts dangerously with water, emitting flammable gases, or self-heating solid which reacts dangerously with water, emitting flammable gases [1]
43	spontaneously flammable (pyrophoric) solid
X432	spontaneously flammable (pyrophoric) solid which reacts dangerously with water, emitting flammable gases[1]
44	flammable solid, in the molten state at an elevated temperature
446	flammable solid, toxic, in the molten state, at an elevated temperature
46	flammable or self-heating solid, toxic
462	toxic solid which reacts with water, emitting flammable gases
X462	solid which reacts dangerously with water, emitting toxic gases[1]
48	flammable or self-heating solid, corrosive
482	corrosive solid which reacts with water, emitting flammable gases
X482	solid which reacts dangerously with water, emitting corrosive gases[1]
50	oxidizing (fire-intensifying) substance
539	flammable organic peroxide
55	strongly oxidizing (fire-intensifying) substance
556	strongly oxidizing (fire-intensifying) substance, toxic
558	strongly oxidizing (fire-intensifying) substance, corrosive
559	strongly oxidizing (fire-intensifying) substance, which can spontaneously lead to violent reaction
56	oxidizing substance (fire-intensifying), toxic
568	oxidizing substance (fire-intensifying), toxic, corrosive
58	oxidizing substance (fire-intensifying), corrosive
59	oxidizing substance (fire-intensifying), which can spontaneously lead to violent reaction
60	toxic or slightly toxic substance
606	infectious substance
623	toxic liquid, which reacts with water, emitting flammable gases
63	toxic substance, flammable (flashpoint between 23 °C and 60 °C, inclusive)
638	toxic substance, flammable (flashpoint between 23 °C and 60 °C, inclusive), corrosive
639	toxic substance, flammable (flashpoint not above 60 °C) which can spontaneously lead to violent reaction
64	toxic solid, flammable or self-heating
642	toxic solid, which reacts with water, emitting flammable gases
65	toxic substance, oxidizing (fire-intensifying)
66	highly toxic substance
663	highly toxic substance, flammable (flashpoint not above 60 °C)
664	highly toxic solid, flammable or self-heating
665	highly toxic substance, oxidizing (fire-intensifying)
668	highly toxic substance, corrosive
X668	highly toxic substance, corrosive, which reacts dangerously with water[1]
669	highly toxic substance which can spontaneously lead to violent reaction
68	toxic substance, corrosive
687	toxic substance, corrosive, radioactive
69	toxic or slightly toxic substance, which can spontaneously lead to violent reaction

[1] *Water not to be used except by approval of experts.*

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70	radioactive material
768	radioactive material, toxic, corrosive
78	radioactive material, corrosive
80	corrosive or slightly corrosive substance
X80	corrosive or slightly corrosive substance, which reacts dangerously with water[1]
823	corrosive liquid which reacts with water, emitting flammable gases
83	corrosive or slightly corrosive substance, flammable (flashpoint between 23 °C and 60 °C, inclusive)
X83	corrosive or slightly corrosive substance, flammable (flashpoint between 23 °C and 60 °C, inclusive), which reacts dangerously with water[1]
839	corrosive or slightly corrosive substance, flammable (flashpoint between 23 °C and 60 °C inclusive) which can spontaneously lead to violent reaction
X839	corrosive or slightly corrosive substance, flammable (flashpoint between 23 °C and 60 °C inclusive), which can spontaneously lead to violent reaction and which reacts dangerously with water[1]
84	corrosive solid, flammable or self-heating
842	corrosive solid which reacts with water, emitting flammable gases
85	corrosive or slightly corrosive substance, oxidizing (fire-intensifying)
856	corrosive or slightly corrosive substance, oxidizing (fire-intensifying) and toxic
86	corrosive or slightly corrosive substance, toxic
88	highly corrosive substance
X88	highly corrosive substance, which reacts dangerously with water[1]
883	highly corrosive substance, flammable (flashpoint between 23 °C and 60 °C inclusive)
884	highly corrosive solid, flammable or self-heating
885	highly corrosive substance, oxidizing (fire-intensifying)
886	highly corrosive substance, toxic
X886	highly corrosive substance, toxic, which reacts dangerously with water[1]
89	corrosive or slightly corrosive substance, which can spontaneously lead to violent reaction
90	environmentally hazardous substance; miscellaneous dangerous substances
99	miscellaneous dangerous substance carried at an elevated temperature.

5.3.3 Mark for elevated temperature substances

Tank-vehicles, tank-wagons, tank-containers, portable tanks, special vehicles, special wagons or special containers or specially equipped vehicles, specially equipped wagons or specially equipped containers containing a substance that is carried or handed over for carriage in a liquid state at or above 100 °C or in a solid state at or above 240 °C shall bear on both sides for wagons, on both sides and at the rear for vehicles, and on both sides and at each end for containers, tank-containers and portable tanks, the mark shown in Figure 5.3.3.

[1] *Water not to be used except by approval of experts*.

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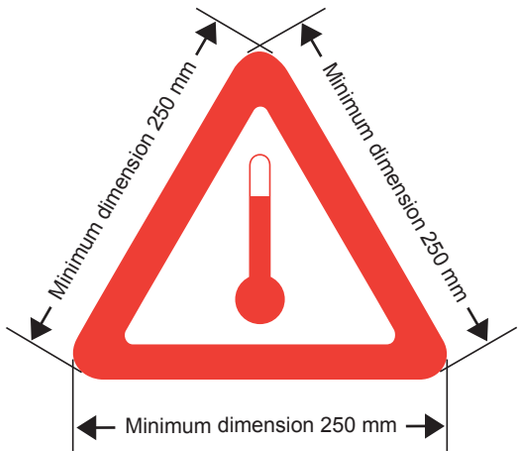
Figure 5.3.3



Mark for carriage at elevated temperature

The mark shall be an equilateral triangle. The colour of the mark shall be red. The minimum dimension of the sides shall be 250 mm. For tank-containers or portable tanks with a capacity of not more than 3 000 litres and with an available surface area insufficient to affix the prescribed marks, the minimum dimensions of the sides may be reduced to 100 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown. The mark shall be weather-resistant and shall ensure durable marking throughout the entire journey.

5.3.4 Marking for carriage in a transport chain including maritime transport

5.3.4.1 For carriage in a transport chain including maritime transport, containers, portable tanks and MEGCs are not required to carry the orange-coloured plate marking according to section 5.3.2 if they carry the marking prescribed in section 5.3.2 of the IMDG Code, where:

(a) The proper shipping name of the contents is durably marked on at least two sides:

– of portable tanks and MEGCs;

– of containers for carriage in bulk;

– of containers containing dangerous goods in packages constituting only one substance for which the IMDG Code does not require a placard or the marine pollutant mark;

(b) The UN number for the goods is displayed in black digits not less than 65 mm high:

– either on a white background in the lower half of the placards affixed to the cargo transport unit;

– or on an orange rectangular panel not less than 120 mm high and 300 mm wide, with a 10 mm black border, to be placed immediately adjacent to the placard or the marine pollutant marks of the IMDG Code, or, if no placard or marine pollutant mark is prescribed, adjacent to the proper shipping name.

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Example of marking for a portable tank carrying acetal, class 3, UN No 1088, according to the IMDG Code

FIRST VARIANT

black flame on
red background

SECOND VARIANT

black flame on
red background

orange background
border and digits in black

5.3.4.2 If portable tanks, MEGCs or containers marked in accordance with 5.3.4.1 are carried on board a vessel loaded on vehicles, only paragraph 5.3.2.1.1 applies to the carrying vehicle.

5.3.4.3 In addition to the placards, orange-coloured plate marking and marks prescribed or permitted by ADN, cargo transport units may carry additional marks, placards and other markings prescribed where appropriate by the IMDG Code, for example, the marine pollutant mark or the “LIMITED QUANTITIES” mark.

5.3.5 *(Reserved)*

5.3.6 Environmentally hazardous substance mark

5.3.6.1 When a placard is required to be displayed in accordance with the provisions of section 5.3.1, containers, bulk containers, MEGCs, tank-containers, portable tanks, vehicles and wagons containing environmentally hazardous substances meeting the criteria of 2.2.9.1.10 shall be marked with the environmentally hazardous substance mark shown in 5.2.1.8.3. This does not apply to the exceptions listed in 5.2.1.8.1.

5.3.6.2 The environmentally hazardous substance mark for containers, bulk containers, MEGCs, tank-containers, portable tanks, wagons and vehicles shall be as described in 5.2.1.8.3 and Figure 5.2.1.8.3, except that the minimum dimensions shall be 250 mm x 250 mm. For tank-containers or portable tanks with a capacity of not more than 3 000 litres and with an available surface area insufficient to affix the prescribed marks, the minimum dimensions may be reduced to 100 mm x 100 mm. The other provisions of section 5.3.1 concerning placards shall apply mutatis mutandis to the mark.

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CHAPTER 5.4

DOCUMENTATION

5.4.0 General

5.4.0.1 Unless otherwise specified, any carriage of goods governed by ADN shall be accompanied by the documentation prescribed in this Chapter, as appropriate.

***NOTE**: For the list of documentation to be carried on board vessels, see 8.1.2.*

5.4.0.2 The use of electronic data processing (EDP) or electronic data interchange (EDI) techniques as an aid to or instead of paper documentation is permitted, provided that the procedures used for the capture, storage and processing of electronics data meet the legal requirements as regards the evidential value and availability of data during carriage in a manner at least equivalent to that of paper documentation.

5.4.0.3 When the dangerous goods transport information is given to the carrier by EDP or EDI techniques, the consignor shall be able to give the information to the carrier as a paper document, with the information in the sequence required by this Chapter.

5.4.1 Dangerous goods transport document and related information

5.4.1.1 *General information required in the transport document*

5.4.1.1.1 *General information required in the transport document for carriage in bulk or in packages*

The transport document(s) shall contain the following information for each dangerous substance, material or article offered for carriage:

(a) the UN number, preceded by the letters “UN” or substance identification number;

(b) the proper shipping name supplemented, when applicable (see 3.1.2.8.1) with the technical name in brackets (see 3.1.2.8.1.1), as determined in accordance with 3.1.2.

(c) – For substances and articles of Class 1: the classification code given in Column (3b) of Table A of Chapter 3.2.

When, in Column (5) of Table A of Chapter 3.2, label model numbers are given other than 1, 1.4, 1.5 and 1.6, these label model numbers, in brackets, shall follow the classification code;

– For radioactive material of Class 7: the Class number: "7";

***NOTE:** For radioactive material with a subsidiary hazard, see also special provision 172 in Chapter 3.3.*

– For lithium batteries of UN numbers 3090, 3091, 3480 and 3481: the Class number “9”;

– For other substances and articles: the label model numbers given in Column (5) of Table A of Chapter 3.2 or applicable according to a special provision referred to in Column (6). When more than one label model number is given, the numbers following the first one shall be given in brackets. For substances and articles for which no label model is given in Column (5) of Table A in Chapter 3.2, their class according to Column (3a) shall be given instead;

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(d) where assigned, the packing group for the substance which may be preceded by the letters "PG" (e.g. "PG II"), or the initials corresponding to the words "Packing Group" in the languages used according to 5.4.1.4.1;

NOTE: *For radioactive material of Class 7 with subsidiary hazards, see special provision 172 (d) in Chapter 3.3.*

(e) the number and a description of the packages when applicable. UN packaging codes may only be used to supplement the description of the kind of package (e.g. one box (4G));

NOTE: *The number, type and capacity of each inner packaging within the outer packaging of a combination packaging is not required to be indicated.*

(f) the total quantity of each item of dangerous goods bearing a different UN number, proper shipping name (as a volume or as a gross mass, or as a net mass as appropriate);

NOTE*: For dangerous goods in machinery and or equipment specified in these Regulations, the quantity indicated shall be the total quantity of dangerous goods contained therein in kilograms or litres as appropriate.*

(g) the name and address of the consignor;

(h) the name and address of the consignee(s);

(i) a declaration as required by the terms of any special agreement.

The location and order in which the elements of information required appear in the transport document is left optional, except that (a), (b), (c) and (d) shall be shown in the order listed above (i.e. (a), (b), (c), (d)) with no information interspersed, except as provided in ADN.

Examples of such permitted dangerous goods descriptions are:

"UN 1098 ALLYL ALCOHOL, 6.1 (3), I" or
"UN1098, ALLYL ALCOHOL, 6.1 (3), PG I"

The information required on a transport document shall be legible.

Although upper case is used in Chapter 3.1 and in Table A of Chapter 3.2 to indicate the elements which shall be part of the proper shipping name, and although upper and lower case are used in this Chapter to indicate the information required in the transport document, the use of upper or of lower case for entering the information in the transport document is left optional.

5.4.1.1.2 *General information required in the transport document for carriage in tank vessels*

The transport document(s) shall contain the following information for each dangerous substance or article offered for carriage:

(a) the UN number preceded by the letters "UN" or the substance identification number;

(b) the proper shipping name given in Column (2) of Table C of Chapter 3.2, supplemented, when applicable, by the technical name in parenthesis;

(c) the data contained in column (5) of Table C of Chapter 3.2. When more than one number is given, the numbers following the first one shall be given in brackets. For substances not mentioned by name in Table C (assigned to a generic entry or a N.O.S.

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entry and for which the flowchart in 3.2.3.3 is applicable) only the actual dangerous properties of the substance shall be mentioned;

(d) where assigned, the packing group for the substance, which may be preceded by the letters 'PG' (e.g. 'PG II'), or the initials corresponding to the words 'Packing Group' in the languages used in accordance with 5.4.1.4.1;

(e) the mass in tonnes;

(f) the name and address of the consignor;

(g) the name and address of the consignee(s).

The location and order in which the elements of information required appear in the transport document is left optional, except that (a), (b), (c) and (d) shall be shown in the order listed above (i.e. (a), (b), (c), (d)) with no information interspersed, except as provided in ADN.

Examples of such permitted dangerous goods descriptions are:

″**UN 1203 MOTOR SPIRIT, 3 (N2, CMR, F), II**″**;** or
″**UN 1203 MOTOR SPIRIT, 3 (N2, CMR, F), PG II**″

The information required on a transport document shall be legible.

Although upper case is used in Chapter 3.1 and in Table C of Chapter 3.2 to indicate the elements which shall be part of the proper shipping name, and although upper and lower case are used in this Chapter to indicate the information required in the transport document, the use of upper or of lower case for entering the information in the transport document is left optional.

5.4.1.1.3 *Special provisions for wastes*

If waste containing dangerous goods (other than radioactive wastes) is being carried, the proper shipping name shall be preceded by the word "**WASTE**", unless this term is part of the proper shipping name, e.g.:

"UN 1230 WASTE METHANOL, 3 (6.1), II", or
"UN 1230 WASTE METHANOL, 3 (6.1), PG II,", or
"UN 1993 WASTE FLAMMABLE LIQUID, N.O.S. (toluene and ethyl alcohol), 3, II,", or
"UN 1993 WASTE FLAMMABLE LIQUID, N.O.S. (toluene and ethyl alcohol), 3, PG II"

If the provision for waste as set out in 2.1.3.5.5 is applied, the following shall be added to the dangerous goods description required in 5.4.1.1.1 (a) to (d) and (k):

"WASTE IN ACCORDANCE WITH 2.1.3.5.5" (e.g. "UN 3264, CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S., 8, II, WASTE IN ACCORDANCE WITH 2.1.3.5.5").

The technical name, as prescribed in Chapter 3.3, special provision 274, need not be added.

5.4.1.1.4 *(Deleted)*

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5.4.1.1.5 *Special provisions for salvage packagings, including large salvage packagings, and salvage pressure receptacles*

When dangerous goods are carried in a salvage packaging, including large salvage packaging, or salvage pressure receptacle, the words "**SALVAGE PACKAGING**" or "**SALVAGE PRESSURE RECEPTACLE**" shall be added after the description of the goods in the transport document.

5.4.1.1.6 *Special provision for empty means of containment and for empty cargo tanks of tank vessels*

5.4.1.1.6.1 For empty means of containment, uncleaned, which contain the residue of dangerous goods of classes other than Class 7, the words "EMPTY, UNCLEANED" or "RESIDUE, LAST CONTAINED" shall be indicated before or after the dangerous goods description specified in 5.4.1.1.1 (a) to (d).. Moreover, 5.4.1.1.1 (f) does not apply.

5.4.1.1.6.2 The special provision of 5.4.1.1.6.1 may be replaced with the provisions of 5.4.1.1.6.2.1, 5.4.1.1.6.2.2 or 5.4.1.1.6.2.3, as appropriate.

5.4.1.1.6.2.1 For empty packagings, uncleaned, which contain the residue of dangerous goods of classes other than Class 7, including empty uncleaned receptacles for gases with a capacity of not more than 1000 litres, the particulars according to 5.4.1.1.1 (a), (b), (c), (d), (e) and (f) are replaced with "EMPTY PACKAGING", "EMPTY RECEPTACLE", "EMPTY IBC" or "EMPTY LARGE PACKAGING", as appropriate, followed by the information of the goods last loaded, as described in 5.4.1.1.1 (c).

Example:

"EMPTY PACKAGING, 6.1 (3)".

In addition, in such a case

(a) if the dangerous goods last loaded are goods of Class 2, the information prescribed in 5.4.1.1.1 (c) may be replaced by the number of the class “2”.

(b) if the dangerous goods last loaded are goods of Classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 8 or 9, the information of the goods last loaded, as described in 5.4.1.1.1 (c) may be replaced by the words “WITH RESIDUES OF [...]” followed by the class(es) and subsidiary hazard(s) corresponding to the different residues, in the class numbering order.

Example: Empty packagings, uncleaned, having contained goods of Class 3 carried together with empty packagings, uncleaned, having contained goods of Class 8 with a Class 6.1 subsidiary hazard may be referred to in the transport document as:

"EMPTY PACKAGINGS, WITH RESIDUES OF 3, 6.1, 8".

5.4.1.1.6.2.2 For empty means of containment other than packagings, uncleaned, which contain the residue of dangerous goods of classes other than Class 7 and for empty uncleaned receptacles for gases with a capacity of more than 1000 litres, the particulars according to 5.4.1.1.1 (a) to (d) are preceded by "**EMPTY TANK-WAGON**", "**EMPTY TANK-VEHICLE**", "**EMPTY DEMOUNTABLE TANK**", "**EMPTY TANK-CONTAINER**", "**EMPTY PORTABLE TANK**", "**EMPTY BATTERY-WAGON**", "**EMPTY BATTERY-VEHICLE**", "**EMPTY MEGC**", "**EMPTY MEMU**", "**EMPTY WAGON**", "**EMPTY VEHICLE**", "**EMPTY CONTAINER**" or "**EMPTY RECEPTACLE**", as appropriate, followed by the words "**LAST LOAD:**". Moreover, paragraph 5.4.1.1.1 (f) does not apply.

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See example as follows:

"EMPTY TANK-CONTAINER, LAST LOAD: UN 1098 ALLYL ALCOHOL, 6.1 (3), I" or
"EMPTY TANK-CONTAINER, LAST LOAD: UN 1098 ALLYL ALCOHOL, 6.1 (3), PG I".

5.4.1.1.6.2.3 When empty means of containment, uncleaned, which contain the residue of dangerous goods of classes other than Class 7, are returned to the consignor, the transport documents prepared for the full-capacity carriage of these goods may also be used. In such cases, the indication of the quantity is to be eliminated (by effacing it, striking it out or any other means) and replaced by the words "**EMPTY, UNCLEANED RETURN**".

5.4.1.1.6.3 (a) If empty tanks, battery-vehicles, battery wagons and MEGCs, uncleaned, are carried to the nearest place where cleaning or repair can be carried out in accordance with the provisions of 4.3.2.4.3 of ADR or RID, the following additional entry shall be made in the transport document: **"Carriage in accordance with 4.3.2.4.3 of ADR (or RID)"**.

(b) If empty vehicles, wagons and containers, uncleaned, are carried to the nearest place where cleaning or repair can be carried out in accordance with the provisions of 7.5.8.1 of ADR or RID, the following additional entry shall be made in the transport document: "**Carriage in accordance with 7.5.8.1 of ADR (or RID)**".

5.4.1.1.6.4 For the carriage of tank wagons, fixed tanks (tank vehicles), wagons with removable tanks, vehicles with demountable tanks, battery-wagons, battery-vehicles, tank-containers and MEGCs under the conditions of 4.3.2.4.4 of ADR or RID, the following entry shall be included in the transport document: "**Carriage in accordance with 4.3.2.4.4 of ADR (or RID)**" as appropriate.

5.4.1.1.6.5 For tank vessels with empty cargo tanks or cargo tanks that have been discharged, the master is deemed to be the consignor for the purpose of the transport documents required. In this case, the following particulars shall be entered on the transport document for each empty cargo tank or cargo tank that has been discharged:

(a) the number of the cargo tank;

(b) the UN number preceded by the letters “UN” or the substance identification number;

(c) the proper shipping name of the last substance carried, the class and, if applicable, the packing group in accordance with 5.4.1.1.2.

5.4.1.1.7 *Special provisions for carriage in a transport chain including maritime, road, rail or air carriage*

For carriage in accordance with 1.1.4.2.1, a statement shall be included in the transport document, as follows: **"Carriage in accordance with 1.1.4.2.1"**.

5.4.1.1.8 and 5.4.1.1.9 (*Reserved*)

5.4.1.1.10 (*Deleted*)

5.4.1.1.11 *Special provisions for the carriage of IBCs, tanks, battery-vehicles, portable tanks and MEGCs after the date of expiry of the last periodic test or inspection*

For carriage in accordance with 4.1.2.2 (b), 4.3.2.3.7 (b), 6.7.2.19.6 (b), 6.7.3.15.6 (b) or 6.7.4.14.6 (b) of ADR (or RID), a statement to this effect shall be included in the transport document, as follows:

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"CARRIAGE IN ACCORDANCE WITH 4.1.2.2 (b) of ADR (or RID)",
"CARRIAGE IN ACCORDANCE WITH 4.3.2.3.7 (b) of ADR (or RID)",
"CARRIAGE IN ACCORDANCE WITH 6.7.2.19.6 (b) of ADR (or RID)",
"CARRIAGE IN ACCORDANCE WITH 6.7.3.15.6 (b) of ADR (or RID)"; or
"CARRIAGE IN ACCORDANCE WITH 6.7.4.14.6 (b) of ADR (or RID)" as appropriate.

5.4.1.1.12 and 5.4.1.1.13 (*Reserved*)

5.4.1.1.14 *Special provisions for the carriage of substances carried under elevated temperature*

If the proper shipping name of a substance which is carried or offered for carriage in a liquid state at a temperature equal to or exceeding 100 °C, or in a solid state at a temperature equal to or exceeding 240 °C, does not convey the elevated temperature condition (for example, by using the term **"MOLTEN"** or **"ELEVATED TEMPERATURE"** as part of the proper shipping name), the word **"HOT"** shall immediately precede the proper shipping name.

5.4.1.1.15 *Special provisions for the carriage of substances stabilized by temperature control*

If the word "STABILIZED" is part of the proper shipping name (see also 3.1.2.6), when stabilization is by means of temperature control, the control and emergency temperatures (see 7.1.7) shall be indicated in the transport document, as follows:

"Control temperature: … °C Emergency temperature: … °C".

5.4.1.1.16 *Information required in accordance with special provision 640 in Chapter 3.3*

Where it is required by special provision 640 of Chapter 3.3, the transport document shall bear the inscription "**Special provision 640X**" where "X" is the capital letter appearing after the pertinent reference to special provision 640 in Column (6) of Table A of Chapter 3.2.

5.4.1.1.17 *Special provisions for the carriage of solids in bulk containers conforming to 6.11.4 of ADR*

When solid substances are carried in bulk containers conforming to 6.11.4 of ADR, the following statement shall be shown on the transport document (see NOTE at the beginning of 6.11.4 of ADR):

"**Bulk container BK(x)**[1] **approved by the competent authority of…**"

5.4.1.1.18 *Special provisions for carriage of environmentally hazardous substances (aquatic environment)*

When a substance belonging to one of classes 1 to 9 meets the classification criteria of 2.2.9.1.10, the transport document shall bear the additional inscription **"ENVIRONMENTALLY HAZARDOUS"** or **"MARINE POLLUTANT/ ENVIRONMENTALLY HAZARDOUS"**. This additional requirement does not apply to UN Nos. 3077 and 3082 or for the exceptions listed in 5.2.1.8.1.

The inscription **"MARINE POLLUTANT"** (according to 5.4.1.4.3 of the IMDG Code) is acceptable for carriage in a transport chain including maritime carriage.

[1] *(x) shall be replaced with "1" or "2" as appropriate.*

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5.4.1.1.19 *Special provisions for carriage of packagings, discarded, empty, uncleaned (UN No. 3509)*

For packagings, discarded, empty, uncleaned, the proper shipping name specified in 5.4.1.1.1 (b) shall be complemented with the words **"(WITH RESIDUES OF [...])"** followed by the class(es) and subsidiary hazard(s) corresponding to the residues, in the class numbering order. Moreover, 5.4.1.1.1 (f) does not apply.

Example: Packagings, discarded, empty, uncleaned having contained goods of Class 4.1 packed together with packagings, discarded, empty, uncleaned having contained goods of Class 3 with a Class 6.1 subsidiary hazard should be referred to in the transport document as:

"UN 3509 PACKAGINGS, DISCARDED, EMPTY, UNCLEANED (WITH RESIDUES OF 3, 4.1, 6.1), 9".

5.4.1.1.20 *Special provisions for the carriage of substances classified in accordance with 2.1.2.8*

For carriage in accordance with 2.1.2.8, a statement shall be included in the transport document, as follows **"Classified in accordance with 2.1.2.8"**.

5.4.1.1.21 *Special provisions for the carriage of UN Nos. 3528, 3529 and 3530*

For carriage of UN Nos. 3528, 3529 and 3530, the transport document, when required according to special provision 363 of Chapter 3.3, shall contain the following additional statement "Transport in accordance with special provision 363".

5.4.1.1.22 *Special provisions for carriage in oil separator vessels and supply vessels*

5.4.1.1.2 and 5.4.1.1.6.5 are not applicable to oil separator vessels or supply vessels.

5.4.1.2 *Additional or special information required for certain classes*

5.4.1.2.1 *Special provisions for Class 1*

(a) The transport document shall indicate, in addition to the requirements in 5.4.1.1.1 (f):

– the total net mass, in kg, of explosive contents[2] for each substance or article identified by its UN number;

– the total net mass, in kg, of explosive contents[2] for all substances and articles covered by the transport document.

(b) For mixed packing of two different goods, the description of the goods in the transport document shall include the UN numbers and names printed in capitals in Columns (1) and (2) of Table A of Chapter 3.2 of both substances or articles. If more than two different goods are contained in the same package in conformity with the mixed packing provisions given in 4.1.10 of ADR special provisions MP1, MP2 and MP20 to MP24, the transport document shall indicate under the description of the goods the UN numbers of all the substances and articles contained in the package, in the form, "**Goods of UN Nos. ...**".

(c) For the carriage of substances and articles assigned to an n.o.s. entry or the entry "0190 SAMPLES, EXPLOSIVE" or packed conforming to packing instruction P101 of 4.1.4.1 of ADR, a copy of the competent authority approval with the conditions of carriage shall be attached to the transport document. It shall be in an official language of the forwarding country and also, if that language is not English, French or German,

[2] *For articles, "explosive contents" means the explosive substance contained in the article.*

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in English, French or German unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise.

(d) If packages containing substances and articles of compatibility groups B and D are loaded together in the same vehicle or wagon in accordance with the requirements of 7.5.2.2 or ADR or RID, the approval certificate of the protective compartment or containment system in accordance with 7.5.2.2, note [a] under the table of ADR or RID, shall be attached to the transport document. It shall be in an official language of the forwarding country and also, if that language is not English, French or German, in English, French or German unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise.

(e) When explosive substances or articles are carried in packagings conforming to packing instruction P101 of ADR, the transport document shall bear the inscription "**Packaging approved by the competent authority of ...**" (see 4.1.4.1, packing instruction P101).

(f) (*Reserved*)

(g) When fireworks of UN Nos. 0333, 0334, 0335, 0336 and 0337 are carried, the transport document shall bear the inscription:

"Classification of fireworks by the competent authority of XX with the firework reference XX/YYZZZZ".

The classification approval certificate need not be carried with the consignment, but shall be made available by the consignor to the carrier or the competent authorities for control purposes. The classification approval certificate or a copy of it shall be in an official language of the forwarding country, and also, if that language is not German, English or French, in German, English or French.

NOTE 1: *The commercial or technical name of the goods may be entered additionally to the proper shipping name in the transport document.*

NOTE 2: *The classification reference(s) shall consist of the ADN Contracting Party in which the classification code according to special provision 645 of 3.3.1 was approved, indicated by the distinguishing sign used on vehicles in international road traffic (XX)[3], the competent authority identification (YY) and a unique serial reference (ZZZZ). Examples of such classification references are:*

GB/HSE123456

D/BAM1234.

5.4.1.2.2 *Additional provisions for Class 2*

(a) For the carriage of mixtures (see 2.2.2.1.1) in tanks (demountable tanks, fixed tanks, tank-wagons, portable tanks, tank-containers or elements of battery-vehicles or battery-wagons or of MEGCs), the composition of the mixture as a percentage of the volume or as a percentage of the mass shall be given. Constituents below 1% need not be indicated (see also 3.1.2.8.1.2). The composition of the mixture need not be given when the technical names authorized by special provisions 581, 582 or 583 are used to supplement the proper shipping name;

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[3] *Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.*

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(b) For the carriage of cylinders, tubes, pressure drums, cryogenic receptacles and bundles of cylinders under the conditions of 4.1.6.10 of ADR, the following entry shall be included in the transport document: **"Carriage in accordance with 4.1.6.10 of ADR"**.

(c) *(Reserved)*

(d) In the case of tank-containers carrying refrigerated liquefied gases the consignor shall enter in the transport document the date (or time) by which the actual holding time will be exceeded.

"End of holding time: ..... (DD/MM/YYYY)".

5.4.1.2.3 *Additional provisions for self-reactive substances and polymerizing substances of Class 4.1 and organic peroxides of Class 5.2*

5.4.1.2.3.1 For self-reactive substances of Class 4.1 and for organic peroxides of Class 5.2 that require temperature control during carriage (for self-reactive substances or polymerizing substances see 2.2.41.1.17; for organic peroxides, see 2.2.52.1.15; for polymerizing substance see 2.2.41.1.21), the control and emergency temperatures shall be indicated in the transport document, as follows:

"Control temperature: ... °C Emergency temperature: ... °C".

5.4.1.2.3.2 When for certain self-reactive substances of Class 4.1 and certain organic peroxides of Class 5.2 the competent authority has permitted the label conforming to model No. 1 to be dispensed with for a specific packaging (see 5.2.2.1.9), a statement to this effect shall be included in the transport document, as follows: **"The label conforming to model No. 1 is not required"**.

5.4.1.2.3.3 When organic peroxides and self-reactive substances are carried under conditions where approval is required (for organic peroxides see 2.2.52.1.8, 4.1.7.2.2 and special provision TA2 of 6.8.4 of ADR; for self-reactive substances see 2.2.41.1.13 and 4.1.7.2.2 of ADR, a statement to this effect shall be included in the transport document, e.g. **"Carriage in accordance with 2.2.52.1.8"**. It shall be in an official language of the forwarding country and also, if that language is not English, French or German, in English, French or German unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise.

A copy of the approval of the competent authority with the conditions of carriage shall be attached to the transport document.

5.4.1.2.3.4 When a sample of an organic peroxide (see 2.2.52.1.9) or a self-reactive substance (see 2.2.41.1.15) is carried, a statement to this effect shall be included in the transport document, e.g. **"Carriage in accordance with 2.2.52.1.9"**.

5.4.1.2.3.5 When self-reactive substances type G (see Manual of Tests and Criteria, Part II, paragraph 20.4.2 (g)) are carried, the following statement may be given in the transport document: **"Not a self-reactive substance of Class 4.1"**.

When organic peroxides type G (see Manual of Tests and Criteria, Part II, paragraph 20.4.3 (g)) are carried, the following statement may be given in the transport document: **"Not a substance of Class 5.2"**.

5.4.1.2.4 *Additional provisions for Class 6.2*

In addition to the information concerning the consignee (see 5.4.1.1.1 (h)), the name and telephone number of a responsible person shall be indicated.

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5.4.1.2.5 *Additional provisions for Class 7*

5.4.1.2.5.1 The following information shall be inserted in the transport document for each consignment of Class 7 material, as applicable, in the order given and immediately after the information required under 5.4.1.1.1 (a) to (c):

(a) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;

(b) A description of the physical and chemical form of the material, or a notation that the material is special form radioactive material or low dispersible radioactive material. A generic chemical description is acceptable for chemical form. For radioactive material with a subsidiary hazard, see sub-paragraph (c) of special provision 172 of Chapter 3.3;

(c) The maximum activity of the radioactive contents during carriage expressed in becquerels (Bq) with an appropriate SI prefix symbol (see 1.2.2.1). For fissile material, the mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) in grams (g), or appropriate multiples thereof, may be used in place of activity;

(d) The category of the package, i.e. I-WHITE, II-YELLOW, III-YELLOW;

(e) The transport index (categories II-YELLOW and III-YELLOW only);

(f) For fissile material:

(i) Shipped under one exception of 2.2.7.2.3.5 (a) to (f), reference to that paragraph;

(ii) Shipped under 2.2.7.2.3.5 (c) to (e), the total mass of fissile nuclides;

(iii) Contained in a package for which one of 6.4.11.2 (a) to (c) or 6.4.11.3 of ADR is applied, reference to that paragraph;

(iv) The criticality safety index, where applicable;

(g) The identification mark for each competent authority certificate of approval (special form radioactive material, low dispersible radioactive material, fissile material excepted under 2.2.7.2.3.5 (f), special arrangement, package design, or shipment) applicable to the consignment;

(h) For consignments of more than one package, the information required in 5.4.1.1.1 and in (a) to (g) above shall be given for each package. For packages in an overpack, container, or conveyance, a detailed statement of the contents of each package within the overpack, container, or conveyance and, where appropriate, of each overpack, container, or conveyance shall be included. If packages are to be removed from the overpack, container, or conveyance at a point of intermediate unloading, appropriate transport documents shall be made available;

(i) Where a consignment is required to be shipped under exclusive use, the statement **"EXCLUSIVE USE SHIPMENT"**; and

(j) For LSA-II and LSA-III substances, SCO-I and SCO-II, the total activity of the consignment as a multiple of A_2. For radioactive material for which the A_2 value is unlimited, the multiple of A_2 shall be zero.

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5.4.1.2.5.2 The consignor shall provide in the transport documents a statement regarding actions, if any, that are required to be taken by the carrier. The statement shall be in the languages deemed necessary by the carrier or the authorities concerned, and shall include at least the following information:

(a) Supplementary requirements for loading, stowage, carriage, handling and unloading of the package, overpack or container including any special stowage provisions for the safe dissipation of heat (see 7.1.4.14.7.3.2), or a statement that no such requirements are necessary;

(b) Restrictions on the mode of carriage or vehicle or wagon and any necessary routeing instructions;

(c) Emergency arrangements appropriate to the consignment.

5.4.1.2.5.3 In all cases of international carriage of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the UN number and proper shipping name required in 5.4.1.1.1 shall be in accordance with the certificate of the country of origin of design.

5.4.1.2.5.4 The applicable competent authority certificates need not necessarily accompany the consignment. The consignor shall make them available to the carrier(s) before loading and unloading.

5.4.1.3 *(Reserved)*

5.4.1.4 *Format and language*

5.4.1.4.1 The document containing the information in 5.4.1.1 and 5.4.1.2 may be that already required by other regulations in force for carriage by another mode of carriage. In case of multiple consignees, the name and address of the consignees and the quantities delivered enabling the nature and quantities carried to be evaluated at any time, may be entered in other documents which are to be used or in any other documents made mandatory according to other specific regulations and which shall be on board.

The particulars to be entered in the document shall be drafted in an official language of the forwarding country, and also, if that language is not English, French or German, in English, French or German, unless agreements concluded between the countries concerned in the transport operation, provide otherwise.

5.4.1.4.2 If by reason of the size of the load, a consignment cannot be loaded in its entirety on a single transport unit, at least as many separate documents, or copies of the single document, shall be made out as transport units loaded. Furthermore, in all cases, separate transport documents shall be made out for consignments or parts of consignments which may not be loaded together on the same vehicle by reason of the prohibitions set forth in 7.5.2 of ADR.

The information relative to the hazards of the goods to be carried (as indicated in 5.4.1.1) may be incorporated in, or combined with, an existing transport or cargo handling document. The layout of the information in the document (or the order of transmission of the corresponding data by electronic data processing (EDP) or electronic data interchange (EDI) techniques) shall be as provided in 5.4.1.1.1 or 5.4.1.1.2 as relevant.

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When an existing transport document or cargo handling document cannot be used for the purposes of dangerous goods documentation for multimodal transport, the use of documents corresponding to the example shown in 5.4.5 is considered advisable.[4]

5.4.1.5 ***Non-dangerous goods***

When goods mentioned by name in Table A of Chapter 3.2, are not subject to ADN because they are considered as non-dangerous according to Part 2, the consignor may enter in the transport document a statement to that effect, e.g.: "**Not goods of Class ...**"

NOTE: *This provision may be used in particular when the consignor considers that, due to the chemical nature of the goods (e.g. solutions and mixtures) carried or to the fact that such goods are deemed dangerous for other regulatory purposes the consignment might be subject to control during the journey.*

5.4.2 Container/vehicle packing certificate

NOTE: *For the purposes of this section the term "vehicle" includes wagon.*

If the carriage of dangerous goods in a container precedes a voyage by sea, a container/vehicle packing certificate conforming to section 5.4.2 of the IMDG Code[5] shall be provided with the transport document.[6]

The functions of the transport document required under 5.4.1 and of the container/vehicle packing certificate as provided above may be incorporated into a single document; if not, these documents shall be attached one to the other. If these functions are incorporated into a

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[4] *If used, the relevant recommendations of the UNECE United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) may be consulted, in particular Recommendation No. 1 (United Nations Layout Key for Trade Documents) (ECE/TRADE/137, edition 81.3), UN Layout Key for Trade Documents - Guidelines for Applications (ECE/TRADE/270, edition 2002), Recommendation No. 11 (Documentary Aspects of the International Transport of Dangerous Goods) (ECE/TRADE/204, edition 96.1 – currently under revision) and Recommendation No. 22 (Layout Key for Standard Consignment Instructions) (ECE/TRADE/168, edition 1989). Refer also to the UN/CEFACT Summary of Trade Facilitation Recommendations (ECE/TRADE/346, edition 2006) and the United Nations Trade Data Elements Directory (UNTDED) (ECE/TRADE/362, edition 2005).*

[5] *Guidelines for use in practice and in training for loading goods in transport units have also been drawn up by the International Maritime Organization (IMO), the International Labour Organization (ILO) and the United Nations Economic Commission for Europe (UNECE) and have been published by IMO ("IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code)").*

[6] *Section 5.4.2 of the IMDG Code (Amendment 38-16) requires the following:*

"5.4.2 Container/vehicle packing certificate

5.4.2.1 When dangerous goods are packed or loaded into any container or vehicle, those responsible for packing the container or vehicle shall provide a "container/vehicle packing certificate" specifying the container/vehicle identification number(s) and certifying that the operation has been carried out in accordance with the following conditions:

.1 The container/vehicle was clean, dry and apparently fit to receive the goods;
.2 Packages, which need to be segregated in accordance with applicable segregation requirements, have not been packed together onto or in the container/vehicle (unless approved by the competent authority concerned in accordance with 7.3.4.1 (of the IMDG Code));
.3 All packages have been externally inspected for damage, and only sound packages have been loaded;
.4 Drums have been stowed in an upright position, unless otherwise authorised by the competent authority, and all goods have been properly loaded, and, where necessary, adequately braced with securing material to suit the mode(s) of transport for the intended journey;
.5 Goods loaded in bulk have been evenly distributed within the container/vehicle;
.6 For consignments including goods of class 1, other than division 1.4, the container/vehicle is structurally serviceable in accordance with 7.1.2 (of the IMDG Code);
.7 The container/vehicle and packages are properly marked, labelled, and placarded, as appropriate;

Cont´d on the next page

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single document, the inclusion in the transport document of a statement that the loading of the container or vehicle has been carried out in accordance with the applicable modal regulations together with the identification of the person responsible for the container/vehicle packing certificate shall be sufficient.

NOTE: *The container/vehicle packing certificate is not required for portable tanks, tank-containers and MEGCs*.

If the carriage of dangerous goods in a vehicle precedes a voyage by sea, a "container/vehicle packing certificate" conforming to section 5.4.2 of the IMDG Code[5,6] may be provided with the transport document.

5.4.3 Instructions in writing

5.4.3.1 As an aid during an accident emergency situation that may occur or arise during carriage, instructions in writing in the form specified in 5.4.3.4 shall be carried in the wheelhouse and shall be readily available.

5.4.3.2 These instructions shall be provided by the carrier to the master in the language(s) that the master and the expert can read and understand before loading. The master shall ensure that each member of the crew concerned understands and is capable of carrying out the instructions properly.

5.4.3.3 Before loading, the members of the crew shall inform themselves of the dangerous goods to be loaded and consult the instructions in writing for details on actions to be taken in the event of an accident or emergency.

5.4.3.4 The instructions in writing shall correspond to the following four-page model as regards its form and contents.

5.4.3.5 Contracting Parties shall provide the UNECE secretariat with the official translation of the instructions in writing in their national language(s), in accordance with this section. The UNECE secretariat shall make the national versions of the instructions in writing that it has received available to all Contracting Parties.

Footnote 6 (cont´d)

.8 When substances presenting a risk of asphyxiation are used for cooling or conditioning purposes (such as dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951)), the container/vehicle is externally marked in accordance with 5.5.3.6 (of the IMDG Code); and

.9 A dangerous goods transport document, as indicated in 5.4.1 (of the IMDG Code) has been received for each dangerous goods consignment loaded in the container/vehicle.

NOTE: *The container/vehicle packing certificate is not required for portable tanks.*

5.4.2.2 The information required in the dangerous goods transport document and the container/vehicle packing certificate may be incorporated into a single document; if not, these documents shall be attached one to the other. If the information is incorporated into a single document, the document shall a signed declaration such as "It is declared that the packing of the goods into the container/vehicle has been carried out in accordance with the applicable provisions". This declaration shall be dated and the person signing this declaration shall be identified on the document. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.

5.4.2.3 If the container/vehicle packing certificate is presented to the carrier by means of EDP or EDI transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign.

5.4.2.4 When the container/vehicle packing certificate is given to a carrier by EDP or EDI techniques and subsequently the dangerous goods are transferred to a carrier that requires a paper container/vehicle packing certificate, the carrier shall ensure that the paper document indicates "Original received electronically" and the name of the signatory shall be shown in capital letters."

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INSTRUCTIONS IN WRITING ACCORDING TO ADN

Actions in the event of an accident or incident

In the event of an accident or incident that may occur during carriage, the members of the crew shall take the following actions where safe and practicable to do so:

– Inform all other persons on board about the emergency and keep them away as much as possible from the danger zone. Alert other vessels in the vicinity;

– Avoid sources of ignition, in particular, do not smoke, use electronic cigarettes or similar devices or switch on or off any electrical equipment or installation that does not meet the requirements for use in zone 1 (that means no installations or equipment marked in red according to 9.1.0.52.1, 9.3.1.52.2, 9.3.2.52.2 or 9.3.3.52.2) and is not designed for use in emergency response;

– Inform the appropriate body, giving as much information about the accident or incident and substances involved as possible;

– Keep the transport documents and the loading plan readily available for responders on arrival;

– Do not walk into or touch spilled substances and avoid inhalation of fumes, smoke, dusts and vapours by staying up wind;

– Where appropriate and safe to do so, tackle small/initial fires;

– Where appropriate and safe to do so, use on-board equipment to prevent leakages into the aquatic environment and contain spillages;

– Where necessary and safe to do so, secure the ship against drifting;

– Where appropriate, move away from the vicinity of the accident or incident, advise other persons to move away and follow the advice of the appropriate body;

– Remove any contaminated clothing and used contaminated protective equipment, dispose of it safely and wash the body by appropriate means;

– Observe the additional guidance assigned to the hazards of all concerned goods in the following table. For carriage in packages or in bulk, the hazards correspond to the number of the danger label model; for carriage in tank vessels to the data in accordance with 5.4.1.1.2 (c).

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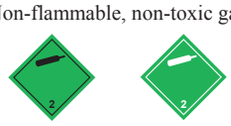
Additional guidance to members of the crew on the hazard characteristics of dangerous goods by class and on actions to be taken subject to prevailing circumstances		
Danger labels and placards, description of the hazards	**Hazard characteristics**	**Additional guidance**
(1)	**(2)**	**(3)**
Explosive substances and articles 1 1.5 1.6	May have a range of properties and effects such as mass detonation; projection of fragments; intense fire/heat flux; formation of bright light, loud noise or smoke. Sensitive to shocks and/or impacts and/or heat.	Take cover but stay away from windows. Steer the vessel as far away as possible from infrastructure and inhabited areas.
Explosive substances and articles 1.4	Slight risk of explosion and fire.	Take cover.
Flammable gases 2.1	Risk of fire. Risk of explosion. May be under pressure. Risk of asphyxiation. May cause burns and/or frostbite. Containments may explode when heated.	Take cover. Keep out of low areas.
Non-flammable, non-toxic gases  2.2	Risk of asphyxiation. May be under pressure. May cause frostbite. Containments may explode when heated.	Take cover. Keep out of low areas.
Toxic gases 2.3	Risk of intoxication. May be under pressure. May cause burns and/or frostbite. Containments may explode when heated.	Use emergency escape mask. Take cover. Keep out of low areas.
Flammable liquids 3	Risk of fire. Risk of explosion. Containments may explode when heated.	Take cover. Keep out of low areas.
Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives 4.1	Risk of fire. Flammable or combustible, may be ignited by heat, sparks or flames. May contain self-reactive substances that are liable to exothermic decomposition in the case of heat supply, contact with other substances (such as acids, heavy-metal compounds or amines), friction or shock. This may result in the evolution of harmful and flammable gases or vapours or self-ignition. Containments may explode when heated. Risk of explosion of desensitized explosives after loss of desensitizer.	
Substances liable to spontaneous combustion 4.2	Risk of fire by spontaneous combustion if packages are damaged or contents spilled. May react vigorously with water.	
Substances which, in contact with water, emit flammable gases 4.3	Risk of fire and explosion in contact with water.	Spilled substances should be kept dry by covering the spillages.

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Additional guidance to members of the crew on the hazard characteristics of dangerous goods by class and on actions to be taken subject to prevailing circumstances		
Danger labels and placards, description of the hazards	**Hazard characteristics**	**Additional guidance**
(1)	**(2)**	**(3)**
Oxidizing substances 5.1	Risk of vigorous reaction, ignition and explosion in contact with combustible or flammable substances.	Avoid mixing with flammable or combustible substances (e.g. sawdust).
Organic peroxides 5.2	Risk of exothermic decomposition at elevated temperatures, contact with other substances (such as acids, heavy-metal compounds or amines), friction or shock. This may result in the evolution of harmful and flammable gases or vapours or self-ignition.	Avoid mixing with flammable or combustible substances (e.g. sawdust).
Toxic substances 6.1	Risk of intoxication by inhalation, skin contact or ingestion. Risk to the aquatic environment.	Use emergency escape mask.
Infectious substances 6.2	Risk of infection. May cause serious disease in humans or animals Risk to the aquatic environment.	
Radioactive material 7A 7B 7C 7D	Risk of intake and external radiation.	Limit time of exposure.
Fissile material 7E	Risk of nuclear chain reaction.	
Corrosive substances 8	Risk of burns by corrosion. May react vigorously with each other, with water and with other substances. Spilled substance may evolve corrosive vapours. Risk to the aquatic environment.	
Miscellaneous dangerous substances and articles 9 9A	Risk of burns. Risk of fire. Risk of explosion. Risk to the aquatic environment	

***NOTE*:** *1. For dangerous goods with multiple risks and for mixed loads, each applicable entry shall be observed.*

2. Additional guidance shown in column (3) of the table may be adapted to reflect the classes of dangerous goods to be carried and their means of transport.

3. Risks see also entries in the transport document as well as Chapter 3.2, Table C, Column (5).

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Additional guidance to members of the crew on the hazard characteristics of dangerous goods, indicated by marks, and on actions to be taken subject to prevailing circumstances		
Mark	**Hazard characteristics**	**Additional guidance**
(1)	**(2)**	**(3)**
Environmentally hazardous substances	Risk to the aquatic environment.	
Elevated temperature substances	Risk of burns by heat.	Avoid contact with hot parts of the transport unit and the spilled substance.

Equipment for personal and general protection to carry out general actions and hazard specific emergency actions to be carried on board the vessel in accordance with section 8.1.5 of ADN

The equipment required by Chapter 3.2, Table A, Column (9) and Table C, Column (18) shall be carried on board the vessel for all hazards listed in the transport document.

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5.4.4 Retention of dangerous goods transport information

5.4.4.1 The consignor and the carrier shall retain a copy of the dangerous goods transport document and additional information and documentation as specified in ADN, for a minimum period of three months.

5.4.4.2 When the documents are kept electronically or in a computer system, the consignor and the carrier shall be able to reproduce them in a printed form.

5.4.5. Example of a multimodal dangerous goods form

Example of a form which may be used as a combined dangerous goods declaration and container packing certificate for multimodal carriage of dangerous goods.

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MULTIMODAL DANGEROUS GOODS FORM

1. Shipper/Consignor/Sender		2. Transport document number	
		3. Page 1 of Pages	4. Shipper's reference
			5. Freight Forwarder's reference
6. Consignee		7. Carrier (to be completed by the carrier)	
		SHIPPER'S DECLARATION I hereby declare that the contents of this consignment are fully and accurately described below by the proper shipping name, and are classified, packaged, marked and labelled/placarded and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.	
8. This shipment is within the limitations prescribed for: (Delete non-applicable) PASSENGER AND CARGO AIRCRAFT CARGO AIRCRAFT ONLY		9. Additional handling information	
10. Vessel/ flight No. and date	11. Port/place of loading		
12. Port/place of discharge	13. Destination		

14. Shipping marks	* Number and kind of packages; description of goods	Gross mass (kg)	Net mass	Cube (m^3)

15. Container identification No./ vehicle registration No.	16. Seal number (s)	17. Container/vehicle size & type	18. Tare (kg)	19. Total gross mass (including tare) (kg)

CONTAINER/VEHICLE PACKING CERTIFICATE I hereby declare that the goods described above have been packed/loaded into the container/vehicle identified above in accordance with the applicable provisions ** **MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER/VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/LOADING**	21.RECEIVING ORGANIZATION RECEIPT Received the above number of packages/containers/trailers in apparent good order and condition unless stated hereon: RECEIVING ORGANIZATION REMARKS:	
20. Name of company	Haulier's name	22. Name of company (OF SHIPPER PREPARING THIS NOTE)
Name/Status of declarant	Vehicle reg. No.	Name/Status of declarant
Place and date	Signature and date	Place and date
Signature of declarant	DRIVER'S SIGNATURE	Signature of declarant

** *See 5.4.2.*

* FOR DANGEROUS GOODS; you must specify: proper shipping name, hazard class, UN No., packing group (where assigned) and any other element of information required under applicable national and international regulations

BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK

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MULTIMODAL DANGEROUS GOODS FORM — Continuation Sheet

1. Shipper/Consignor/Sender	2. Transport document number	
	3. Page 1 of pages	4. Shipper's reference
		5. Freight Forwarder's reference

14. Shipping marks	* Number and kind of packages; description of goods	Gross mass (kg)	Net mass	Cube (m^3)

* FOR DANGEROUS GOODS: you must specify: proper shipping name, hazard class, UN No., packing group (where assigned) and any other element of information required under applicable national and international regulations

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CHAPTER 5.5

SPECIAL PROVISIONS

5.5.1 *(Deleted)*

5.5.2 Special provisions applicable to fumigated cargo transport units (UN 3359)

5.5.2.1 *General*

5.5.2.1.1 Fumigated cargo transport units (UN 3359) containing no other dangerous goods are not subject to any provisions of ADN other than those of this section.

5.5.2.1.2 When the fumigated cargo transport unit is loaded with dangerous goods in addition to the fumigant, any provision of ADN relevant to these goods (including placarding, marking and documentation) applies in addition to the provisions of this section.

5.5.2.1.3 Only cargo transport units that can be closed in such a way that the escape of gas is reduced to a minimum shall be used for the carriage of cargo under fumigation.

5.5.2.2 *Training*

Persons engaged in the handling of fumigated cargo transport units shall be trained commensurate with their responsibilities.

5.5.2.3 *Marking and placarding*

5.5.2.3.1 A fumigated cargo transport unit shall be marked with a warning mark, as specified in 5.5.2.3.2, affixed at each access point in a location where it will be easily seen by persons opening or entering the cargo transport unit. This mark shall remain on the cargo transport unit until the following provisions are met:

(a) The fumigated cargo transport unit has been ventilated to remove harmful concentrations of fumigant gas; and

(b) The fumigated goods or materials have been unloaded.

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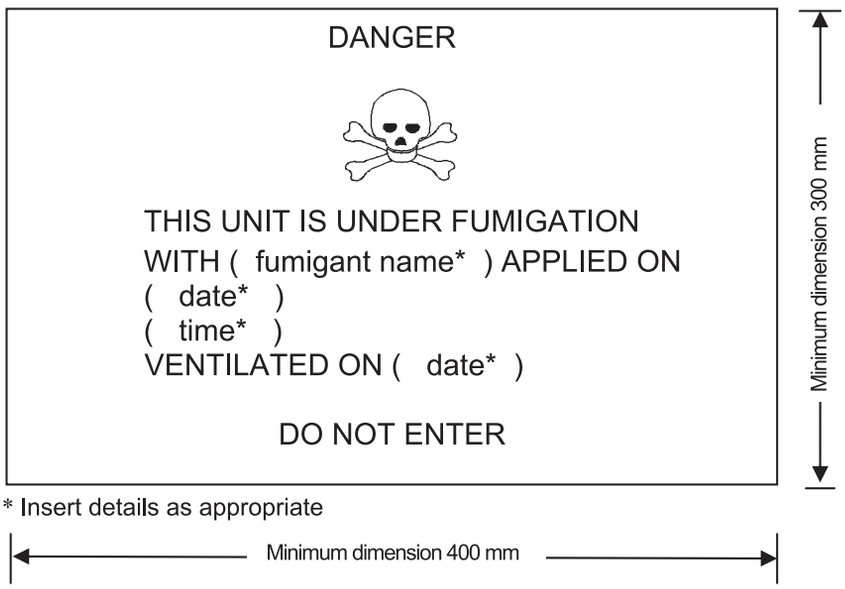
5.5.2.3.2 The fumigation warning mark shall be as shown in Figure 5.5.2.3.2.

Figure 5.5.2.3.2



Fumigation warning mark

The mark shall be a rectangle. The minimum dimensions shall be 400 mm wide x 300 mm high and the minimum width of the outer line shall be 2 mm. The mark shall be in black print on a white background with lettering not less than 25 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

5.5.2.3.3 If the fumigated cargo transport unit has been completely ventilated either by opening the doors of the unit or by mechanical ventilation after fumigation, the date of ventilation shall be marked on the fumigation warning mark.

5.5.2.3.4 When the fumigated cargo transport unit has been ventilated and unloaded, the fumigation warning mark shall be removed.

5.5.2.3.5 Placards conforming to model No. 9 (see 5.2.2.2.2) shall not be affixed to a fumigated cargo transport unit except as required for other Class 9 substances or articles packed therein.

5.5.2.4 ***Documentation***

5.5.2.4.1 Documents associated with the carriage of cargo transport units that have been fumigated and have not been completely ventilated before carriage shall include the following information:

– "UN 3359, fumigated cargo transport unit, 9", or "UN 3359, fumigated cargo transport unit, class 9";

– The date and time of fumigation; and

– The type and amount of the fumigant used.

These particulars shall be drafted in an official language of the forwarding country and also, if the language is not English, French or German, in English, French or German, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise.

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5.5.2.4.2 The documents may be in any form, provided they contain the information required in 5.5.2.4.1. This information shall be easy to identify, legible and durable.

5.5.2.4.3 Instructions for disposal of any residual fumigant including fumigation devices (if used) shall be provided.

5.5.2.4.4 A document is not required when the fumigated cargo transport unit has been completely ventilated and the date of ventilation has been marked on the warning mark (see 5.5.2.3.3 and 5.5.2.3.4).

5.5.3 Special provisions applicable to packages and vehicles and containers containing substances presenting a risk of asphyxiation when used for cooling or conditioning purposes (such as dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951))

5.5.3.1 ***Scope***

5.5.3.1.1 This section is not applicable to substances which may be used for cooling or conditioning purposes when carried as a consignment of dangerous goods, except for the carriage of dry ice (UN No. 1845). When they are carried as a consignment, these substances shall be carried under the relevant entry of Table A of Chapter 3.2 in accordance with the associated conditions of carriage

For UN No. 1845, the conditions of carriage specified in this section, except 5.5.3.3.1, apply for all kinds of carriage, as a coolant, conditioner, or as a consignment. For the carriage of UN No. 1845, no other provisions of ADN apply.

5.5.3.1.2 This section is not applicable to gases in cooling cycles.

5.5.3.1.3 Dangerous goods used for cooling or conditioning tanks or MEGCs during carriage are not subject to this section.

5.5.3.1.4 Vehicles, wagons and containers containing substances used for cooling or conditioning purposes include vehicles, wagons and containers containing substances used for cooling or conditioning purposes inside packages as well as vehicles, wagons and containers with unpackaged substances used for cooling or conditioning purposes.

5.5.3.1.5 Sub-sections 5.5.3.6 and 5.5.3.7 only apply when there is an actual risk of asphyxiation in the vehicle, wagon or container. It is for the participants concerned to assess this risk, taking into consideration the hazards presented by the substances being used for cooling or conditioning, the amount of substance to be carried, the duration of the journey, the types of containment to be used and the gas concentration limits given in the note to 5.5.3.3.3.

5.5.3.2 ***General***

5.5.3.2.1 Vehicles, wagons and containers containing substances used for cooling or conditioning purposes (other than fumigation) during carriage are not subject to any provisions of ADN other than those of this section.

5.5.3.2.2 When dangerous goods are loaded in vehicles, wagons or containers containing substances used for cooling or conditioning purposes any provisions of ADN relevant to these dangerous goods apply in addition to the provisions of this section.

5.5.3.2.3 *(Reserved)*

5.5.3.2.4 Persons engaged in the handling or carriage of vehicles, wagons and containers containing substances used for cooling or conditioning purposes shall be trained commensurate with their responsibilities.

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5.5.3.3 ***Packages containing a coolant or conditioner***

5.5.3.3.1 Packaged dangerous goods requiring cooling or conditioning assigned to packing instructions P203, P620, P650, P800, P901 or P904 of 4.1.4.1 of ADR shall meet the appropriate requirements of that packing instruction.

5.5.3.3.2 For packaged dangerous goods requiring cooling or conditioning assigned to other packing instructions, the packages shall be capable of withstanding very low temperatures and shall not be affected or significantly weakened by the coolant or conditioner. Packages shall be designed and constructed to permit the release of gas to prevent a build-up of pressure that could rupture the packaging. The dangerous goods shall be packed in such a way as to prevent movement after the dissipation of any coolant or conditioner.

5.5.3.3.3 Packages containing a coolant or conditioner shall be carried in well ventilated vehicles, wagons and containers. Marking according to 5.5.3.6 is not required in this case.

Ventilation is not required, and marking according to 5.5.3.6 is required, if:

– the load compartment is insulated, refrigerated or mechanically refrigerated equipment, for example as defined in the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP) and separated from the driver's cab;

– for vehicles, gas exchange between the load compartment and the driver's cab is prevented.

NOTE: *In this context "well ventilated" means there is an atmosphere where the carbon dioxide concentration is below 0.5% by volume and the oxygen concentration is above 19.5% by volume.*

5.5.3.4 ***Marking of packages containing a coolant or conditioner***

5.5.3.4.1 Packages containing dangerous goods used for cooling or conditioning shall be marked with the name indicated in Column (2) of Table A of Chapter 3.2 of these dangerous goods followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements concluded between the countries concerned in the transport operation provide otherwise.

5.5.3.4.2 The marks shall be durable, legible and placed in such a location and of such a size relative to the package as to be readily visible.

5.5.3.5 ***Vehicles, wagons and containers containing unpackaged dry ice***

5.5.3.5.1 If dry ice in unpackaged form is used, it shall not come into direct contact with the metal structure of a vehicle, wagon or container to avoid embrittlement of the metal. Measures shall be taken to provide adequate insulation between the dry ice and the vehicle, wagon or container by providing a minimum of 30 mm separation (e.g. by using suitable low heat conducting materials such as timber planks, pallets etc).

5.5.3.5.2 Where dry ice is placed around packages, measures shall be taken to ensure that packages remain in the original position during carriage after the dry ice has dissipated.

5.5.3.6 ***Marking of vehicles, wagons and containers***

5.5.3.6.1 Vehicles, wagons and containers containing dangerous goods used for cooling or conditioning purposes that are not well ventilated shall be marked with a warning mark, as specified in 5.5.3.6.2, affixed at each access point in a location where it will be easily seen

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by persons opening or entering the vehicle, wagon or container. This mark shall remain on the vehicle, wagon or container until the following provisions are met:

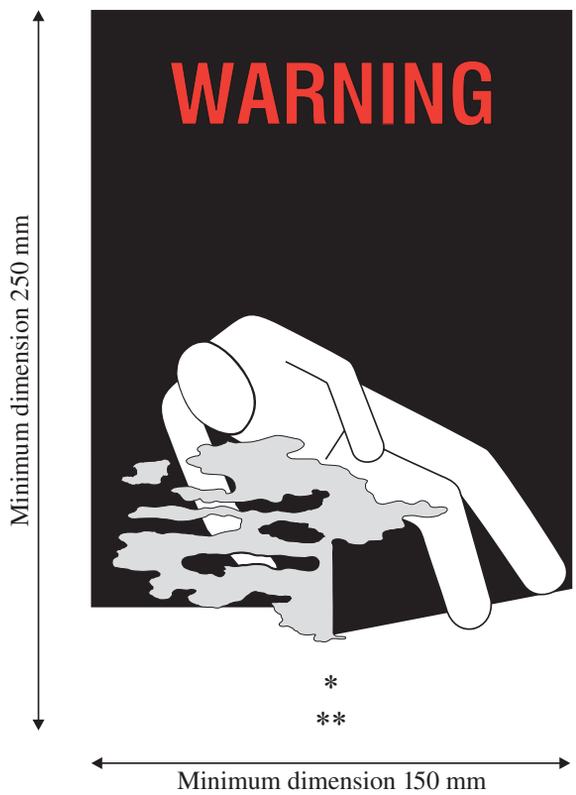
(a) The vehicle, wagon or container has been well ventilated to remove harmful concentrations of coolant or conditioner; and

(b) The cooled or conditioned goods have been unloaded.

As long as the vehicle, wagon or container is marked, the necessary precautions have to be taken before entering it. The necessity of ventilating through the cargo doors or other means (e.g. forced ventilation) has to be evaluated and included in training of the involved persons.

5.5.3.6.2 The warning mark shall be as shown in Figure 5.5.3.6.2.

Figure 5.5.3.6.2



Coolant/conditioning warning mark for vehicles, wagons and containers

* *Insert the name indicated in column (2) of Table A of Chapter 3.2 of the coolant/conditioner. The lettering shall be in capitals, all be on one line and shall be at least 25 mm high. If the length of the proper shipping name is too long to fit in the space provided, the lettering may be reduced to the maximum size possible to fit. For example: "CARBON DIOXIDE, SOLID".*

** *Insert "AS COOLANT" or "AS CONDITIONER" as appropriate. The lettering shall be in capitals, all be on one line and be at least 25 mm high.*

The mark shall be a rectangle. The minimum dimensions shall be 150 mm wide x 250 mm high. The word "WARNING" shall be in red or white and be at least 25 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

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The word "WARNING" and the words "AS COOLANT" or "AS CONDITIONER", as appropriate, shall be in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements concluded between the countries concerned in the transport operation provide otherwise.

5.5.3.7 ***Documentation***

5.5.3.7.1 Documents (such as a bill of lading, cargo manifest or CMR/CIM/CMNI consignment note) associated with the carriage of vehicles, wagons or containers containing or having contained substances used for cooling or conditioning purposes and that have not been completely ventilated before carriage shall include the following information:

(a) The UN number preceded by the letters "UN"; and

(b) The name indicated in Column (2) of Table A of Chapter 3.2 followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise.

For example: UN 1845, CARBON DIOXIDE, SOLID, AS COOLANT.

5.5.3.7.2 The transport document may be in any form, provided it contains the information required in 5.5.3.7.1. This information shall be easy to identify, legible and durable.

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PART 6

Requirements for the construction and testing of packagings (including IBCs and large packagings), tanks and bulk cargo transport units

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CHAPTER 6.1

GENERAL REQUIREMENTS

6.1.1 Packagings (including IBCs and large packagings) and tanks shall meet the following requirements of ADR in respect of construction and testing:

Chapter 6.1: Requirements for the construction and testing of packagings;

Chapter 6.2: Requirements for the construction and testing of pressure receptacles, aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas;

Chapter 6.3: Requirements for the construction and testing of packagings for Class 6.2 infectious substances of category A;

Chapter 6.4: Requirements for the construction, testing and approval of packages and material of Class 7;

Chapter 6.5 Requirements for the construction and testing of intermediate bulk containers (IBCs);

Chapter 6.6 Requirements for the construction and testing of large packagings;

Chapter 6.7 Requirements for the design, construction, inspection and testing of portable tanks and UN multiple-element gas containers (MEGCs);

Chapter 6.8 Requirements for the construction, equipment, type approval, inspections and tests, and marking of fixed tanks (tank-vehicles), demountable tanks and tank-containers and tank swap bodies, with shell made of metallic materials and battery-vehicles and multiple element gas containers (MEGCs);

Chapter 6.9 Requirements for the design, construction, equipment, type approval, testing and marking of fibre-reinforced plastics (FRP) fixed tanks (tank-vehicles), demountable tanks, tank-containers and tank swap bodies;

Chapter 6.10 Requirements for the construction, equipment, type approval, inspection and marking of vacuum-operated waste tanks;

Chapter 6.11 Requirements for the design, construction, inspection and testing of bulk containers;

Chapter 6.12 Requirements for the construction, equipment, type approval, inspections and tests, and marking of tanks, bulk containers and special compartments for explosives of mobile explosive manufacturing units (MEMUs).

6.1.2 Portable tanks may also meet the requirements of Chapter 6.7 or, if appropriate, Chapter 6.9 of the IMDG Code.

6.1.3 Tank-vehicles may also meet the requirements of Chapter 6.8 of the IMDG Code.

6.1.4 Tank wagons, with fixed or demountable tanks and battery-wagons shall meet the requirements of Chapter 6.8 of the RID.

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6.1.5 Bodies of vehicles for bulk carriage shall, if necessary, meet the requirements of Chapter 6.11 or of Chapter 9.5 of ADR.

6.1.6 When the provisions of 7.3.1.1 (a) of RID or ADR are applied, the bulk containers shall meet the requirements of Chapter 6.11 of RID or ADR.

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PART 7

Requirements concerning loading, carriage, unloading and handling of cargo

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CHAPTER 7.1

DRY CARGO VESSELS

7.1.0 General requirements

7.1.0.1 The provisions of 7.1.0 to 7.1.7 are applicable to dry cargo vessels.

7.1.0.2 to 7.1.0.99 *(Reserved)*

7.1.1 Mode of carriage of goods

7.1.1.1 to 7.1.1.9 *(Reserved)*

7.1.1.10 ***Carriage of packages***

Unless otherwise specified, the masses given for packages shall be the gross masses. When packages are carried in containers or vehicles, the mass of the container or vehicle shall not be included in the gross mass of such packages.

7.1.1.11 ***Carriage in bulk***

Carriage of dangerous goods in bulk shall be prohibited except where this mode of carriage is explicitly authorized in column (8) of Table A of Chapter 3.2. The code "B" shall then appear in this column.

7.1.1.12 ***Ventilation***

The ventilation of holds is required only if it is prescribed in 7.1.4.12 or by an additional requirement "VE …" in column (10) of Table A of Chapter 3.2.

7.1.1.13 ***Measures to be taken prior to loading***

Additional measures to be taken prior to loading are required only if prescribed in 7.1.4.13 or by an additional requirement "LO …" in column (11) of Table A of Chapter 3.2.

7.1.1.14 ***Handling and stowage of cargo***

During the handling and stowage of cargo additional measures are required only if prescribed in 7.1.4.14 or by an additional requirement "HA …" in column (11) of Table A of Chapter 3.2.

7.1.1.15 *(Reserved)*

7.1.1.16 ***Measures to be taken during loading, carriage, unloading and handling of cargo***

The additional measures to be taken during loading, carriage, unloading and handling of cargo are required only if prescribed in 7.1.4.16 or by an additional requirement "IN …" in column (11) of Table A of Chapter 3.2.

7.1.1.17 *(Reserved)*

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7.1.1.18 ***Carriage in containers, in bulk containers, in intermediate bulk containers (IBCs) and in large packagings, in MEGCs, in portable tanks and in tank-containers***

The carriage of containers, bulk containers, IBCs, large packagings, MEGCs, portable tanks and tank-containers shall be in accordance with the provisions applicable to the carriage of packages.

7.1.1.19 ***Vehicles and wagons***

The carriage of vehicles and wagons shall be in accordance with the provisions applicable to the carriage of packages.

7.1.1.20 *(Reserved)*

7.1.1.21 ***Carriage in cargo tanks***

The carriage of dangerous goods in cargo tanks in dry-cargo vessels is prohibited.

7.1.1.22 to 7.1.1.99 *(Reserved)*

7.1.2 Requirements applicable to vessels

7.1.2.0 ***Permitted vessels***

7.1.2.0.1 Dangerous goods may be carried in quantities not exceeding those indicated in 7.1.4.1.1, or, if applicable, in 7.1.4.1.2:

– In dry cargo vessels conforming to the applicable construction requirements of 9.1.0.0 to 9.1.0.79; or

– In seagoing vessels conforming to the applicable construction requirements of 9.1.0.0 to 9.1.0.79, or otherwise to the requirements of 9.2.0 to 9.2.0.79.

7.1.2.0.2 Dangerous goods of classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 or 9, with the exception of those for which a No. 1 model label is required in column (5) of table A of Chapter 3.2, may be carried in quantities greater than those indicated in 7.1.4.1.1 and 7.1.4.1.2:

– In double-hull dry cargo vessels conforming to the applicable construction requirements of 9.1.0.80 to 9.1.0.95; or

– In double-hull seagoing vessels conforming to the applicable construction requirements of 9.1.0.80 to 9.1.0.95, or otherwise to the requirements of 9.2.0 to 9.2.0.95.

7.1.2.1 to 7.1.2.4 *(Reserved)*

7.1.2.5 ***Instructions for the use of devices and installations***

Where specific safety rules have to be complied with when using any device or installation, instructions for the use of the particular device or installation shall be readily available for consultation at appropriate places on board in the language normally spoken on board and also if that language is not English, French or German, in English, French or German unless agreements concluded between the countries concerned in the transport operation provide otherwise.

7.1.2.6 to 7.1.2.18 *(Reserved)*

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7.1.2.19 ***Pushed convoys and side-by-side formations***

7.1.2.19.1 Where at least one vessel of a convoy or side-by-side formation is required to be in possession of a certificate of approval for the carriage of dangerous goods, all vessels of such convoy or side-by-side formation shall be provided with an appropriate certificate of approval.

Vessels not carrying dangerous goods shall comply with the requirements of the following paragraphs:

1.16.1.1, 1.16.1.2, 1.16.1.3, 1.16.1.4, 7.1.2.5, 8.1.4, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 8.3.5, 9.1.0.0, 9.1.0.12.3, 9.1.0.12.4, 9.1.0.17.2, 9.1.0.17.3, 9.1.0.31, 9.1.0.32.2, 9.1.0.34, 9.1.0.40.2, 9.1.0.41, 9.1.0.51, 9.1.0.52, 9.1.0.71 and 9.1.0.74.

7.1.2.19.2 For the purposes of the application of the provisions of this Chapter with the exception of 7.1.4.1.1 and 7.1.4.1.2, the entire pushed convoy or the side-by-side formation shall be deemed to be a single vessel.

7.1.2.20 to 7.1.2.99 *(Reserved)*

7.1.3 General service requirements

7.1.3.1 ***Access to holds, double-hull spaces and double bottoms; inspections***

7.1.3.1.1 Access to the holds is not permitted except for the purpose of loading or unloading and carrying out inspections or cleaning work.

7.1.3.1.2 Access to the double-hull spaces and the double bottoms is not permitted while the vessel is under way.

7.1.3.1.3 If the concentration of gases and vapours given off by the cargo or the oxygen content of the air in holds, double-wall spaces or double bottoms has to be measured before entry, the results of these measurements shall be recorded in writing. The measurement may only be effected by an expert referred to in 8.2.1.2, equipped with suitable breathing apparatus for the substance carried.

Entry into the spaces is not permitted for the purpose of measuring.

7.1.3.1.4 *Carriage of cargo in bulk or without packaging*

If a vessel carries dangerous goods in bulk or without packaging in its holds for which EX and/or TOX appears in column (9) of Table A of Chapter 3.2, the concentration of flammable and/or toxic gases and vapours given off by the cargo in these holds and adjacent holds shall be measured before any person enters these holds.

7.1.3.1.5 Entry into holds where dangerous goods are carried in bulk or without packaging as well as entry into double-hull spaces and double bottoms is only permitted if:

– the concentration of flammable gases and vapours given off by the cargo in the hold, double hull space or double bottom is below 10% of the LEL, the concentration of toxic gases and vapours given off by the cargo is below national accepted exposure levels, and the percentage of oxygen is between 20 and 23.5 vol %; or

– the concentration of flammable gases and vapours given off by the cargo is below 10% of the LEL, and the person entering the space wears a self-contained breathing apparatus and other necessary protective and rescue equipment, and is secured by a line. Entry into these spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another two persons

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capable of giving assistance in an emergency shall be on the vessel within calling distance.

In deviation of 1.1.4.6, more stringent national legislation on the entry into holds shall take precedence over the ADN.

7.1.3.1.6 *Carriage in packages*

In case of suspected damage to packages, the concentration of flammable and/or toxic gases and vapours given off by the cargo in holds containing dangerous goods of Classes 2, 3, 4.3, 5.2, 6.1 and 8 for which EX and/or TOX appears in column (9) of Table A of Chapter 3.2, shall be measured before any person enters these holds.

7.1.3.1.7 Entry into holds where damage is suspected to packages in which dangerous goods of Classes 2, 3, 4.3, 5.2, 6.1 and 8 are carried as well as entry into double-hull spaces and double bottoms is only permitted if:

– the concentration of flammable gases and vapours given off by the cargo in the hold, double hull space or double bottom is below 10% of the LEL, the concentration of toxic gases and vapours given off by the cargo is below national accepted exposure levels, and the percentage of oxygen is between 20 and 23,5 vol %; or

– the concentration of flammable gases and vapours given off by the cargo in the hold is below 10% of the LEL and the person entering the space wears a self-contained breathing apparatus and other necessary protective and rescue equipment and is secured by a line. Entry into these spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another two persons capable of giving assistance in an emergency shall be on the vessel within calling distance.

In deviation of 1.1.4.6, more stringent national legislation on the entry into holds shall take precedence over the ADN.

7.1.3.2 to 7.1.3.14 *(Reserved)*

7.1.3.15 ***Expert on board the vessel***

When dangerous goods are carried, the responsible master shall at the same time be an expert according to 8.2.1.2.

NOTE**:** *Which master of the vessel's crew is the responsible master shall be determined and documented on board by the carrier. If there is no such determination, the requirement applies to every master.*

By derogation from this, for the loading and unloading of dangerous goods in a barge, it is sufficient that the person who is responsible for loading and unloading and for ballasting of the barge has the expertise required according to 8.2.1.2.

7.1.3.16 All measurements on board the vessel shall be performed by an expert according to 8.2.1.2, unless provided otherwise in the Regulations annexed to ADN. The results of the measurements shall be recorded in writing in the book according to 8.1.2.1 (g).

7.1.3.17 to 7.1.3.19 *(Reserved)*

7.1.3.20 ***Water ballast***

Double-hull spaces and double bottoms may be used for water ballast.

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7.1.3.21 *(Reserved)*

7.1.3.22 *Opening of holds*

7.1.3.22.1 Dangerous goods shall be protected against the influences of weather and against spray water except during loading and unloading or during inspection.

This provision does not apply when dangerous goods are loaded in sprayproof containers, IBCs, or large packagings, or in MEGCs, portable tanks, tank-containers, vehicles or wagons which are closed or sheeted.

7.1.3.22.2 Where dangerous goods are carried in bulk, the holds shall be covered with hatch covers.

7.1.3.23 to 7.1.3.30 *(Reserved)*

7.1.3.31 *Engines*

The use of engines running on fuels having a flashpoint equal to or lower than 55 ºC (e.g. petrol engines) is prohibited. This provision does not apply to:

– the petrol-operated outboard motors of lifeboats;

– the propulsion and auxiliary systems which meet the requirements of Chapter 30 and Annex 8, Section 1 of the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) as amended.[1]

If a substance is carried in bulk and has in column (9) of Table A of Chapter 3.2 an entry "EX" then:

– Outboard motors and their fuel tanks shall be carried on board only outside the protected area; and

– Mechanical inflation devices, outboard motors and their electrical installations shall be put into operation only outside the protected area.

7.1.3.32 *Oil fuel tanks*

Double bottoms with a height of at least 0.6 m may be used as oil fuel tanks provided that they have been constructed in accordance with Chapters 9.1 or 9.2.

7.1.3.33 to 7.4.3.40 *(Reserved)*

7.1.3.41 *Smoking, fire or naked light*

7.1.3.41.1 Smoking, including electronic cigarettes and other similar devices, fire and naked light are prohibited on board the vessel.

This prohibition shall be displayed on notice boards at appropriate places.

The prohibition does not apply in the accommodation or the wheelhouse, provided that their windows, doors, skylights and hatches are closed or the ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa.

7.1.3.41.2 Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels.

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[1] *As available on the website of the Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI,* https://www.cesni.eu/en/documents/es-trin/.

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Cooking and refrigerating appliances may only be used in the accommodation and in the wheelhouse.

7.1.3.41.3 Heating appliances or boilers fuelled with liquid fuels having a flash-point above 55º C which are installed in the engine room or in another suitable space may, however, be used.

7.1.3.42 *Heating of holds*

The heating of holds or the operation of a heating system in the holds is prohibited.

7.1.3.43 *(Reserved)*

7.1.3.44 *Cleaning operations*

The use of liquids having a flash-point below 55º C for cleaning purposes is prohibited.

7.1.3.45 to 7.1.3.50 *(Reserved)*

7.1.3.51 *Electrical and non-electrical installations and equipment*

7.1.3.51.1 The electrical and non-electrical installations and equipment shall be properly maintained.

7.1.3.51.2 The use of movable electric cables is prohibited in the protected area. This provision does not apply to the electric cables referred to in 9.1.0.53.5.

Movable electric cables must undergo visual inspection each time before use. They must be installed in such a way as to ensure that they are not at risk of damage. Connectors must be located outside of the protected area.

The use of electric cables to connect the power network of a vessel to a land-based power network is not permitted:

– During the loading or unloading of substances that have an entry “EX” in column (9) of Table A of Chapter 3.2; or

– When the vessel is located immediately adjacent to or within an onshore assigned zone.

7.1.3.51.3 The sockets for connecting the signal lights and gangway lighting and for connecting containers, submerged pumps, hatch cover gantries, or hold fans shall not be live except when the signal lights or the gangway lighting are switched on or when the containers or the submerged pumps or the hatch cover gantries or hold fans are in operation. Connecting or disconnecting shall only be possible when the sockets are not live.

7.1.3.51.4 The electrical installations and equipment in the holds shall be kept switched off and protected against unintentional connection.

This provision does not apply to permanently installed electrical cables passing through the holds, to movable electrical cables connecting containers stowed according to 7.1.4.4.4, or to electrical installations and equipment fulfilling the requirements for use in zone 1.

7.1.3.51.5 During a stay in the immediate vicinity of or within an onshore assigned zone, electrical and non-electrical installations and equipment not fulfilling the requirements of 9.1.0.52.1 or that may have a surface temperature higher than 200 °C (marked in red according to 9.1.0.51 and 9.1.0.52.2) shall be switched off and cooled down to below 200 °C, or the measures mentioned in 7.1.3.51.6 shall be taken.

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7.1.3.51.6 7.1.3.51.5 does not apply in accommodation, wheelhouse and service spaces located outside the protected area if:

(a) The ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa; and

(b) The gas detection system is switched on, taking measurements continuously.

7.1.3.51.7 Installations and equipment referred to in 7.1.3.51.5 that have been switched off during loading or unloading or during a stay in the immediate vicinity of or within an onshore assigned zone may only be switched on again when:

(a) The vessel is no longer in the vicinity of or within the onshore assigned zone; or

(b) A concentration of less than 10% of the LEL of n-Hexane is reached in the wheelhouse, accommodation and service spaces located outside the protected area.

The results of the measurements shall be recorded in writing.

7.1.3.51.8 If vessels are not able to meet the requirements of 7.1.3.51.5 and 7.1.3.51.6, they are not permitted to remain in the immediate vicinity of or within an onshore assigned zone. The competent authority may allow exceptions in individual cases.

7.1.3.52 to 7.1.3.69 *(Reserved)*

7.1.3.70 ***Aerials, lightning conductors, wire cables and masts***

7.1.3.70.1 No part of an aerial for electronic apparatus, no lightning conductor and no wire cable shall be situated above the holds.

7.1.3.70.2 No part of aerials for radiotelephones shall be located within 2.00 m from substances or articles of Class 1.

7.1.3.71 to 7.1.3.99 *(Reserved)*

7.1.4 Additional requirements concerning loading, carriage, unloading and other handling of the cargo

7.1.4.1 ***Limitation of the quantities carried***

7.1.4.1.1 Subject to 7.1.4.1.3, the following gross masses shall not be exceeded on any vessel. For pushed convoys and side-by-side formations this gross mass applies to each unit of the convoy or formation.

Class 1

All substances and articles of Division 1.1 of compatibility group A	90 kg[1]
All substances and articles of Division 1.1 of compatibility groups B, C, D. E, F, G, J or L	15,000 kg[2]
All substances and articles of Division 1.2 of compatibility groups B, C, D, E, F, G, H, J or L	50,000 kg
All substances and articles of Division 1.3 of compatibility groups C, G, H, J or L	300,000 kg[3]
All substances and articles of Division 1.4 of compatibility groups B, C, D, E, F, G or S	1,100,000 kg
All substances of Division 1.5 of compatibility group D	15,000 kg[2]

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All articles of Division 1.6 of compatibility group N	300,000 kg[3]
Empty packagings, uncleaned	1,100,000 kg

Note:

[1] In not less than three batches of a maximum of 30 kg each, distance between batches not less than 10.00 m.

[2] In not less than three batches of a maximum of 5 000 kg each, distance between batches not less than 10.00 m.

[3] Not more than 100,000 kg per hold. A wooden partition is permitted for subdividing a hold.

Class 2

All goods for which label No. 2.1 is required in column (5) of Table A of Chapter 3.2: total	300 000 kg
All goods for which label No. 2.3 is required in column (5) of Table A of Chapter 3.2: total	120 000 kg
Other goods	No limitation

Class 3

All goods for which label No. 6.1 is required in column (5) of Table A of Chapter 3.2: total	120 000 kg
Other goods: total	300 000 kg

Class 4.1

UN Nos. 3221, 3222, 3231 and 3232, total	15 000 kg
All goods of packing group I; all goods of packing group II for which label No. 6.1 is required in column (5) of Table A of Chapter 3.2; self-reactive substances of types C, D, E and F (UN Nos. 3223 to 3230 and 3233 to 3240); other substances of classification code SR1 or SR2 (UN Nos. 2956, 3241, 3242 and 3251); and desensitized explosive substances of packing group II (UN Nos. 2907, 3319 and 3344): total	120 000 kg
Other goods	No limitation

Class 4.2

All goods of packing groups I or II for which label No. 6.1 is required in column (5) of Table A of Chapter 3.2: total	300 000 kg
Other goods	No limitation

Class 4.3

All goods of packing groups I or II for which label No. 3, 4.1 or 6.1 is required in column (5) of Table A of Chapter 3.2: total	300 000 kg
Other goods	No limitation

Class 5.1

All goods of packing groups I or II for which label No. 6.1 is required in column (5) of Table A of Chapter 3.2: total	300 000 kg
Other goods	No limitation

Class 5.2

UN Nos. 3101, 3102, 3111 and 3112: total	15 000 kg
Other goods: total	120 000 kg

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Class 6.1	
All goods of packing group I: total	120 000 kg
All goods of packing group II: total	300 000 kg
All goods carried in bulk	0 kg
Other goods	No limitation
Class 7	
UN Nos. 2912, 2913, 2915, 2916, 2917, 2919, 2977, 2978 and 3321 to 3333	0 kg
Other goods	No limitation
Class 8	
All goods of packing group I; goods of packing group II for which label No. 3 or 6.1 is required in column (5) of Table A in Chapter 3.2: total	300 000 kg
Other goods	No limitation
Class 9	
All goods of packing group II: total	300 000 kg
UN No. 3077, for goods carried in bulk and classified as hazardous to the aquatic environment, categories Acute 1 or Chronic 1, in accordance with 2.4.3:	0 kg
Other goods	No limitation

7.1.4.1.2 Subject to 7.1.4.1.3, the maximum quantity of dangerous goods permitted on board a vessel or on board each unit of a pushed convoy or side-by-side formation is 1,100,000 kg.

7.1.4.1.3 The limitations of 7.1.4.1.1 and 7.1.4.1.2 shall not apply in the case of transport of dangerous goods of classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 and 9, except of those for which a label of Model No 1 is required in column (5) of Table A of Chapter 3.2, on board double-hull vessels complying with the additional requirements of 9.1.0.88 to 9.1.0.95 or 9.2.0.88 to 9.2.0.95.

7.1.4.1.4 Where substances and articles of different divisions of Class 1 are loaded in a single vessel in conformity with the provisions for prohibition of mixed loading of 7.1.4.3.3 or 7.1.4.3.4, the entire load shall not exceed the smallest maximum mass given in 7.1.4.1.1 above for the goods of the most dangerous division loaded, the order of precedence being 1.1, 1.5, 1.2, 1.3, 1.6, 1.4.

7.1.4.1.5 *(Deleted)*

7.1.4.1.6 For activity limits, transport index (TI) limits and criticality safety indices (CSI) in the case of the carriage of radioactive material, see 7.1.4.14.7.

7.1.4.2 ***Prohibition of mixed loading (bulk)***

Vessels carrying substances of Class 5.1 in bulk shall not carry any other goods.

7.1.4.3 ***Prohibition of mixed loading (packages in holds)***

7.1.4.3.1 Goods of different classes shall be separated by a minimum horizontal distance of 3.00 m. They shall not be stowed one on top of the other.

7.1.4.3.2 Irrespective of the quantity, dangerous goods for which marking with two blue cones or two blue lights is prescribed in column (12) of Table A of Chapter 3.2 shall not be stowed in the

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same hold together with flammable goods for which marking with one blue cone or one blue light is prescribed in column (12) of Table A of Chapter 3.2.

7.1.4.3.3 Packages containing substances or articles of Class 1 and packages containing substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 shall be separated by a distance of not less than 12 m from goods of all other classes.

7.1.4.3.4 Substances and articles of Class 1 shall not be stowed in the same hold, except as indicated in the following table:

Compatibility group	A	B	C	D	E	F	G	H	J	L	N	S
A	X	-	-	-	-	-	-	-	-	-	-	-
B	-	X	-	1/	-	-	-	-	-	-	-	X
C	-	-	X	X	X	-	X	-	-	-	2/, 3/	X
D	-	1/	X	X	X	-	X	-	-	-	2/, 3/	X
E	-	-	X	X	X	-	X	-	-	-	2/, 3/	X
F	-	-	-	-	-	X	-	-	-	-	-	X
G	-	-	X	X	X	-	X	-	-	-	-	X
H	-	-	-	-	-	-	-	X	-	-	-	X
J	-	-	-	-	-	-	-	-	X	-	-	X
L	-	-	-	-	-	-	-	-	-	4/	-	-
N	-	-	2/, 3/	2/, 3/	2/, 3/	-	-	-	-	-	2/	X
S	-	X	X	X	X	X	X	X	X	-	X	X

"X" indicates that explosive substances or articles of corresponding compatibility groups in accordance with Part 2 of these Regulations may be stowed in the same hold.

1/ Packages containing articles assigned to compatibility group B or substances or articles assigned to compatibility group D may be loaded together in the same hold provided that they are carried in closed containers, vehicles or wagons.

2/ Different categories of articles of Division 1.6, compatibility group N, may be carried together as articles of Division 1.6, compatibility group N, only when it is proven by testing or analogy that there is no additional risk of sympathetic detonation between the articles. Otherwise they should be treated as hazard Division 1.1.

3/ When articles of compatibility group N are carried with substances or articles of compatibility groups C, D or E, the articles of compatibility group N should be considered as having the characteristics of compatibility group D.

4/ Packages with substances or articles of compatibility group L may be stowed in the same hold with packages containing the same type of substances or articles of the same compatibility group.

7.1.4.3.5 For the carriage of material Class 7 (UN Nos. 2916, 2917, 3323, 3328, 3329 and 3330) in Type B(U) or Type B(M) or Type C packages, the controls, restrictions or provisions specified in the competent authority approval certificate shall be complied with.

7.1.4.3.6 For the carriage of material of Class 7 under special arrangement (UN Nos. 2919 and 3331), the special provisions specified by the competent authority shall be met. In particular, mixed loading shall not be permitted unless specifically authorized by the competent authority.

7.1.4.4 *Prohibition of mixed loading (containers, vehicles, wagons)*

7.1.4.4.1 7.1.4.3 shall not apply to packages stowed in containers, vehicles or wagons in accordance with international regulations.

7.1.4.4.2 7.1.4.3 shall not apply to:

– closed containers;

– closed vehicles and closed wagons;

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– tank-containers, portable tanks and MEGCs;

– tank-vehicles and tank-wagons.

7.1.4.4.3 For containers other than those referred to in paragraph 7.1.4.4.1 and 7.1.4.4.2 above the separation distance required by 7.1.4.3.1 may be reduced to 2.40 m (width of container).

7.1.4.4.4 The electrical installations and equipment fitted to the outside of a closed container may be connected with removable electrical cables in accordance with the provisions of 9.1.0.53.5 or be put into operation provided that:

(a) These electrical installations and equipment are appropriate at least for use in zone 1 and comply with the requirements for temperature class T4 and explosion group II B; or that

(b) These electrical installations and equipment do not fulfil the requirements referred to in (a), but are sufficiently separated from other containers containing substances of:

– Class 2 for which a label No. 2.1 is required in column (5) of Table A of Chapter 3.2;

– Class 3, packing group I or II;

– Class 4.3;

– Class 6.1; packing group I or II, with an additional hazard of Class 4.3;

– Class 8, packing group I, with an additional hazard of Class 3; and

– Class 8, packing group I or II, with an additional hazard of Class 4.3.

This condition is deemed to be met if no container containing the above-mentioned substances is stowed within an area of cylindrical form with a radius of 2.40 m around the electrical installations and equipment and an unlimited vertical extension.

The requirements of subparagraphs (a) and (b) need not be complied with if containers with the electrical installations or equipment which do not meet the requirements for use in explosion hazardous areas and the containers containing the above-mentioned substances are stowed in separate holds.

Examples of stowage and segregation of containers

Legend

R Container (e.g. reefer) with electrical equipment which is not of a certified safe type.

Z Electrical equipment which is not of a certified safe type.

X Container not allowed when containing dangerous substances for which sufficient separation is required.

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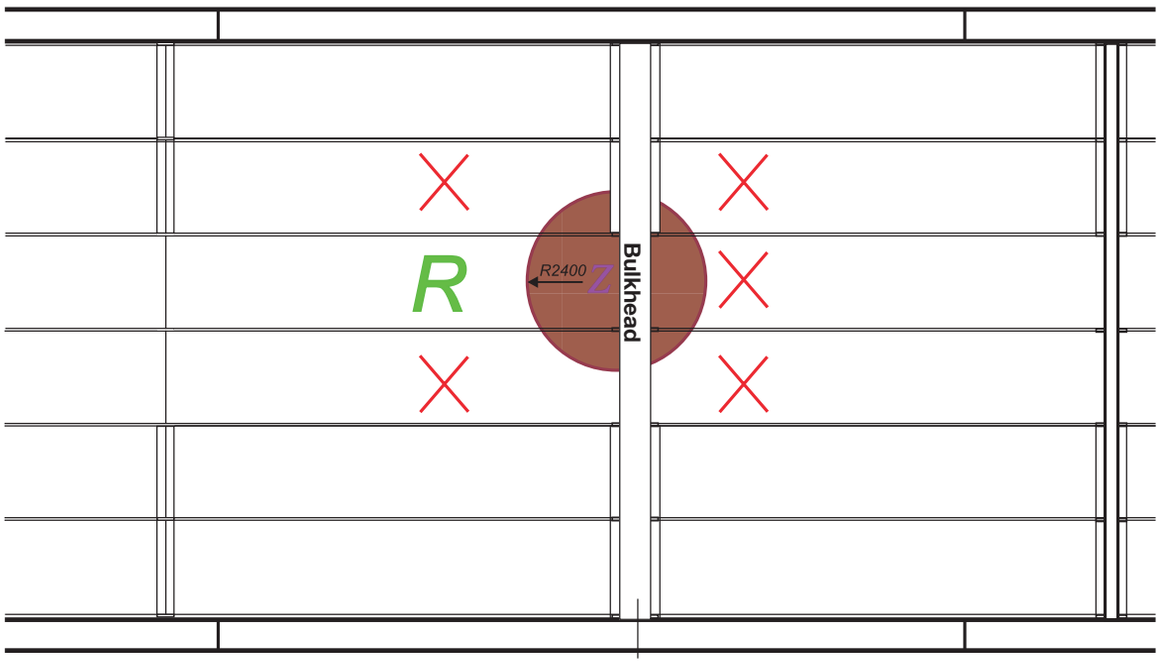
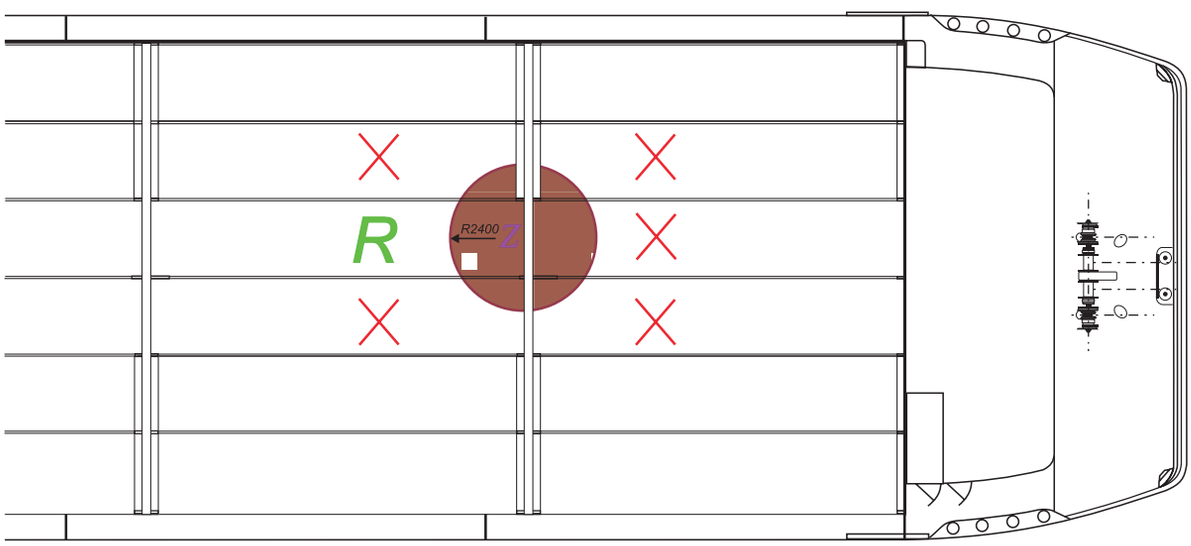
Top view

1. On deck



Top view

2. In the hold



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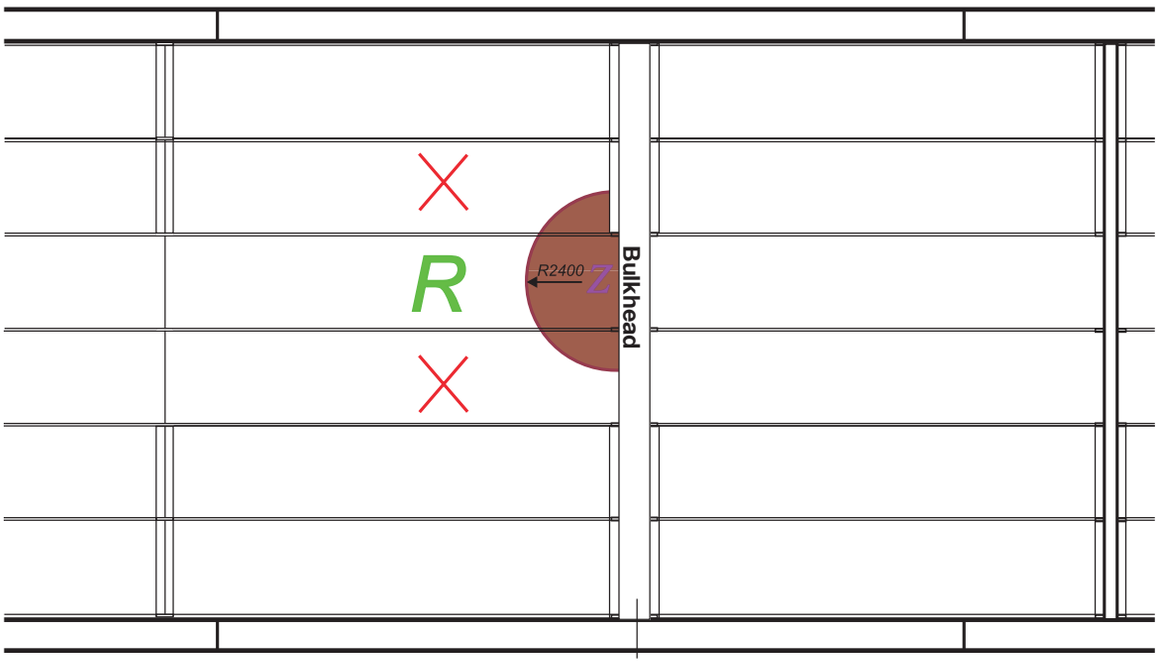
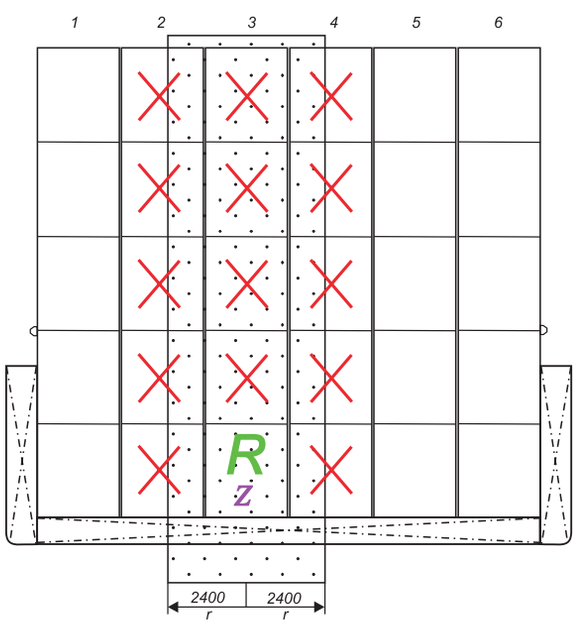
Top view

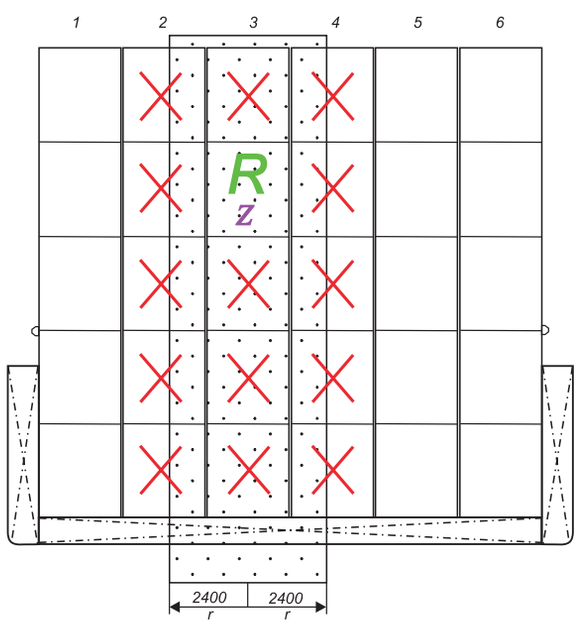
2. In the hold



Front view



Front view



7.1.4.4.5 Electrical installations and equipment fitted on an open container may not be connected with removable electrical cables in accordance with the provisions of 9.1.0.53.5 or be used unless they are appropriate at least for use in zone 1 and they comply with the requirements for temperature class T4 and explosion group II B, or the container is loaded in a hold free of containers containing substances mentioned in 7.1.4.4.4 (b).

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7.1.4.5 ***Prohibition of mixed loading (seagoing vessels; inland navigation vessels carrying containers)***

For seagoing vessels and inland waterway vessels, where the latter only carry containers, the prohibition of mixed loading shall be deemed to have been met if the stowage and segregation requirements of the IMDG Code have been complied with.

7.1.4.6 *(Reserved)*

7.1.4.7 ***Places of loading and unloading***

7.1.4.7.1 The dangerous goods shall be loaded or unloaded only at the places designated or approved for this purpose by the competent authority. In those places the means of evacuation mentioned in subsection 7.1.4.77 should be made available. Otherwise trans-shipment is permitted only with the authorization of the competent authority.

7.1.4.7.2 When substances or articles of Class 1 and substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 are on board, no goods of any kind may be loaded or unloaded except at the places designated or permitted for this purpose by the competent authority.

7.1.4.7.3 If a zone is assigned onshore at the loading or unloading station, the vessel is only authorized to stay in its immediate vicinity or within the zone if it meets the requirements of 9.1.0.12.3 (b) or (c), 9.1.0.51, 9.1.0.52.1 and 9.1.0.52.2. The competent authority may allow exceptions in individual cases.

7.1.4.8 ***Time and duration of loading and unloading operations***

7.1.4.8.1 Loading and unloading operations of substances or articles of Class 1 and substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 shall not start without permission in writing from the competent authority. This provision also applies to loading or unloading of other goods when substances or articles of Class 1 or substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 are on board.

7.1.4.8.2 Loading and unloading operations of substances or articles of Class 1 and substances of Classes 4.1 or 5.2, for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2, shall be suspended in the event of a storm.

7.1.4.9 ***Cargo transhipment operations***

Partial or complete cargo transhipment into another vessel without permission from the competent authority is prohibited outside a cargo transhipment place approved for this purpose.

Note: *For transhipment to means of transport of another mode see 7.1.4.7.1.*

7.1.4.10 ***Precautions with respect to foodstuffs, other articles of consumption and animal feeds***

7.1.4.10.1 When special provision 802 is indicated for a dangerous good in column (6) of Table A of Chapter 3.2, precautions shall be taken as follows with respect to foodstuffs, other articles of consumption and animal feeds:

Packages as well as uncleaned empty packagings, including large packagings and intermediate bulk containers (IBCs), bearing labels conforming to models Nos. 6.1 or 6.2, and those bearing labels of Class 9, containing substances of Class 9, UN Nos. 2212, 2315, 2590, 3151, 3152 or 3245, shall not be stacked on or loaded in immediate proximity to

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packages known to contain foodstuffs, other articles of consumption or animal feeds in the same hold and at places of loading and unloading or trans-shipment.

When these packages, bearing the said labels, are loaded in immediate proximity of packages known to contain foodstuffs, other articles of consumption or animal feeds, they shall be kept apart from the latter:

(a) by complete partitions which should be as high as the packages bearing the said labels; or

(b) by packages not bearing labels conforming to models Nos. 6.1, 6.2 or 9 or packages bearing labels of Class 9 but not containing substances of that class, UN Nos. 2212, 2315, 2590, 3151, 3152 or 3245; or

(c) by a space of at least 0.8 m;

unless the packages bearing said labels are provided with an additional packaging or are completely covered (e.g. by a sheeting, a fibreboard cover or other measures).

7.1.4.11 ***Stowage plan***

7.1.4.11.1 The master shall enter on a stowage plan the dangerous goods stowed in the individual holds or on deck. The goods shall be described as in the transport document in accordance with 5.4.1.1.1 (a), (b), (c) and (d).

7.1.4.11.2 Where the dangerous goods are transported in containers, the number of the container shall suffice. In this case, the stowage plan shall contain as an annex a list of all containers with their numbers and the description of the goods contained therein in accordance with 5.4.1.1.1 (a), (b), (c) and (d).

7.1.4.12 ***Ventilation***

7.1.4.12.1 During loading or unloading of road vehicles into or from the holds of ro-ro-vessels, there shall be not less than five changes of air per hour based upon the total volume of the empty hold.

7.1.4.12.2 On board vessels carrying dangerous goods only in containers placed in open holds, ventilators do not require to be incorporated but must be on board. Where damage of the container or release of content inside the container is suspected, the holds shall be ventilated so as to reduce the concentration of flammable gases and vapours given off by the cargo to less than 10% of the LEL or in the case of toxic gases and vapours to below national accepted exposure levels.

7.1.4.12.3 If tank-containers, portable tanks, MEGCs, tank vehicles or tank wagons are carried in closed holds, such holds shall be permanently ventilated for ensuring five air changes per hour.

7.1.4.13 ***Measures to be taken before loading***

The holds and cargo areas shall be cleaned prior to loading. The holds shall be ventilated.

7.1.4.14 ***Handling and stowage of the cargo***

7.1.4.14.1 The various components of the cargo shall be stowed such as to prevent them from shifting in relation to one another or to the vessel and such that no damage can be caused by other cargo.

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7.1.4.14.1.1 Packages containing dangerous substances and unpackaged dangerous articles shall be secured by suitable means capable of restraining the goods (such as fastening straps, sliding slatboards, adjustable brackets) in a manner that will prevent any movement during carriage which would change the orientation of the packages or cause them to be damaged. When dangerous goods are carried with other goods (e.g. heavy machinery or crates), all goods shall be securely fixed or packed so as to prevent the release of dangerous goods. Movement of packages may also be prevented by filling any voids by the use of dunnage or by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation of the package. Flexible bulk containers shall be stowed in such way that there are no void spaces between them in the hold. If the flexible bulk containers do not completely fill the hold, adequate measures shall be taken to avoid shifting of cargo.

7.1.4.14.1.2 Packages shall not be stacked unless designed for that purpose. Where different design types of packages that have been designed for stacking are to be loaded together, consideration shall be given to their compatibility for stacking with each other. Where necessary, stacked packages shall be prevented from damaging the package below by the use of load-bearing devices. Flexible bulk containers may be stacked on each other in holds provided that the stacking height does not exceed three high. When flexible bulk containers are fitted with venting devices, the stowage of the flexible bulk containers shall not impede their function.

7.1.4.14.1.3 During loading and unloading, packages containing dangerous goods shall be protected from being damaged.

NOTE: *Particular attention shall be paid to the handling of packages during their preparation for carriage, the type of vessel on which they are to be carried and to the method of loading or unloading, so that accidental damage is not caused through dragging or mishandling the packages.*

7.1.4.14.1.4 When orientation arrows are required, packages and overpacks shall be oriented in accordance with such markings.

NOTE: *Liquid dangerous goods shall be loaded below dry dangerous goods whenever practicable.*

7.1.4.14.2 Dangerous goods shall be stowed at a distance of not less than 1 m from the accommodation, the engine rooms, the wheelhouse and any sources of heat.

When the accommodation or wheelhouse is situated above a hold, dangerous goods shall in no case be stowed beneath such accommodation or wheelhouse.

7.1.4.14.3 Packages shall be protected against heat, sunlight and the effects of the weather. This provision does not apply to vehicles, wagons, tank-containers, portable tanks, MEGCs and containers.

Where packages are not enclosed in vehicles, wagons or containers but loaded on deck, they shall be covered with tarpaulins that are not readily flammable.

The ventilation shall not be obstructed.

7.1.4.14.4 The dangerous goods shall be stowed in the holds. However, dangerous goods packed or loaded in:

– closed containers;

– MEGCs;

– sheeted vehicles or sheeted wagons;

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– tank-containers or portable tanks;

– tank vehicles or tank wagons;

may be carried on deck in the protected area.

7.1.4.14.5 Packages containing dangerous goods of Classes 3, 4.1, 4.2, 5.1 or 8 may be stowed on deck in the protected area provided that drums are used or that they are contained in containers with complete walls or vehicles or wagons with complete walls. Substances of Class 2 may be stowed on deck in the protected area, provided they are contained in cylinders.

7.1.4.14.6 For seagoing vessels, the stowage requirements set out in 7.1.4.14.1 to 7.1.4.14.5 above and 7.1.4.14.7 below shall be deemed to have been met, if the relevant stowage provisions of the IMDG Code and, in the case of carriage of dangerous goods in bulk, those set out in subsection 9.3 of the IMSBC Code have been complied with.

7.1.4.14.7 *Handling and stowage of radioactive material*

NOTE 1: *"Critical group" means a group of members of the public which is reasonably homogeneous with respect to its exposure for a given radiation source and given exposure pathway and is typical of individuals receiving the highest effective dose by the given exposure pathway from the given source.*

NOTE 2: *"Members of the public" means in a general sense, any individuals in the population except when subject to occupational or medical exposure.*

NOTE 3: *"Workers" are any persons who work, whether full time, part-time or temporarily, for an employer and who have recognized rights and duties in relation to occupational radiation protection.*

7.1.4.14.7.1 *Segregation*

7.1.4.14.7.1.1 Packages, overpacks, containers, tanks and vehicles and wagons containing radioactive material and unpackaged radioactive material shall be segregated during carriage:

(a) from workers in regularly occupied working areas;

(i) in accordance with Table A below; or

(ii) by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;

NOTE: *Workers subject to individual monitoring for the purposes of radiation protection shall not be considered for the purposes of segregation.*

(b) from members of the critical group of the public, in areas where the public has regular access;

(i) in accordance with Table A below; or

(ii) by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters;

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(c) from undeveloped photographic film and mailbags;

(i) in accordance with Table B below; or

(ii) by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of radioactive material for 0.1 mSv per consignment of such film; and

NOTE: *Mailbags shall be assumed to contain undeveloped film and plates and therefore be separated from radioactive material in the same way.*

(d) from other dangerous goods in accordance with 7.1.4.3.

Table A: Minimum distances between packages of category II-YELLOW or of category III-YELLOW and persons

Sum of transport indexes not more than	Exposure time per year (hours)			
	Areas where members of the public have regular access		Regularly occupied working areas	
	50	250	50	250
	Segregation distance in metres, no shielding material intervening, from:			
2	1	3	0.5	1
4	1.5	4	0.5	1.5
8	2.5	6	1.0	2.5
12	3	7.5	1.0	3
20	4	9.5	1.5	4
30	5	12	2	5
40	5.5	13.5	2.5	5.6
50	6.5	15.5	3	6.5

Table B: Minimum distances between packages of category II-YELLOW or of category III-YELLOW and packages bearing the word "FOTO", or mailbags

Total number of packages not more than		Sum of transport indexes not more than	Journey or storage duration, in hours							
Category			1	2	4	10	24	48	120	240
III-yellow	II-yellow		Minimum distances in metres							
		0.2	0.5	0.5	0.5	0.5	1	1	2	3
		0.5	0.5	0.5	0.5	1	1	2	3	5
	1	1	0.5	0.5	1	1	2	3	5	7
	2	2	0.5	1	1	1.5	3	4	7	9
	4	4	1	1	1.5	3	4	6	9	13
	8	8	1	1.5	2	4	6	8	13	18
1	10	10	1	2	3	4	7	9	14	20
2	20	20	1.5	3	4	6	9	13	20	30
3	30	30	2	3	5	7	11	16	25	35
4	40	40	3	4	5	8	13	18	30	40
5	50	50	3	4	6	9	14	20	32	45

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7.1.4.14.7.1.2 Category II-YELLOW or III-YELLOW packages or overpacks shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such packages or overpacks.

7.1.4.14.7.1.3 No persons other than the master of the vessel or the driver of the vehicle embarked, persons who are on board for duty reasons and the other members of the crew shall be permitted in vessels carrying packages, overpacks or containers bearing category II-YELLOW or III-YELLOW labels.

7.1.4.14.7.2 *Activity limits*

The total activity in a single hold or compartment of a vessel, or in another conveyance, for carriage of LSA material or SCO articles in Type IP-1, Type IP-2, Type IP-3 or unpackaged, shall not exceed the limits shown in Table C below:

Table C: Conveyance activity limits for LSA material and SCO in industrial packages or unpackaged

Nature of material or articles	Activity limit for conveyances other than by vessel	Activity limit for a hold or compartment of a vessel
LSA-I	No limit	No limit
LSA-II and LSA-III non-combustible solids	No limit	$100A_2$
LSA-II and LSA-III combustible solids, and all liquids and gases	$100A_2$	$10A_2$
SCO	$100A_2$	$10A_2$

7.1.4.14.7.3 *Stowage during carriage and storage in transit*

7.1.4.14.7.3.1 Consignments shall be securely stowed.

7.1.4.14.7.3.2 Provided that its average surface heat flux does not exceed $15W/m^2$ and that the immediately surrounding cargo is not in bags, a package or overpack may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the competent authority in an applicable approval certificate.

7.1.4.14.7.3.3 Loading of containers and accumulation of packages, overpacks and containers shall be controlled as follows:

(a) Except under the conditions of exclusive use, and for consignments of LSA-I material, the total number of packages, overpacks and containers aboard a single conveyance shall be so limited that the total sum of the transport indexes aboard the conveyance does not exceed the values shown in Table D below;

(b) The radiation level under routine conditions of carriage shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the conveyance, except for consignments carried under exclusive use, for which the radiation limits around the conveyance are set forth in 7.1.4.14.7.3.5 (b) and (c);

(c) The total sum of the criticality safety indexes in a container and aboard a conveyance shall not exceed the values shown in Table E below.

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Table D: Transport Index limits for containers and conveyances not under exclusive use

Type of container or conveyance	Limit on total sum of transport indexes in a container or aboard a conveyance
Small container	50
Large container	50
Vehicle or wagon	50
Vessel	50

Table E: Criticality Safety Index for containers and vehicles containing fissile material

Type of container or conveyance	Limit on total sum of criticality safety indexes	
	Not under exclusive use	Under exclusive use
Small container	50	n.a.
Large container	50	100
Vehicle or wagon	50	100
Vessel	50	100

7.1.4.14.7.3.4 Any package or overpack having either a transport index greater than 10, or any consignment having a criticality safety index greater than 50, shall be carried only under exclusive use.

7.1.4.14.7.3.5 For consignments under exclusive use in vehicles or wagons, the radiation level shall not exceed:

(a) 10 mSv/h at any point on the external surface of any package or overpack, and may only exceed 2 mSv/h provided that:

(i) the vehicle or wagon is equipped with an enclosure which, during routine conditions of carriage, prevents the access of unauthorized persons to the interior of the enclosure;

(ii) provisions are made to secure the package or overpack so that its position within the vehicle or wagon enclosure remains fixed during routine conditions of carriage; and

(iii) there is no loading or unloading during the shipment;

(b) 2 mSv/h at any point on the outer services of the vehicle or wagon, including the upper and lower surfaces, or, in the case of an open vehicle or wagon, at any point on the vertical planes projected from the outer edges of the vehicle or wagon, on the upper surface of the load, and on the lower external surface of the vehicle or wagon; and

(c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the vehicle or wagon, or, if the load is carried in an open vehicle or wagon, at any point 2 m from the vertical planes projected from the outer edges of the vehicle or wagon.

7.1.4.14.7.3.6 Packages or overpacks having a surface radiation level greater than 2 mSv/h, unless being carried in or on a vehicle or wagon under exclusive use and unless they are not removed from the vehicle or wagon when on board the vessel shall not be transported by vessel except under special arrangement.

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7.4.1.14.7.3.7 The transport of consignments by means of a special use vessel which, by virtue of its design, or by reason of its being chartered, is dedicated to the purpose of carrying radioactive material, shall be excepted from the requirements specified in 7.1.4.14.7.3.3 provided that the following conditions are met:

(a) A radiation protection programme for the shipment shall be approved by the competent authority of the flag state of the vessel and, when requested, by the competent authority at each port of call of the transit countries;

(b) Stowage arrangements shall be predetermined for the whole voyage including any consignments to be loaded at ports of call en route; and

(c) The loading, carriage and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive material.

7.1.4.14.7.4 *Segregation of packages containing fissile material during carriage and storage in transit*

7.1.4.14.7.4.1 Any group of packages, overpacks, and containers containing fissile material stored in transit in any one storage area shall be so limited that the total sum of the criticality safety indexes in the group does not exceed 50. Each group shall be stored so as to maintain a spacing of at least 6 m from other such groups.

7.1.4.14.7.4.2 Where the total sum of the criticality safety indexes on board a vehicle, a wagon or in a container exceeds 50, as permitted in Table E above, storage shall be such as to maintain a spacing of at least 6 m from other groups of packages, overpacks or containers containing fissile material or other vehicles or wagons carrying radioactive material. The space between such groups may be used for other dangerous goods of ADN. The carriage of other goods with consignments under exclusive use is permitted provided that the pertinent provisions have been taken by the consignor and that carriage is not prohibited under other requirements.

7.1.4.14.7.4.3 Fissile material meeting one of the provisions (a) to (f) of 2.2.7.2.3.5 shall meet the following requirements:

(a) Only one of the provisions (a) to (f) of 2.2.7.2.3.5 is allowed per consignment;

(b) Only one approved fissile material in packages classified in accordance with 2.2.7.2.3.5 (f) is allowed per consignment unless multiple materials are authorized in the certificate of approval;

(c) Fissile material in packages classified in accordance with 2.2.7.2.3.5 (c) shall be carried in a consignment with no more than 45 g of fissile nuclides;

(d) Fissile material in packages classified in accordance with 2.2.7.2.3.5 (d) shall be carried in a consignment with no more than 15 g of fissile nuclides;

(e) Unpackaged or packaged fissile material classified in accordance with 2.2.7.2.3.5 (e) shall be carried under exclusive use on a vehicle with no more than 45 g of fissile nuclides.

7.1.4.14.7.5 *Damaged or leaking packages, contaminated packagings*

7.1.4.14.7.5.1 If it is evident that a package is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package shall be restricted and a qualified person shall, as soon as possible, assess the extent of contamination and the resultant radiation level of the package. The scope of the assessment shall include the package, the vehicle, the wagon, the vessel, the adjacent loading and unloading areas, and, if necessary, all other material which has been carried in the vessel. When necessary, additional steps for

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the protection of persons, property and the environment, in accordance with provisions established by the competent authority, shall be taken to overcome and minimize the consequences of such leakage or damage.

7.1.4.14.7.5.2 Packages damaged or leaking radioactive contents in excess of allowable limits for normal conditions of carriage may be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.

7.1.4.14.7.5.3 Vehicles, wagons, vessels and equipment used regularly for the carriage of radioactive material shall be periodically checked to determine the level of contamination. The frequency of such checks shall be related to the likelihood of contamination and the extent to which radioactive material is carried.

7.1.4.14.7.5.4 Except as provided in paragraph 7.1.4.14.7.5.6, any vessel, or equipment or part thereof which has become contaminated above the limits specified in 7.1.4.14.7.5.5 in the course of carriage of radioactive material, or which shows a radiation level in excess of 5 μSv/h at the surface, shall be decontaminated as soon as possible by a qualified person and shall not be re-used unless the following conditions are fulfilled:

(a) the non-fixed contamination shall not exceed the limits specified in 4.1.9.1.2 of ADR;

(b) the radiation level resulting from the fixed contamination shall not exceed 5 μSv/h at the surface.

7.1.4.14.7.5.5 For the purposes of 7.1.4.14.7.5.4, non-fixed contamination shall not exceed:

– 4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters;

– 0.4 Bq/cm^2 for all other alpha emitters.

These are average limits applicable to any area of 300 cm^2 on any part of the surface.

7.1.4.14.7.5.6 Vessels dedicated to the carriage of radioactive material under exclusive use shall be excepted from the requirements of the previous paragraph 7.1.4.14.7.5.4 solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.

7.1.4.14.7.6 *Limitation of the effect of temperature*

7.1.4.14.7.6.1 If the temperature of the accessible outer surfaces of a Type B (U) or Type B (M) package could exceed 50 ºC in the shade, carriage is permitted only under exclusive use. As far as practicable, the surface temperature shall be limited to 85 ºC. Account may be taken of barriers or screens intended to give protection to transport workers without the barriers or screens being subject to any test.

7.1.4.14.7.6.2 If the average heat flux from the external surfaces of a Type B (U) or B (M) package could exceed 15 W/m^2, the special stowage requirements specified in the competent authority package design approval certificate shall be met.

7.1.4.14.7.7 *Other provisions*

If neither the consignor nor the consignee can be identified or if the consignment cannot be delivered to the consignee and the carrier has no instructions from the consignor the consignment shall be placed in a safe location and the competent authority shall be informed as soon as possible and a request made for instructions on further action.

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7.1.4.15 ***Measures to be taken after unloading***

7.1.4.15.1 After unloading the holds shall be inspected and cleaned if necessary. In the case of carriage in bulk, this requirement does not apply if the new cargo comprises the same goods as the previous cargo.

7.1.4.15.2 For material of Class 7 see also 7.1.4.14.7.5.

7.1.4.15.3 A cargo transport unit or hold space which has been used to carry infectious substances shall be inspected for release of the substance before re-use. If the infectious substances were released during carriage, the cargo transport unit or hold space shall be decontaminated before it is re-used. Decontamination may be achieved by any means which effectively inactivates the released infectious substance.

7.1.4.16 ***Measures to be taken during loading, carriage, unloading and handling of the cargo***

The filling or emptying of receptacles, tank vehicles, tank wagons, intermediate bulk containers (IBCs), large packagings, MEGCs, portable tanks or tank-containers on board the vessel is prohibited without special permission from the competent authority.

7.1.4.17 to 7.1.4.40 *(Reserved)*

7.1.4.41 ***Fire and naked light***

The use of fire or naked light is prohibited while substances or articles of Divisions 1.1, 1.2, 1.3, 1.5 or 1.6 of Class 1 are on board and the holds are open or the goods to be loaded are located at a distance of less than 50 m from the vessel.

7.1.4.42 to 7.1.4.50 *(Reserved)*

7.1.4.51 ***Electrical equipment***

The use of radiotelephone or radar transmitters is not permitted while substances or articles of Divisions 1.1, 1.2, 1.3, 1.5 or 1.6 of Class 1 are being loaded or unloaded.

This shall not apply to VHF-transmitters of the vessel, in cranes or in the vicinity of the vessel, provided the power of the VHF-transmitter does not exceed 25 W and no part of its aerial is located at a distance less than 2.00 m from the substances or articles mentioned above.

7.1.4.52 *(Reserved)*

7.1.4.53 ***Lighting***

If loading or unloading is performed at night or in conditions of poor visibility, effective lighting shall be provided.

If provided from the deck, it shall be effected by properly secured electric lamps which shall be positioned in such a way that they cannot be damaged.

Where these lamps are positioned on deck in zone 2, they must conform to the requirements for use in zone 2.

7.1.4.54 to 7.1.4.74 *(Reserved)*

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7.1.4.75 ***Risk of sparking***

All electrically continuous connections between the vessel and the shore shall be so designed that they do not present a source of ignition. If substances are carried that have in column (9) of Table A of Chapter 3.2 an entry “EX”, then taking off clothes not sufficiently dissipative shall be prohibited in the protected area.

7.1.4.76 ***Synthetic ropes***

During loading or unloading operations, the vessel may be moored by means of synthetic ropes only when steel cables are used to prevent the vessel from going adrift.

Steel cables sheathed in synthetic material or natural fibres are considered as equivalent when the minimum tensile strength required in accordance with the Regulations referred to in 1.1.4.6 is obtained from the steel strands.

However, during loading or unloading of containers, vessels may be moored by means of synthetic ropes.

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7.1.4.77 Possible means of evacuation in case of an emergency

		Dry cargo bulk (vessel and barge)		Container (vessel and barge) and packaged goods
		Class		Class
		4.1, 4.2, 4.3	5.1, 6.1, 7, 8, 9	All classes
1	Two escape routes inside or outside the protected area in opposite directions	•	•	•
2	One escape route outside the protected area and one safe haven outside the vessel including the escape route towards it at the opposite end	•	•	•
3	One escape route outside the protected area and one safe haven on the vessel at the opposite end	•	•	•
4	One escape route outside the protected area and one life boat at the opposite end	•	•	•
5	One escape route outside the protected cargo area and one escape boat at the opposite end	•	•	•
6	One escape route inside the protected area and one escape route outside the cargo area at the opposite end	•	•	•
7	One escape route inside the protected area and one safe haven outside the vessel in the opposite direction	•	•	•
8	One escape route inside the protected area and one safe haven on the vessel in the opposite direction	•	•	•
9	One escape route inside the protected cargo area and one life boat at the opposite end	•	•	•
10	One escape route inside the protected area and one escape boat at the opposite end	•	•	•
11	One escape route inside or outside the protected cargo area and two safe havens on the vessel at opposite ends	•	•	•
12	One escape route inside or outside the protected area and two safe areas on the vessel at opposite ends	•	•	•
13	One escape route outside the protected area	•	•	•
14	One escape route inside the protected area	•	•	•
15	One or more safe havens outside the vessel, including the escape route towards it	•	•	•
16	One or more safe havens on the vessel		•	•
17	One or more escape boats	•	•	•
18	One escape boat and one evacuation boat	•	•	•
19	One or more evacuation boats		•	•

• = *Possible option.*

Based on local circumstances, competent authorities may prescribe additional requirements for the availability of means of evacuation.

7.1.4.78 to 7.1.4.99 *(Reserved)*

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7.1.5 Additional requirements concerning the operation of vessels

7.1.5.0 *Marking*

7.1.5.0.1 Vessels carrying dangerous goods listed in Table A of Chapter 3.2 shall, in accordance with Chapter 3 of the European Code for Inland Waterways (CEVNI), display the markings prescribed in column (12) in this table.

7.1.5.0.2 Vessels carrying the dangerous goods listed in Table A of Chapter 3.2 in packages placed exclusively in containers shall display the number of blue cones or blue lights indicated in column (12) of Table A of Chapter 3.2 where:

– three blue cones or three blue lights are required; or

– two blue cones or two blue lights are required, a substance of Class 2 is involved or packing group I is indicated in column (4) of Table A of Chapter 3.2 and the total gross mass of these dangerous goods exceeds 30 000 kg; or

– one blue cone or one blue light is required, a substance of Class 2 is involved or packing group I is indicated in column (4) of Table A of Chapter 3.2 and the total gross mass of these dangerous goods exceeds 130 000 kg.

7.1.5.0.3 Vessels carrying empty, uncleaned tanks, battery vehicles, battery wagons or MEGCs shall display the marking referred to in column (12) of Table A of Chapter 3.2 if these cargo transport units have contained dangerous goods for which this table prescribes marking.

7.1.5.0.4 Where more than one marking could apply to a vessel, only the marking which includes the greatest number of blue cones or blue lights shall apply, i.e. in the following order of precedence:

– three blue cones or three blue lights; or

– two blue cones or two blue lights; or

– one blue cone or one blue light.

7.1.5.0.5 By derogation from paragraph 7.1.5.0.1, and in accordance with the footnotes to article 3.14 of the European Code for Inland Waterways (CEVNI), the competent authority of a Contracting Party may authorize seagoing vessels temporarily operating in an inland navigation area on the territory of this Contracting Party, the use of the day and night signals prescribed in the Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas adopted by the Maritime Safety Committee of the International Maritime Organization (by night an all-round fixed red light and by day flag “B” of the International Code of Signals), instead of the signals prescribed in 7.1.5.0.1. Contracting Parties which have taken the initiative with respect to the derogation granted shall notify the Executive Secretary of the UNECE, who shall bring this derogation to the attention of the Administrative Committee.

7.1.5.1 *Mode of navigation*

7.1.5.1.1 The competent authorities may impose restrictions on the inclusion of vessels carrying dangerous goods in pushed conveys of large dimension.

7.1.5.1.2 When vessels carry substances or articles of Class 1, or substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2, or material of Class 7 of UN Nos. 2912, 2913, 2915, 2916, 2917, 2919, 2977, 2978 or 3321 to 3333, the competent authority may impose restrictions on the

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dimensions of convoys or side-by-side formations. Nevertheless, the use of a motorized vessel giving temporary towing assistance is permitted.

7.1.5.2 ***Vessels under way***

Vessels carrying substances or articles of Class 1, or substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2, when under way shall keep not less than 50 m away from any other vessel, if possible.

7.1.5.3 ***Mooring***

Vessels shall be moored securely, but in such a way that they can be released quickly in an emergency and that the electric cables are not compressed, folded or subject to tensile strain.

7.1.5.4 ***Berthing***

7.1.5.4.1 The distances to be kept by vessels carrying dangerous goods at berth from other vessels shall not be less than the distance prescribed by the Regulations referred to in 1.1.4.6.

7.1.5.4.2 An expert in accordance with 8.2.1.2 shall be permanently on board berthed vessels for which marking is prescribed in column (12) of Table A of Chapter 3.2.

The competent authority may, however, exempt from this obligation those vessels which are berthed in a harbour basin or in an accepted berthing position.

7.1.5.4.3 Outside the berthing areas specifically designated by the competent authority, the distances to be kept by berthed vessels shall not be less than:

– 100 m from residential areas, civil engineering structures or storage tanks, if the vessel is required to be marked with one blue cone or one blue light in accordance with the requirements of column (12) of Table A of Chapter 3.2;

– 100 m from civil engineering structures and storage tanks and 300 m from residential areas if the vessel is required to be marked with two blue cones or two blue lights in accordance with the requirements of column (12) of Table A of Chapter 3.2;

– 500 m from residential areas, civil engineering structures and storage tanks holding gas or flammable liquids if the vessel is required to be marked with three blue cones or three blue lights in accordance with the requirements of column (12) of Table A of Chapter 3.2.

While waiting in front of locks or bridges, vessels are allowed to keep distances different from and lower than those given above. In no case shall the distance be less than 100 m.

7.1.5.4.4 The competent authority may prescribe distances lower than those given in 7.1.5.4.3 above, especially taking local conditions into account.

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7.1.5.5 ***Stopping of vessels***

If navigation of a vessel carrying substances and articles of Class 1 or substances of Class 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 threatens to become dangerous owing either to:

– external factors (bad weather, unfavourable conditions of the waterway, etc.); or

– the condition of the vessel itself (accident or incident);

the vessel shall be stopped at a suitable berthing area as far away as possible from residential areas, harbours, civil engineering structures or storage tanks for gas or flammable liquids, regardless of the provisions set out in 7.1.5.4.

The competent authority shall be notified without delay.

7.1.5.6 and 7.1.5.7 *(Reserved)*

7.1.5.8 ***Reporting duty***

7.1.5.8.1 In the States where the reporting duty is in force, the master of the vessel shall provide information in accordance with paragraph 1.1.4.6.1.

7.1.5.8.2 to 7.1.5.8.4 (*Deleted*)

7.1.5.9 to 7.1.5.99 *(Reserved)*

7.1.6 Additional requirements

7.1.6.1 to 7.1.6.10 *(Reserved)*

7.1.6.11 ***Carriage in bulk***

The following additional requirements shall be met when they are indicated in column (11) of Table A of Chapter 3.2:

CO01: The surfaces of holds shall be coated or lined such that they are not readily flammable and not liable to impregnation by the cargo.

CO02: Any part of the holds and of the hatchway covers which may come into contact with this substance shall consist of metal or of wood having a specific density of not less than 750 kg/m^3 (seasoned wood).

CO03: The inner surfaces of holds shall be lined or coated so as to prevent corrosion.

ST01: The substances shall have been stabilized in accordance with the requirements applicable to ammonium nitrate fertilizers set out in the IMSBC Code. Stabilizing shall be certified by the consignor in the transport document.

In those States where this is required, these substances may be carried in bulk only with the approval of the competent authority.

ST02: These substances may be carried in bulk if the results of the trough test according to subsection 38.2 of the *Manual of Tests and Criteria* show that the self-sustaining decomposition rate is not greater than 25 cm/h.

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RA01: The materials may be carried in bulk provided that:

(a) for materials other than natural ores, carriage is under exclusive use and there is no escape of contents out of the vessel and no loss of shielding under normal conditions of transport; or

(b) for natural ores, carriage is under exclusive use.

RA02: The materials may be carried in bulk provided that:

(a) they are carried in a vessel so that, under normal conditions of transport, there is no escape of contents or loss of shielding;

(b) they are carried under exclusive use if the contamination on the accessible and inaccessible surfaces is greater than 4 Bq/cm^2 (10^{-4} μCi/cm^2) for beta and gamma emitters and low toxicity alpha emitters or 0.4 Bq/cm^2 (10^{-5} μCi/cm^2) for all other alpha emitters;

(c) measures are taken to ensure that radioactive material is not released into the vessel, if it is suspected that non-fixed contamination exists on inaccessible surfaces of more than 4 Bq/cm^2 (10^{-4} μCi/cm^2) for beta and gamma emitters and low toxicity alpha emitters or 0.4 Bq/cm^2 (10^{-5} μCi/cm^2) for all other alpha emitters.

Surface contaminated objects group (SCO-II) shall not be carried in bulk.

RA03: *Merged with RA02*.

7.1.6.12 ***Ventilation***

The following additional requirements shall be met when they are indicated in column (10) of Table A of Chapter 3.2:

VE01: Holds containing these substances shall be ventilated with the ventilators operating at full power, where after measurement it has been established that the concentration of flammable gases and vapours given off by the cargo exceeds 10% of the LEL. The measurement shall be carried out immediately after loading. A control measurement shall be repeated after one hour. The results of the measurement shall be recorded in writing.

VE02: Holds containing these substances shall be ventilated with the ventilators operating at full power, where after measurement it has been established that the holds are not free from toxic gases and vapours given off by the cargo. The measurement shall be carried out immediately after loading. A control measurement shall be repeated after one hour. The results of the measurement shall be recorded in writing. Alternatively, on vessels only containing these substances in containers in open holds, the holds containing such containers may be ventilated with the ventilation operating at full power only when it is suspected that the holds are not free of toxic gases and vapours given off by the cargo. Prior to unloading, the unloader shall be informed about this suspicion.

VE03: Spaces such as holds, accommodation and engine rooms, adjacent to holds containing these substances shall be ventilated.

After unloading, holds having contained these substances shall undergo forced ventilation.

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After ventilation, the concentration of flammable or toxic gases and vapours given off by the cargo in these holds shall be measured.

The results of the measurement shall be recorded in writing.

VE04 When aerosols are carried for the purposes of reprocessing or disposal under special provision 327 of Chapter 3.3, provisions of VE01 and VE02 are applied.

7.1.6.13 ***Measures to be taken before loading***

The following additional requirements shall be met when they are indicated in column (11) of Table A of Chapter 3.2:

LO01: Before these substances or articles are loaded, it shall be ensured that there are no metal objects in the hold which are not an integral part of the vessel.

LO02: These substances may be loaded in bulk only if their temperature is not above 55 °C.

LO03: Before loading these substances in bulk or unpackaged, holds should be made as dry as possible.

LO04: Any loose organic material shall be removed from holds before loading these substances in bulk.

LO05: Prior to carriage of pressure receptacles it shall be ensured that the pressure has not risen due to potential hydrogen generation.

7.1.6.14 ***Handling and stowage of cargo***

The following additional requirements shall be met when they are indicated in column (11) of Table A of Chapter 3.2:

HA01: These substances or articles shall be stowed at a distance of not less than 3.00 m from the accommodation, engine rooms, the wheelhouse and from any sources of heat.

HA02: These substances or articles shall be stowed at a distance of not less than 2.00 m from the vertical planes defined by the sides of the vessel.

HA03: Any friction, impact, jolting, overturning or dropping shall be prevented during handling of these substances or articles.

All packages loaded in the same hold shall be stowed and wedged as to prevent any jolting or friction during carriage.

Stacking of non-dangerous goods on top of packages containing these substances or articles is prohibited.

Where these substances or articles are loaded together with other goods in the same hold, these substances or articles shall be loaded after, and unloaded before, all the other goods.

There is no need for these substances or articles to be loaded after, and unloaded before, all others if these substances or articles are contained in containers.

While these substances or articles are being loaded or unloaded, no loading or unloading operations shall take place in the other holds and no filling or emptying

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of fuel tanks shall be allowed. The competent authority may, however, permit exceptions to this provision.

HA04: *Merged with HA03*.

HA05: *Merged with HA03*.

HA06: *Merged with HA03*.

HA07: It is prohibited to load or unload these substances in bulk or unpackaged if there is a danger that they may get wet because of the prevailing weather conditions.

HA08: If the packages with these substances are not contained in a container, they shall be placed on gratings and covered with waterproof tarpaulins arranged in such a way that the water drains off to the outside and the air circulation is not hindered.

HA09: If these substances are carried in bulk they shall not be loaded in the same hold together with flammable substances.

HA10: These substances shall be stowed on deck in the protected area. For seagoing vessels, the stowage requirements are deemed to be met if the provisions of the IMDG Code are complied with.

7.1.6.15 *(Reserved)*

7.1.6.16 ***Measures to be taken during loading, carriage, unloading and handling of cargo***

The following additional requirements shall be met when they are indicated in column (11) of Table A of Chapter 3.2:

IN01: After loading and unloading of these substances in bulk or unpackaged and before leaving the cargo transfer site, the concentration of flammable gases and vapours given off by the cargo in the accommodation, engine rooms and adjacent holds shall be measured by the loader or unloader or by an expert according to 8.2.1.2 using a gas detector. The results of the measurement shall be recorded in writing.

Before any person enters a hold and prior to unloading, the concentration of flammable gases and vapours given off by the cargo shall be measured by the unloader of the cargo or by an expert according to 8.2.1.2. The results of the measurement shall be recorded in writing.

The hold shall not be entered or unloading started until the concentration of flammable gases and vapours given off by the cargo in the airspace above the cargo is below 50% of the LEL.

If the concentrations of flammable gases and vapours given off by the cargo is not below 50% of the LEL safety measures shall be taken immediately by the loader, the unloader or the responsible master.

IN02: If a hold contains these substances in bulk or unpackaged, the concentration of toxic gases and vapours given off by the cargo shall be measured in all other spaces of the vessel which are used by the crew at least once every eight hours with a toximeter. The results of the measurements shall be recorded in writing.

IN03: If a hold contains these substances in bulk or unpackaged, the master shall make sure every day by checking the hold bilge wells or pump ducts that no water has entered the hold bilges.

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Water which has entered the hold bilges shall be removed immediately.

7.1.6.17 to 7.1.6.99 *(Reserved)*

7.1.7 Special provisions applicable to the carriage of self-reactive substances of Class 4.1, organic peroxides of Class 5.2 and substances stabilized by temperature control (other than self-reactive substances and organic peroxides)

7.1.7.1 All self-reactive substances, organic peroxides and polymerizing substances shall be protected from direct sunlight and all sources of heat, and placed in adequately ventilated areas.

7.1.7.2 Where a number of packages are assembled in a container or closed vehicle, the total quantity of substance, the type and number of packages and the stacking arrangement shall not create an explosion hazard.

7.1.7.3 ***Temperature control provisions***

7.1.7.3.1 These provisions apply to certain self-reactive substances when required by 2.2.41.1.17, and certain organic peroxides when required by 2.2.52.1.15 and certain polymerizing substances when required by 2.2.41.1.21 or special provision 386 of Chapter 3.3 which may only be carried under conditions where the temperature is controlled.

7.1.7.3.2 These provisions also apply to the carriage of substances for which:

(a) The proper shipping name as indicated in column (2) of Table A of Chapter 3.2 or according to 3.1.2.6 contains the word "STABILIZED"; and

(b) The SADT or SAPT determined for the substance (with or without chemical stabilization) as offered for carriage is:

(i) 50 °C or less for single packagings and IBCs; or

(ii) 45 °C or less for tanks.

When chemical inhibition is not used to stabilize a reactive substance which may generate dangerous amounts of heat and gas, or vapour, under normal carriage conditions, this substance needs to be carried under temperature control. These provisions do not apply to substances which are stabilized by the addition of chemical inhibitors such that the SADT or the SAPT is greater than that prescribed in (b) (i) or (ii), above.

7.1.7.3.3 In addition, if a self-reactive substance or organic peroxide or a substance the proper shipping name of which contains the word "STABILIZED" and which is not normally required to be carried under temperature control is carried under conditions where the temperature may exceed 55 °C, it may require temperature control.

7.1.7.3.4 The "control temperature" is the maximum temperature at which the substance can be safely carried. It is assumed that during carriage the temperature of the immediate surroundings of the package does not exceed 55 °C and attains this value for a relatively short time only during each period of 24 hours. In the event of loss of temperature control, it may be necessary to implement emergency procedures. The "emergency temperature" is the temperature at which such procedures shall be implemented.

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7.1.7.3.5 *Derivation of control and emergency temperatures*

Type of receptacle	SADT[a] /SAPT[a]	Control temperature	Emergency temperature
Single packagings and IBCs	20 °C or less over 20 °C to 35 °C over 35 °C	20 °C below SADT/SAPT 15 °C below SADT/SAPT 10 °C below SADT/SAPT	10 °C below SADT/SAPT 10 °C below SADT/SAPT 5 °C below SADT/SAPT
Tanks	≤ 45 °C	10 °C below SADT/SAPT	5 °C below SADT/SAPT

[a] i.e. the SADT/SAPT of the substance as packed for carriage.

7.1.7.3.6 The control and emergency temperatures are derived using the table in 7.1.7.3.5 from the SADT or from the SAPT which are defined as the lowest temperatures at which self-accelerating decomposition or self-accelerating polymerization may occur with a substance in the packaging, IBC or tank as used in carriage. An SADT or SAPT shall be determined in order to decide if a substance shall be subjected to temperature control during carriage. Provisions for the determination of the SADT and SAPT are given in Part II, section 28 of the Manual of Tests and Criteria.

7.1.7.3.7 Control and emergency temperatures, where appropriate, are provided for currently assigned self-reactive substances in 2.2.41.4 and for currently assigned organic peroxide formulations in 2.2.52.4.

7.1.7.3.8 The actual carriage temperature may be lower than the control temperature but shall be selected so as to avoid dangerous separation of phases.

7.1.7.4 ***Carriage under temperature control***

7.1.7.4.1 Maintenance of the prescribed temperature is an essential feature of the safe carriage of substances stabilized by temperature control. In general, there shall be:

(a) Thorough inspection of the cargo transport unit prior to loading;

(b) Instructions to the carrier about the operation of the refrigeration system including a list of the suppliers of coolant available en route;

(c) Procedures to be followed in the event of loss of control;

(d) Regular monitoring of operating temperatures; and

(e) Provision of a back-up refrigeration system or spare parts.

7.1.7.4.2 Any control and temperature sensing devices in the refrigeration system shall be readily accessible and all electrical connections weather-proof. The temperature of air space within the cargo transport unit shall be measured by two independent sensors and the output shall be recorded so that temperature changes are readily detectable. The temperature shall be checked every four to six hours and logged. When substances having a control temperature of less than +25 °C are carried, the cargo transport unit shall be equipped with visible and audible alarms, powered independently of the refrigeration system, set to operate at or below the control temperature.

7.1.7.4.3 If during carriage the control temperature is exceeded, an alert procedure shall be initiated involving any necessary repairs to the refrigeration equipment or an increase in the cooling capacity (e.g. by adding liquid or solid refrigerants). The temperature shall also be checked frequently and preparations made for implementation of the emergency procedures. If the emergency temperature is reached, the emergency procedures shall be initiated.

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7.1.7.4.4 The suitability of a particular means of temperature control for carriage depends on a number of factors. Factors to be considered include:

(a) The control temperature(s) of the substance(s) to be carried;

(b) The difference between the control temperature and the anticipated ambient temperature conditions;

(c) The effectiveness of the thermal insulation;

(d) The duration of carriage; and

(e) Allowance of a safety margin for delays.

7.1.7.4.5 Suitable methods for preventing the control temperature being exceeded are, in order of increasing control capability:

(a) Thermal insulation provided that the initial temperature of the substance(s) to be carried is sufficiently below the control temperature;

(b) Thermal insulation with coolant system provided that:

(i) An adequate quantity of non-flammable coolant (e.g. liquid nitrogen or solid carbon dioxide), allowing a reasonable margin for delay, is carried or a means of replenishment is assured;

(ii) Liquid oxygen or air is not used as coolant;

(iii) There is a uniform cooling effect even when most of the coolant has been consumed; and

(iv) The need to ventilate the transport unit before entering is clearly indicated by a warning on the door(s) of the transport unit;

(c) Thermal insulation and single mechanical refrigeration provided that for substance(s) to be carried with a flash point lower than the sum of the emergency temperature plus 5 °C explosion-proof electrical fittings, EEx IIB T3 are used within the cooling compartment to prevent ignition of flammable vapours from the substances;

(d) Thermal insulation and combined mechanical refrigeration system with coolant system; provided that:

(i) The two systems are independent of one another;

(ii) The provisions in (b) and (c) are complied with;

(e) Thermal insulation and dual mechanical refrigeration system; provided that:

(i) Apart from the integral power supply unit, the two systems are independent of one another;

(ii) Each system alone is capable of maintaining adequate temperature control; and

(iii) For substance(s) to be carried with a flash point lower than the sum of the emergency temperature plus 5 °C explosion-proof electrical fittings, EEx IIB T3 are used within the cooling compartment to prevent ignition of flammable vapours from the substances.

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7.1.7.4.6 The methods described in 7.1.7.4.5 (d) and (e) may be used for all organic peroxides and self-reactive substances and polymerizing substances.

The method described in 7.1.7.4.5 (c) may be used for organic peroxides and self-reactive substances of Types C, D, E and F and, when the maximum ambient temperature to be expected during carriage does not exceed the control temperature by more than 10 °C, for organic peroxides and self-reactive substances of Type B and polymerizing substances.

The method described in 7.1.7.4.5 (b) may be used for organic peroxides and self-reactive substances of Types C, D, E and F and polymerizing substances when the maximum ambient temperature to be expected during carriage does not exceed the control temperature by more than 30 °C.

The method described in 7.1.7.4.5 (a) may be used for organic peroxides and self-reactive substances of Types C, D, E and F and polymerizing substances when the maximum ambient temperature to be expected during carriage is at least 10 °C below the control temperature.

7.1.7.4.7 Where substances are required to be carried in insulated, refrigerated or mechanically-refrigerated vehicles or containers, these vehicles or containers shall satisfy the requirements of Chapter 9.6 of ADR.

7.1.7.4.8 If substances are contained in protective packagings filled with a coolant, they shall be loaded in closed or sheeted vehicles or closed or sheeted containers. If the vehicles or containers used are closed they shall be adequately ventilated. Sheeted vehicles and containers shall be fitted with sideboards and a tailboard. The sheets of these vehicles and containers shall be of an impermeable and non-combustible material.

7.1.7.5 to 7.1.9.99 *(Reserved)*

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CHAPTER 7.2

TANK VESSELS

7.2.0 General requirements

7.2.0.1 The provisions of 7.2.0 to 7.2.5 are applicable to tank vessels.

7.2.0.2 to 7.2.0.99 *(Reserved)*

7.2.1 Mode of carriage of goods

7.2.1.1 to 7.2.1.20 *(Reserved)*

7.2.1.21 *Carriage in cargo tanks*

7.2.1.21.1 Substances, their assignment to the various types of tank vessels and the special conditions for their carriage in these tank vessels, are listed in Table C of Chapter 3.2.

7.2.1.21.2 Substances, which according to column (6) of Table C of Chapter 3.2, have to be carried in a tank vessel of type N, open, may also be carried in a tank vessel of type N, open, with flame-arresters; type N, closed; types C or G provided that all conditions of carriage prescribed for tank vessels of type N, open, as well as all other conditions of carriage required for these substances in Table C of Chapter 3.2 are met.

7.2.1.21.3 Substances which, according to column (6) of Table C of Chapter 3.2 have to be carried in a tank vessel of type N, open, with flame-arresters, may also be carried in tank vessels of type N, closed, and types C or G provided that all conditions of carriage prescribed for tank vessels of type N, open, with flame arresters, as well as all other conditions of carriage required for these substances in Table C of Chapter 3.2 are met.

7.2.1.21.4 Substances which, according to column (6) of Table C of Chapter 3.2 have to be carried in a tank vessel of type N, closed, may also be carried in tank vessels of type C or G provided that all conditions of carriage prescribed for tank vessels of type N, closed, as well as all other conditions of carriage required for these substances in Table C of Chapter 3.2 are met.

7.2.1.21.5 Substances which, according to column (6) of Table C of Chapter 3.2 have to be carried in tank vessels of type C may also be carried in tank vessels of type G provided that all conditions of carriage prescribed for tank vessels of type C as well as all other conditions of carriage required for these substances in Table C of Chapter 3.2 are met.

7.2.1.21.6 Oily and greasy wastes resulting from the operation of the vessel may only be carried in fire-resistant receptacles, fitted with a lid, or in cargo tanks.

7.2.1.21.7 A substance which according to column (8) of Table C of Chapter 3.2 must be carried in cargo tank type 2 (integral cargo tank), may also be carried in a cargo tank type 1 (independent cargo tank) or cargo tank type 3 (cargo tank with walls distinct from the outer hull) of the vessel type prescribed in Table C or a vessel type prescribed in 7.2.1.21.2 to 7.2.1.21.5, provided that all other conditions of carriage required for this substance by Table C of Chapter 3.2 are met.

7.2.1.21.8 A substance which according to column (8) of Table C of Chapter 3.2 must be carried in cargo tank type 3 (cargo tank with walls distinct from the outer hull), may also be carried in a cargo tank type 1 (independent cargo tank) of the vessel type prescribed in Table C or a vessel type prescribed in 7.2.1.21.2 to 7.2.1.21.5 or in a type C vessel with cargo tank type 2 (integral cargo tank), provided that at least the conditions of carriage concerning the prescribed N type are met and all other conditions of carriage required for this substance by Table C of Chapter 3.2 or 7.2.1.21.2 to 7.2.1.21.5 are met.

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7.2.1.22 to 7.2.1.99 *(Reserved)*

7.2.2 Requirements applicable to vessels

7.2.2.0 *Permitted vessels*

NOTE 1: *The relief pressure of the safety valves shall be indicated in the certificate of approval (see 8.6.1.3).*

NOTE 2: *The design pressure and the test pressure of cargo tanks shall be indicated in the certificate of the recognised classification society prescribed in 9.3.1.8.1 or 9.3.2.8.1 or 9.3.3.8.1.*

NOTE 3: *Where a vessel carries cargo tanks with different valve-relief pressures, the relief pressure of each tank shall be indicated in the certificate of approval and the design and test pressures of each tank shall be indicated in the certificate of the recognised classification society.*

7.2.2.0.1 Dangerous substances may be carried in tank vessels of Types G, C or N in accordance with the requirements of sections 9.3.1, 9.3.2 or 9.3.3 respectively. The type of tank vessel to be used is specified in column (6) of Table C in chapter 3.2 and in 7.2.1.21.

NOTE: *The substances accepted for carriage in the individual vessel are listed in the vessel substance list to be drawn up by the recognised classification society (see 1.16.1.2.5).*

7.2.2.1 to 7.2.2.4 *(Reserved)*

7.2.2.5 *Instructions for the use of devices and installations*

Where specific safety rules have to be complied with when using any device or installation, instructions for the use of the particular device or installation shall be readily available for consultation at appropriate places on board in the language normally spoken on board, and also, if that language is not English, French or German, in English, French or German unless agreements concluded between the countries concerned in the transport operation provide otherwise.

7.2.2.6 *Gas detection system*

When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which n-Hexane is not representative, the gas detection system shall also be calibrated in addition according to the most critical LEL of the substances accepted for carriage on the vessel.

7.2.2.7 to 7.2.2.18 *(Reserved)*

7.2.2.19 *Pushed convoys and side-by-side formations*

7.2.2.19.1 Where at least one vessel of a convoy or side-by-side formation is required to be in possession of a certificate of approval for the carriage of dangerous goods, all vessels of such convoy or side-by-side formation shall be provided with an appropriate certificate of approval.

Vessels not carrying dangerous goods shall comply with the provisions of 7.1.2.19.

7.2.2.19.2 For the purposes of the application of this Chapter, the entire pushed convoy or side-by-side formation shall be deemed to be a single vessel.

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7.2.2.19.3 When a pushed convoy or a side-by-side formation comprises a tank vessel carrying dangerous substances, vessels used for propulsion shall meet the requirements of the following paragraphs:

1.16.1.1, 1.16.1.2, 1.16.1.3, 1.16.1.4, 7.2.2.5, 8.1.4, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 8.3.5, 9.3.3.0.1, 9.3.3.0.3 (d), 9.3.3.0.5, 9.3.3.10.1, 9.3.3.10.2, 9.3.3.10.5, 9.3.3.12.4, 9.3.3.12.6, 9.3.3.16.1, 9.3.3.16.2, 9.3.3.17.1 to 9.3.3.17.4, 9.3.3.31.1 to 9.3.3.31.5, 9.3.3.32.2, 9.3.3.34.1, 9.3.3.34.2, 9.3.3.40.1, (however, one single fire or ballast pump shall be sufficient), 9.3.3.40.2, 9.3.3.41, 9.3.3.51, 9.3.3.52.1 to 9.3.3.52.8, 9.3.3.71 and 9.3.3.74.

Vessels used only to move tank vessels where the list of substances on the vessel according to 1.16.1.2.5 contains only substances for which explosion protection is not required do not have to meet the requirements of 9.3.3.10.1, 9.3.3.10.5, 9.3.3.12.6, 9.3.3.51 and 9.3.3.52.1. In this case the following entry shall be made in the certificate of approval or provisional certificate of approval under number 5, permitted derogations: ‘Derogation from 9.3.3.10.1, 9.3.3.10.5, 9.3.3.12.6, 9.3.3.51 and 9.3.3.52.1; the vessel may only move tank vessels where the list of substances on the vessel according to 1.16.1.2.5 contains only substances for which explosion protection is not required’.

7.2.2.19.4 During loading and unloading of substances for which explosion protection is required in column (17) of Table C of Chapter 3.2, only installations and equipment that meet the requirements of 9.3.3.53 may be used on the deck of other vessels of the convoy. This condition shall not apply to:

(a) Installations and equipment of vessels linked fore or aft of the vessel which is being loaded or unloaded, if the tank vessel being loaded or unloaded is equipped with a protective wall at the respective end of the cargo area or located at a distance of at least 12.00 m from the boundary plane of the cargo area of the vessel being loaded or unloaded.

(b) Installations and equipment of tank vessels coupled side-by-side with the vessel being loaded or unloaded, if such installations or equipment are positioned behind a protective wall according to 9.3.3.10.3 and the protective wall is not next to the cargo area of the vessel being loaded or unloaded, or located at a distance of at least 12.00 m from the boundary plane of the cargo area of the vessel being loaded or unloaded.

7.2.2.20 *(Reserved)*

7.2.2.21 ***Safety and control equipment***

It shall be possible to interrupt loading or unloading of substances of Class 2 and substances assigned to UN Nos. 1280 and 2983 of Class 3 by means of switches installed at two locations on the vessel (fore and aft) and at two locations ashore (directly at the access to the vessel and at an appropriate distance on shore). Interruption of loading and unloading shall be effected by the means of a quick closing valve which shall be directly fitted to the flexible connecting hose between the vessel and the shore facility.

The system of disconnection shall be designed in accordance with the closed circuit principle.

7.2.2.22 *(Deleted)*

7.2.2.23 to 7.2.2.99 *(Reserved)*

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7.2.3 General service requirements

7.2.3.1 *Access to cargo tanks, residual cargo tanks, cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms and hold spaces; inspections*

7.2.3.1.1 The cofferdams shall be empty. They shall be inspected once a day in order to ascertain that they are dry (except for condensation water).

7.2.3.1.2 Access to the cargo tanks, residual cargo tanks, cofferdams, double-hull spaces, double bottoms and hold spaces is not permitted except for carrying out inspections or cleaning operations.

7.2.3.1.3 Access to the double-hull spaces and the double bottoms is not permitted while the vessel is under way.

7.2.3.1.4 When the concentration of flammable or toxic gases and vapours given off by the cargo or the oxygen content has to be measured before entry into cargo tanks, residual cargo tanks, cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms or hold spaces, the results of these measurements shall be recorded in writing.

The measurement may only be effected by an expert referred to in 8.2.1.2 equipped with breathing apparatus suited to the substance carried.

Entry into these spaces is not permitted for the purpose of measuring.

7.2.3.1.5 Before any person enters cargo tanks, the residual cargo tanks, the cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms, hold spaces or other confined spaces:

(a) When dangerous substances of Classes 2, 3, 4.1, 6.1, 8 or 9 for which a gas detector is required in column (18) of Table C of Chapter 3.2 are carried on board the vessel, it shall be established, by means of this device that the concentration of flammable gases and vapours given off by the cargo in these cargo tanks, residual cargo tanks, cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms, or hold spaces is not more than 50% of the LEL. For the cargo pump-rooms below deck this may be determined by means of the permanent gas detection system;

(b) When dangerous substances of Classes 2, 3, 4.1, 6.1, 8 or 9 for which a toximeter is required in column (18) of Table C of Chapter 3.2 are carried on board the vessel, it shall be established, by means of this device that the cargo tanks, residual cargo tanks, cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms or hold spaces do not contain concentration of toxic gases and vapours given off by the cargo which exceeds national accepted exposure levels.

In deviation of 1.1.4.6, more stringent national legislation on the entry into holds shall take precedence over the ADN.

7.2.3.1.6 Entry into empty cargo tanks, the residual cargo tanks, the cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms, hold spaces or other confined spaces is only permitted if:

– The concentration of flammable gases and vapours given off by the cargo in the cargo tanks, the residual cargo tanks, the cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms, hold spaces or other confined spaces, is below 10% of the LEL, the concentration of toxic gases and vapours given off by the cargo is below national accepted exposure levels, and the percentage of oxygen is between 20 and 23,5 vol %; or

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– The concentration of flammable gases and vapours given off by the cargo in the cargo tanks, the residual cargo tank, the cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms, hold spaces or other confined spaces, is below 10% of the LEL, and the person entering the spaces wears a self-contained breathing apparatus and other necessary protective and rescue equipment, and is secured by a line. Entry into these spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another two persons capable of giving assistance in an emergency shall be on the vessel within calling distance. If a rescue winch has been installed, only one other person is sufficient.

  In case of emergency or mechanical problems, it is allowed to enter the tank when the concentration of flammable gases and vapours given off by cargo is between 10 and 50% of the LEL. The breathing apparatus (self-contained) in use has to be designed in such a way that the causing of sparks is avoided.

In deviation of 1.1.4.6, more stringent national legislation on the entry into cargo tanks shall take precedence over the ADN.

7.2.3.2 ***Cargo pump-rooms below deck***

7.2.3.2.1 When carrying dangerous substances of classes 3, 4.1, 6.1, 8 or 9, the cargo pump-rooms below deck shall be inspected daily so as to ascertain that there are no leaks. The bilges and the drip pans shall be kept free from products.

7.2.3.2.2 When the gas detection system is activated, the loading and unloading operations shall be stopped immediately. All shut-off devices shall be closed and the cargo pump-rooms shall be evacuated immediately. All entrances shall be closed. The loading or unloading operations shall not be continued except when the damage has been repaired or the fault eliminated.

7.2.3.3 to 7.2.3.5 *(Reserved)*

7.2.3.6 ***Gas detection system***

The gas detection system shall be maintained and calibrated by trained and qualified personnel in accordance with the instructions of the manufacturer.

7.2.3.7 ***Degassing of empty or unloaded cargo tanks and piping for loading and unloading***

7.2.3.7.0 Degassing of empty or unloaded cargo tanks and piping for loading and unloading into the atmosphere or to reception facilities is permitted under the conditions below but only if and insofar it is not prohibited on the basis of other legal requirements.

7.2.3.7.1 *Degassing of empty or unloaded cargo tanks and piping for loading and unloading into the atmosphere*

7.2.3.7.1.1 Empty or unloaded cargo tanks having previously contained dangerous substances of:

– Class 2 or Class 3, with a classification code including the letter “T” in column (3b) of Table C of Chapter 3.2;

– Class 6.1; or

– Packing group I of Class 8;

may only be degassed by an expert according to 8.2.1.2. This may be carried out only at the locations approved by the competent authority.

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7.2.3.7.1.2 Where degassing of cargo tanks having previously contained the dangerous goods referred to in 7.2.3.7.1.1 above is not practicable at the locations approved for this purpose by the competent authority, degassing may be carried out while the vessel is under way, provided that:

– The requirements of the first paragraph of 7.2.3.7.1.3 are complied with; the concentration of flammable gases and vapours given off by the cargo in the vented mixture at the outlet shall, however, be not more than 10% of the LEL;

– The crew is not exposed to a concentration of gases and vapours which exceeds national accepted exposure levels;

– Any entrances or openings of spaces connected to the outside are closed; this provision does not apply to the air supply openings of the engine room and overpressure ventilation systems;

– Any member of the crew working on deck is wearing suitable protective equipment;

– It is not carried out within the area of locks including their lay-bys, under bridges or within densely populated areas.

7.2.3.7.1.3 Degassing of empty or unloaded cargo tanks having contained dangerous goods other than those referred to under 7.2.3.7.1.1, when the concentration of flammable gases and vapours given off by the cargo is 10% of the LEL or above, may be carried out while the vessel is underway or at locations approved by the competent authority by means of suitable venting equipment with the tank lids closed and by leading the gas/air mixtures through flame-arresters capable of withstanding steady burning (Explosion group / subgroup according to column (16) of Table C, Chapter 3.2). The concentration of flammable gases and vapours in the vented mixture at the outlet shall be less than 50% of the LEL. The suitable venting equipment may be used for degassing by extraction only when a flame-arrester is fitted immediately before the ventilation fan on the extraction side (Explosion group /subgroup according to column (16) of Table C, Chapter 3.2). The concentration of flammable gases and vapours shall be measured once each hour during the two first hours after the beginning of the degassing operation by forced ventilation or by extraction, by an expert referred to in 8.2.1.2. The results of these measurements shall be recorded in writing.

Degassing is, however, prohibited within the area of locks including their lay-bys, under bridges or within densely populated areas.

Degassing of empty or unloaded cargo tanks having contained dangerous goods other than those referred to in 7.2.3.7.1.1, when the concentration of gases and vapours given off by the cargo is below 10% of the LEL, is allowed, and also additional openings of the cargo tank are allowed to be opened as long as the crew is not exposed to a concentration of gases and vapour which exceeds national accepted exposure levels. Also, there is no obligation to use a flame arrester.

It is prohibited within the area of locks, including their lay-bys, under bridges or within densely populated areas.

7.2.3.7.1.4 Degassing operations shall be interrupted during a thunderstorm or when, due to unfavourable wind conditions, dangerous concentrations of flammable or toxic gases and vapours are to be expected outside the cargo area in front of the accommodation, the wheelhouse and service spaces. The critical state is reached as soon as concentrations given off by the cargo of flammable gases and vapours of more than 20% of the LEL or of toxic gases and vapours exceeding the national accepted exposure levels have been detected in those areas by measurements by means of portable measurement devices.

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7.2.3.7.1.5 The marking prescribed in 7.2.5.0.1 may be withdrawn by order of the master when, after degassing of the cargo tanks, it has been ascertained, using the equipment described in column (18) of Table C of Chapter 3.2, that none of the cargo tanks contain flammable gases and vapours in concentrations of more than 20% of the LEL or contain a concentration of toxic gases and vapours which exceeds national accepted exposure levels. The result of the measurement shall be recorded in writing.

7.2.3.7.1.6 Before taking measures which could cause hazards as described in 8.3.5, all cargo tanks and pipes in the cargo area shall be made gas-free. This shall be documented in a gas-free certificate, valid on the day the works commence. The condition of being gas-free may only be declared and certified by a person approved by the competent authority.

7.2.3.7.2 *Degassing of empty or unloaded cargo tanks and piping for loading and unloading to reception facilities*

7.2.3.7.2.1 Empty or unloaded cargo tanks may only be degassed by an expert according to 8.2.1.2. If required by international or national law, it may only be carried out at the locations approved by the competent authority. Degassing to a mobile reception facility while the vessel is underway, is prohibited. Degassing to a mobile reception facility is prohibited while another vessel degasses to the same facility. Degassing to an on board mobile reception facility is prohibited.

7.2.3.7.2.2 Before the degassing operation commences, the degassing vessel shall be earthed. The master of the degassing vessel or an expert according to 8.2.1.2 mandated by him and the operator of the reception facility shall have filled in and signed a checklist confirming with 8.6.4 of ADN.

The checklist shall be printed at least in languages understood by the master or the expert and the operator of the reception facility.

If a positive response to all the questions is not possible, degassing to a reception facility is only permitted with the consent of the competent authority.

7.2.3.7.2.3 Degassing to reception facilities may be carried out by using the piping for loading and unloading or the venting piping to remove the gases and vapours from the cargo tanks while using the other piping respectively to prevent exceedance of the maximum permissible overpressure or vacuum of the cargo tanks.

Piping shall be part of a closed system or, if used to prevent exceedance of the maximum permissible vacuum in the cargo tanks, be equipped with a permanently installed or portable spring-loaded low-pressure valve, with a flame-arrester (Explosion group/subgroup according to column (16) of Table C of Chapter 3.2) if explosion protection is required (column (17) of Table C of Chapter 3.2). This low-pressure valve shall be so installed that under normal working conditions the vacuum valve is not activated. A permanently installed valve or the opening to which a portable valve is connected, must remain closed with a blind flange when the vessel is not degassing to a reception facility.

All piping connected between the degassing vessel and the reception facility shall be equipped with an appropriate flame arrester if explosion protection is required in column (17) of Table C of Chapter 3.2. The requirements for piping on board shall be: Explosion group/subgroup according to column (16) of Table C of Chapter 3.2.

7.2.3.7.2.4 It shall be possible to interrupt degassing operations by means of switches installed at two locations on the vessel (fore and aft) and at two locations at the reception facility (directly at the access to the vessel and at the location from where the reception facility is operated). Interruption of degassing shall be effected by the means of a quick closing valve which shall be directly fitted in the connection between the degassing vessel and the reception facility. The system of disconnection shall be designed in accordance with the closed circuit principle

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and may be integrated in the emergency shutdown system of the cargo pumps and overfill protections prescribed in 9.3.1.21.5, 9.3.2.21.5 and 9.3.3.21.5.

Degassing operations shall be interrupted during a thunderstorm.

7.2.3.7.2.5 The marking prescribed in column (19) of Table C of Chapter 3.2 may be withdrawn by order of the master when, after degassing of the cargo tanks, it has been ascertained, using the equipment described in column (18) of Table C of Chapter 3.2, that none of the cargo tanks contain flammable gases and vapours in concentrations of more than 20% of the LEL or contain a concentration of toxic gases and vapours which exceeds national accepted exposure levels. The result of the measurement shall be recorded in writing.

7.2.3.7.2.6 Before taking measures which could cause hazards as described in 8.3.5, all cargo tanks and pipes in the cargo area shall be made gas-free. This shall be documented in a gas-free certificate, valid on the day the works commence. The condition of being gas-free may only be declared and certified by a person approved by the competent authority.

7.2.3.7.3 Where gas-freeing of cargo tanks having previously contained the dangerous goods referred to in 7.2.3.7.1 above is not practicable at the locations designated or approved for this purpose by the competent authority, gas-freeing may be carried out while the vessel is under way, provided that:

– the requirements of 7.2.3.7.2 are complied with; the concentration of dangerous substances in the vented mixture at the outlet shall, however, be not more than 10% of the lower explosive limit;

– there is no risk involved for the crew;

– any entrances or openings of spaces connected to the outside are closed; this provision does not apply to the air supply openings of the engine room and overpressure ventilation systems;

– any member of the crew working on deck is wearing suitable protective equipment;

– it is not carried out within the area of locks including their lay-bys, under bridges or within densely populated areas.

7.2.3.7.4 Gas-freeing operations shall be interrupted during a thunderstorm or when, due to unfavourable wind conditions, dangerous concentrations of gases are to be expected outside the cargo area in front of accommodation, the wheelhouse and service spaces. The critical state is reached as soon as concentrations of more than 20% of the lower explosive limit have been detected in those areas by measurements by means of portable equipment.

7.2.3.7.5 The marking prescribed in column (19) of Table C of Chapter 3.2 may be withdrawn by the master when, after gas-freeing of the cargo tanks, it has been ascertained, using the equipment described in column (18) of Table C of Chapter 3.2, that the cargo tanks no longer contain flammable gases in concentrations of more than 20% of the lower explosive limit or do not contain any significant concentration of toxic gases.

7.2.3.7.6 Before taking measures which could cause hazards as described in section 8.3.5, cargo tanks and pipes in the cargo area shall be cleaned and gas-freed. The result of the gas-freeing shall be documented in a gas-free certificate. The condition of being gas-free may only be declared and certified by a person approved by the competent authority.

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7.2.3.8 to 7.2.3.11 *(Reserved)*

7.2.3.12 *Ventilation*

7.2.3.12.1 While the machinery in the service spaces is operating, the extension ducts connected to the air inlets, if any, shall be in the upright position; otherwise the inlets shall be closed. This provision does not apply to air inlets of service spaces outside the cargo area, provided the inlets without extension duct are located not less than 0.50 m above the deck.

7.2.3.12.2 The ventilation of pump rooms shall be in operation:

– at least 30 minutes before entry and during occupation;

– during loading, unloading and degasing; and

– after the gas detection system has been activated.

7.2.3.13 and 7.2.3.14 *(Reserved)*

7.2.3.15 *Expert on board the vessel*

When dangerous substances are carried, the responsible master shall at the same time be an expert according to 8.2.1.2. In addition this expert shall be:

– An expert as referred to in 8.2.1.5 when dangerous goods are carried for which a type G tank vessel is prescribed in column (6) of Table C of Chapter 3.2; and

– An expert as referred to in 8.2.1.7 when dangerous goods are carried for which a type C tank vessel is prescribed in column (6) of Table C of Chapter 3.2.

***NOTE*:** *Which master of the vessel's crew is the responsible master shall be determined and documented on board by the carrier. If there is no such determination, the requirement applies to every master.*

By derogation from this, for the loading and unloading of dangerous goods in a tank barge, it is sufficient that the person who is responsible for loading and unloading and for ballasting of the tank barge has the expertise required according to 8.2.1.2.

During the carriage of goods for which a type C tank vessel is prescribed in column (6) of Table C of Chapter 3.2 and cargo tank type 1 in column (8), an expert referred to in 8.2.1.5 for carriage in type G vessels is sufficient.

7.2.3.16 All measurements on board the vessel shall be performed by an expert according to 8.2.1.2, unless provided otherwise in the Regulations annexed to ADN. The results of the measurements shall be recorded in writing in the book according to 8.1.2.1 (g).

7.2.3.17 to 7.2.3.19 *(Reserved)*

7.2.3.20 *Water ballast*

7.2.3.20.1 Cofferdams and hold spaces containing insulated cargo tanks shall not be filled with water. Double-hull spaces, double bottoms and hold spaces which do not contain insulated cargo tanks may be filled with ballast water provided:

– this has been taken into account in the intact and damage stability calculations; and

– the filling is not prohibited in column (20) of Table C of Chapter 3.2.

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If the water in the ballast tanks and compartments leads to the vessel no longer respecting these stability criteria:

– fixed level indicators shall be installed; or

– the filling level of the ballast tanks and compartments shall be checked daily before departure and during operations.

In case of the existence of level indicators, ballast tanks may also be partially filled. Otherwise they shall be completely full or empty.

7.2.3.20.2 (*Deleted*)

7.2.3.21 *(Reserved)*

7.2.3.22 ***Entrances to hold spaces, cargo pump-rooms below deck and cofferdams, openings of cargo tanks and residual cargo tanks; closing devices***

The cargo tanks, residual cargo tanks and entrances to cargo pump-rooms below deck, cofferdams and hold spaces shall remain closed. This requirement shall not apply to cargo pump-rooms on board oil separator and supply vessels or to the other exceptions set out in this Part.

7.2.3.23 and 7.2.3.24 *(Reserved)*

7.2.3.25 ***Connections between pipes***

7.2.3.25.1 Connecting two or more of the following groups of pipes is prohibited:

(a) piping for loading and unloading;

(b) pipes for ballasting and draining cargo tanks, cofferdams, hold spaces, double-hull spaces and double bottoms;

(c) pipes located outside the cargo area.

7.2.3.25.2 The provision of 7.2.3.25.1 above does not apply to removable pipe connections between cofferdam pipes and

– piping for loading and unloading;

– pipes located outside the cargo area while the cofferdams have to be filled with water in an emergency.

In these cases the connections shall be designed so as to prevent water from being drawn from the cargo tanks. The cofferdams shall be emptied only by means of ejectors or an independent system within the cargo area.

7.2.3.25.3 The provisions of 7.2.3.25.1 (b) and (c) above do not apply to:

– pipes intended for ballasting and draining double-hull spaces and double bottoms which do not have a common boundary with the cargo tanks;

– pipes intended for ballasting hold spaces where the pipes of the fire-fighting system within the cargo area are used for this purpose. Double-hull and double bottom spaces and hold spaces shall be stripped only by means of ejectors or an independent system within the cargo area.

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7.2.3.26 and 7.2.3.27 *(Reserved)*

7.2.3.28 *Refrigeration system*

For the carriage of refrigerated substances, an instruction shall be on board mentioning the permissible maximum loading temperature in relation to the capacity of the refrigeration system and the insulation design of the cargo tanks.

7.2.3.29 *Lifeboats*

7.2.3.29.1 The lifeboat required in accordance with the Regulations referred to in 1.1.4.6 shall be stowed outside the cargo area. The lifeboat may, however, be stowed in the cargo area provided an easily accessible collective life-saving appliance conforming to the Regulations referred to in 1.1.4.6 is available within the accommodation area. If the vessel substance list according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2,

– Outboard motors and their fuel tanks shall be carried on board only outside the cargo area; and

– Mechanical inflation devices, outboard motors and their electrical installations shall be put into operation only outside the cargo area.

7.2.3.29.2 7.2.3.29.1 above does not apply to oil separator or supply vessels.

7.2.3.30 *(Reserved)*

7.2.3.31 *Engines*

7.2.3.31.1 The use of engines running on fuels having a flashpoint equal to or lower than 55 ºC (e.g. petrol engines) is prohibited. This provision does not apply to:

– the petrol-operated outboard motors of lifeboats;

– the propulsion and auxiliary systems which meet the requirements of Chapter 30 and Annex 8, Section 1 of the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) as amended.[1]

7.2.3.31.2 The carriage of power-driven conveyances such as passenger cars and motor boats in the cargo area is prohibited.

7.2.3.32 *Oil fuel tanks*

Double bottoms with a height of at least 0.60 m may be used as oil fuel tanks, provided they have been constructed in accordance with Part 9.

7.2.3.33 to 7.2.3.40 *(Reserved)*

7.2.3.41 *Smoking, fire or naked light*

7.2.3.41.1 Smoking, including electronic cigarettes and other similar devices, fire and naked light are prohibited on board the vessel.

This prohibition shall be displayed on notice boards at appropriate places.

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[1] *As available on the website of the Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI,* https://www.cesni.eu/en/documents/es-trin/.

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The prohibition on smoking does not apply in the accommodation or the wheelhouse, provided that their windows, doors, skylights and hatches are closed or the ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa.

7.2.3.41.2 Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels.

Cooking and refrigerating appliances may only be used in the accommodation and in the wheelhouse.

7.2.3.41.3 Heating appliances or boilers fuelled with liquid fuels having a flash-point above 55° C which are installed in the engine room or in another suitable space may, however, be used.

7.2.3.42 ***Cargo heating system***

7.2.3.42.1 Heating of the cargo is not permitted except where there is risk of solidification of the cargo or where the cargo, because of its viscosity, cannot be unloaded in the usual manner.

In general, a liquid shall not be heated up to a temperature above its flash-point.

Special provisions are included in column 20 of Table C of Chapter 3.2.

7.2.3.42.2 Cargo tanks containing substances which are heated during transport shall be equipped with devices for measuring the temperature of the cargo.

7.2.3.42.3 During unloading, the cargo heating system may be used provided that the space where it has been installed meets in all respects the provisions of 9.3.2.52.3 or 9.3.3.52.3.

7.2.3.42.4 The provisions of 7.2.3.42.3 above do not apply when the cargo heating system is supplied with steam from shore and only the circulation pump is in operation, as well as when the flash-point of the cargo being unloaded is not less than 60 °C.

7.2.3.43 *(Reserved)*

7.2.3.44 ***Cleaning operations***

The use of liquids having a flash-point below 55 °C for cleaning purposes is permitted only in the explosion hazardous area.

7.2.3.45 to 7.2.3.50 *(Reserved)*

7.2.3.51 ***Electrical and non-electrical installations and equipment***

7.2.3.51.1 The electrical and non-electrical installations and equipment shall be properly maintained in a faultless condition.

7.2.3.51.2 The use of movable electric cables is prohibited in the explosion hazardous area. This provision does not apply to the movable electric cables referred to in 9.3.1.53.3, 9.3.2.53.3, and 9.3.3.53.3.

Movable electric cables must undergo visual inspection each time before use. They must be installed in such a way as to ensure that they are not at risk of damage. Connectors must be located outside of the explosion danger area.

The use of electric cables to connect the power network of a vessel to a land-based power network is not permitted:

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– During the loading or unloading of substances for which explosion protection is required in column (17) of Table C of Chapter 3.2; or

– When the vessel is located immediately adjacent to or within an onshore assigned zone.

7.2.3.51.3 The sockets for connecting the signal lights and gangway lighting or for submerged pumps on board oil separator vessels shall not be live except when the signal lights or the gangway lighting or the submerged pumps on board oil separator vessels are switched on.

Connecting or disconnecting shall not be possible except when the sockets are not live.

7.2.3.51.4 During a stay in the immediate vicinity of or within an onshore assigned zone, electrical and non-electrical installations and equipment not complying with the requirements of 9.3.x.51 (a), 9.3.x.51 (b), 9.3.x.51 (c) or 9.3.x.52.1 (marked in red according to 9.3.x.51 and 9.3.x.52.3) shall be switched off, cooled down to below the temperature mentioned in 9.3.x.51 (a) or 9.3.x.51 (b), or the measures mentioned in 7.2.3.51.6 shall be taken.

When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2, this provision applies also during loading and unloading and gas-freeing during berthing.

7.2.3.51.5 When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which the temperature classes T4, T5 or T6 are indicated in column (15) of Table C of Chapter 3.2, the corresponding surface temperatures within the assigned zones shall not exceed 135 °C (T4), 100 °C (T5) or 85 °C (T6), respectively.

7.2.3.51.6 7.2.3.51.4 and 7.2.3.51.5 do not apply in the accommodation, the wheelhouse or service spaces located outside the cargo area if:

(a) The ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa; and

(b) The gas detection system is switched on, taking measurements continuously.

7.2.3.51.7 Installations and equipment according to 7.2.3.51.4 that have been switched off during loading and unloading, gas-freeing during berthing or a stay in the vicinity of or within an onshore assigned zone may only be switched on again:

– Once the vessel is no longer in the vicinity of or within the onshore assigned zone; or

– When values corresponding to 10% of the LEL of n-Hexane or 10% of the LEL of the cargo, whichever is the more critical, are reached in the wheelhouse, accommodation and service spaces located outside the cargo area.

The results of the measurements shall be recorded in writing.

7.2.3.51.8 If vessels are not able to meet the requirements of 7.2.3.51.4 and 7.2.3.51.6, they are not permitted to remain in the immediate vicinity of or within an onshore assigned zone.

7.2.3.52 to 7.2.3.99 *(Reserved)*

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7.2.4 Additional requirements concerning loading, carriage, unloading and other handling of cargo

7.2.4.1 *Limitation of the quantities carried*

7.2.4.1.1 The carriage of packages in the cargo area is prohibited. This prohibition does not apply to:

– residual cargo, washing water, cargo residues and slops contained in no more than six approved receptacles for residual products and receptacles for slops having a maximum total capacity of not more than 12 m³. The receptacles for residual products and the receptacles for slops shall be properly secured in the cargo area, be located at a minimum distance from the hull equal to one quarter of the vessel's breadth and comply with the provisions of 9.3.2.26.3 or 9.3.3.26.3 concerning them;

– to cargo samples, up to a maximum of 30, of substances accepted for carriage in the tank vessel, where the maximum contents are 500 ml per receptacle. Receptacles shall meet the packing requirements referred to in Part 4 of ADR and shall be placed on board, at a specific point in the cargo area, such that under normal conditions of carriage they cannot break or be punctured and their contents cannot spill in the hold space. Fragile receptacles shall be suitably padded.

7.2.4.1.2 On board oil separator vessel receptacles with a maximum capacity of 2.00 m^3 oily and greasy wastes resulting from the operation of vessels may be placed in the cargo area provided that these receptacles are properly secured.

7.2.4.1.3 On board supply vessels or other vessels delivering products for the operation of vessels, packages of dangerous goods and non-dangerous goods may be carried in the cargo area up to a gross quantity of 5,000 kg provided that this possibility is mentioned in the certificate of approval. The packages shall be properly secured and shall be protected against heat, sun and bad weather.

7.2.4.1.4 On board supply vessels or other vessels delivering products for the operation of vessels, the number of cargo samples referred to in 7.2.4.1.1 may be increased from 30 to a maximum of 500.

7.2.4.2 *Reception of oily and greasy wastes resulting from the operation of vessels and delivery of products for the operation of vessels*

7.2.4.2.1 The reception of unpackaged liquid oily and greasy wastes resulting from the operation of vessels may only be effected by suction.

7.2.4.2.2 Mooring and reception of oily and greasy wastes may not take place during the loading and unloading of substances for which protection against explosion is required in column (17) of Table C of Chapter 3.2 nor during the degasing of tank vessels. This requirement does not apply to oil separator vessels provided that the provisions for protection against explosion applicable to the dangerous substance are complied with.

7.2.4.2.3 Mooring and handing over of products for the operation of vessels shall not take place during the loading or unloading of substances for which protection against explosions is required in column (17) of Table C of Chapter 3.2 nor during the degasing of tank vessels. This requirement does not apply to supply vessels provided that the provisions for protection against explosion applicable to the dangerous substance are complied with.

7.2.4.2.4 The competent authority may issue derogations to the requirements of 7.2.4.2.1 and 7.2.4.2.2 above. During unloading it may also issue derogations to 7.2.4.2.3 above.

7.2.4.3 to 7.2.4.6 *(Reserved)*

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7.2.4.7 ***Places of loading and unloading***

7.2.4.7.1 Tank vessels shall be loaded or unloaded only at the places designated or approved for this purpose by the competent authority. If a zone is assigned onshore at the loading or unloading station, the vessel is only authorized to stay in its immediate vicinity or within the zone if it meets the requirements of 9.3.x.12.4 (b) or (c), 9.3.x.51, 9.3.x.52.1 and 9.3.x.52.3. The competent authority may allow exceptions in individual cases.

7.2.4.7.2 The reception from other vessels of unpackaged oily and greasy liquid wastes resulting from the operation of vessels and the handing over of products for the operation of vessels into the bunkers of other vessels shall not be taken to be loading or unloading within the meaning of 7.2.4.7.1 above or transhipment within the meaning of 7.2.4.9.

7.2.4.8 *(Reserved)*

7.2.4.9 ***Cargo transfer operations***

Partial or complete cargo transfer into another vessel without permission from the competent authority is prohibited outside a cargo transfer place approved for this purpose.

NOTE 1: *For transhipment to means of transport of another mode see 7.2.4.7.1.*

NOTE 2: *This prohibition also applies to transhipment between supply vessels.*

7.2.4.10 ***Checklist***

7.2.4.10.1 Loading or unloading shall start only once a checklist conforming with section 8.6.3 of ADN has been completed for the cargo in question and questions 1 to 19 of the list have been checked off with an “X”. Irrelevant questions should be deleted. The list shall be completed, after the pipes intended for the handling are connected and prior to the handling, in duplicate and signed by the master or a person mandated by him and the person responsible for the handling at the shore facilities. If a positive response to all the questions is not possible, loading or unloading is only permitted with the prior consent of the competent authority.

7.2.4.10.2 The list shall conform to the model in 8.6.3.

7.2.4.10.3 The checklist shall be printed at least in languages understood by the master and the person responsible for the handling at the shore facilities.

7.2.4.10.4 The provisions of 7.2.4.10.1 to 7.2.4.10.3 above shall not apply to the reception of oily and greasy wastes by oil separator vessels nor to the handing over of products for the operation of vessels by supply vessels.

7.2.4.11 ***Loading plan***

7.2.4.11.1 (*Deleted*)

7.2.4.11.2 The master shall enter on a cargo stowage plan the goods carried in the individual cargo tanks. The goods shall be described as in the transport document (information according to 5.4.1.1.2 (a) to (d)).

7.2.4.12 ***Registration during the voyage***

The following particulars shall immediately be entered in the register referred to in 8.1.11:

Loading: Place of loading and loading berth, date and time, UN number or identification number of the substance, proper shipping name of the substance, the class and packing group if any;

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Unloading: Place of unloading and unloading berth, date and time;

Degasing of UN No. 1203 petrol: Degasing place and facility or sector, date and time.

These particulars shall be provided for each cargo tank.

7.2.4.13 Measures to be taken before loading

7.2.4.13.1 When residues of the previous cargo may cause dangerous reactions with the next cargo, any such residues shall be properly removed.

Substances which react dangerously with other dangerous goods shall be separated by a cofferdam, an empty space, a pump-room, an empty cargo tank or a cargo tank loaded with a substance which does not react with the cargo.

Where an empty, uncleaned cargo tank, or a cargo tank containing residues of previous cargo of a substance liable to react dangerously with other dangerous goods, this separation is not required if the master has taken appropriate measures to avoid a dangerous reaction.

If the vessel is equipped with piping for loading and unloading below the deck passing through the cargo tanks, the mixed loading or carriage of substances likely to react dangerously with each other is prohibited.

7.2.4.13.2 Before the start of loading operations, any prescribed safety and control devices and any items of equipment shall, if possible, be checked and controlled for proper functioning.

7.2.4.13.3 Before the start of loading operations the overflow control device switch shall be connected to the shore installation.

7.2.4.14 *Cargo handling and stowage*

Dangerous goods shall be loaded in the cargo area in cargo tanks, in cargo residue tanks or in packages permitted under 7.2.4.1.1.

7.2.4.15 *Measures to be taken after unloading (stripping system)*

7.2.4.15.1 If the provisions listed in 1.1.4.6.1 foresee the application of a stripping system, the cargo tanks and the cargo piping shall be emptied by means of the stripping system in accordance with the conditions laid down in the testing procedure after each unloading operation. This provision need not be complied with if the new cargo is the same as the previous cargo or a different cargo, the carriage of which does not require a prior cleaning of the cargo tanks.

Residual cargo shall be discharged ashore by means of the equipment provided for that effect (article 7.04 Nr. 1 and appendix II model 1 of CDNI) or shall be stored in the vessel's own tank for residual products or in receptacles for residual products according to 7.2.4.1.1.

7.2.4.15.2 During the filling of the residual tanks and receptacles for residual products, released gases shall be safely evacuated. They shall only be connected to the venting piping for the time necessary to fill them.

Capacity to collect any leaking liquids shall be placed under the connections used during filling.

7.2.4.15.3 The degasing of cargo tanks and piping for loading and unloading shall be carried out in compliance with the conditions of 7.2.3.7.

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7.2.4.16 ***Measures to be taken during loading, carriage, unloading and handling***

7.2.4.16.1 The loading rate and the maximum operational pressure of the cargo pumps shall be determined in agreement with the personnel of the shore installation.

7.2.4.16.2 All safety or control devices required in the cargo tanks shall remain switched on. During carriage this provision is only applicable for the installations mentioned in 9.3.1.21.1 (e) and (f), 9.3.2.21.1 (e) and (f) or 9.3.3.21.1 (e) and (f).

In the event of a failure of a safety or control device, loading or unloading shall be suspended immediately.

When a cargo pump-room is located below deck, the prescribed safety and control devices in the cargo pump-room shall remain permanently switched on.

Any failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by a visual and audible warning.

7.2.4.16.3 The shut-off devices of the loading and unloading piping if available, as well as of the pipes of the stripping systems shall remain closed except during loading, unloading, stripping, cleaning or degasing operations.

7.2.4.16.4 If the vessel is fitted with a transverse bulkhead according to 9.3.1.25.3, 9.3.2.25.3 or 9.3.3.25.3, the doors in this bulkhead shall be closed during loading and unloading.

7.2.4.16.5 Receptacles intended for recovering possible liquid spillage shall be placed under connections to shore installations used for loading and unloading. Before coupling and after uncoupling the connections and in between if necessary, the receptacles shall be emptied. These requirements shall not apply to the carriage of substance of Class 2.

7.2.4.16.6 In case of recovery of the gas-air mixture from shore into the vessel, the pressure at the connecting-point of the vapour return piping and the venting piping shall not be more than the opening pressure of the pressure relief device/high-velocity vent valve.

7.2.4.16.7 When a tank vessel conforms to 9.3.2.22.4 (b) or 9.3.3.22.4 (b), the individual cargo tanks shall be closed off during carriage and opened during loading, unloading and degassing.

7.2.4.16.8 Persons entering the premises located in the cargo area below deck during loading or unloading shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of Chapter 3.2.

Persons connecting or disconnecting the loading and unloading piping or the venting piping, relieving pressure in cargo tanks, taking samples, carrying out measurements or cleaning or replacing the flame arrester plate stack (see 7.2.4.22), shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of Chapter 3.2; they shall also wear protective equipment A if a toximeter (TOX) is prescribed in column (18) of Table C of Chapter 3.2.

7.2.4.16.9 (a) During loading or unloading in a closed tank vessel of substances for which an open type N vessel with a flame arrester is sufficient according to columns (6) and (7) of Table C of Chapter 3.2, the cargo tanks may be opened using the safe pressure-relief device referred to in 9.3.2.22.4 (a) or 9.3.3.22.4 (a).

(b) During loading or unloading in a closed tank vessel of substances for which an open type N vessel is sufficient according to columns (6) and (7) of Table C of Chapter 3.2, the cargo tanks may be opened using the safe pressure-relief device referred to in 9.3.2.22.4 (a) or 9.3.3.22.4 (a) or using another suitable opening in the venting

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piping if any accumulation of water and its penetration into the cargo tanks is prevented and the opening is appropriately closed again after loading or unloading.

7.2.4.16.10 7.2.4.16.9 shall not apply when the cargo tanks contain gases or vapour from substances for the carriage of which a closed-type tank vessel is required in column (7) of Table C of Chapter 3.2.

7.2.4.16.11 The connection closure referred to in 9.3.1.21.1 (g), 9.3.2.21.1 (g) or 9.3.3.21.1 (g) can be opened only after a gastight connection has been made to the closed or partly closed sampling device.

7.2.4.16.12 For substances requiring protection against explosions according to column (17) of Table C of Chapter 3.2, the connection of the venting piping to the shore installation shall be such that the vessel is protected against detonations and the passage of flames from the shore (explosion group/subgroup according to column (16) of table C of Chapter 3.2). The protection of the vessel against detonations and the passage of flames from the shore is not required when the cargo tanks are inerted in accordance with 7.2.4.18.

7.2.4.16.13 For the carriage of substances of UN No. 2448, or of goods of Class 5.1 or 8, the bulwark ports, openings in the foot rail, etc., shall not be closed off. Nor shall they be closed off, during the voyage, in the event of carriage of other dangerous goods.

7.2.4.16.14 If supervision is required in column (20) of Table C of Chapter 3.2 for substances of Classes 2 or 6.1, loading and unloading shall be carried out under the supervision of a person who is not a member of the crew and has been mandated for the task by the consignor or the consignee.

7.2.4.16.15 The initial cargo throughput established in the loading instructions shall be such as to ensure that no electrostatic charge exists at the start of loading.

7.2.4.16.16 Measures to be taken before loading refrigerated liquefied gases

Unless the temperature of the cargo is controlled in accordance with 9.3.1.24.1 (a) or 9.3.1.24.1 (c) guaranteeing the use of the maximal boil-off in any service conditions, the holding time has to be determined by the master or another person on his behalf before loading and validated by the master or another person on his behalf during loading and shall be documented on board.

7.2.4.16.17 Determination of the holding time

A table, approved by the recognized classification society that certified the vessel, giving the relation between holding time and filling conditions, incorporating the parameters below shall be kept on board.

The holding time of the cargo shall be determined on the basis of the following parameters:

– The heat transmission coefficient as defined in 9.3.1.27.9;

– The set pressure of the safety valves;

– The initial filling conditions (temperature of cargo during loading and degree of filling);

– The ambient temperatures as given in 9.3.1.24.2;

– When using the boil-off vapours, the minimum guaranteed use of the boil-off vapours (that is the amount of boil-off vapours used under any service conditions), may be taken into account.

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Adequate safety margin

To leave an adequate margin to ensure safety, the holding time is at least three times the expected duration of the journey of the vessel, including the following:

– To ensure safety for short journeys of (as expected) no more than 5 days, the minimum holding time for any vessel with refrigerated liquefied gases is 15 days.

– For long journeys of (as expected) more than 10 days, the minimum holding time shall be 30 days, adding two days for each day the journeys takes more than 10 days.

As soon as it becomes clear that the cargo will not be unloaded within the holding time, the master shall inform the nearest emergency services according to 1.4.1.2.

7.2.4.17 ***Closing of windows and doors***

7.2.4.17.1 During loading, unloading, degasing operations, or a stay in the vicinity of or within an onshore assigned zone, all entrances or openings of spaces which are accessible from the deck and all openings of spaces facing the outside shall remain closed.

This provision does not apply to:

– air intakes of running engines;

– ventilation inlets of engine rooms while the engines are running;

– air intakes of the ventilation system referred to in 9.3.1.12.4, 9.3.2.12.4 or 9.3.3.12.4;

– air intakes of air conditioning installations if these openings are fitted with a gas detection system referred to in 9.3.1.12.4, 9.3.2.12.4 or 9.3.3.12.4.

These entrances and openings may only be opened when necessary and for a short time, after the master has given his permission.

7.2.4.17.2 After the loading, unloading and degasing operations, the spaces which are accessible from the deck shall be ventilated.

7.2.4.17.3 The provisions of 7.2.4.17.1 and 7.2.4.17.2 above shall not apply to the reception of oily and greasy wastes resulting from the operation of vessels nor to the handing over of products for the operation of vessels.

7.2.4.18 ***Blanketing of the cargo and inerting***

7.2.4.18.1 In cargo tanks and the corresponding piping, inerting in the gaseous phase or blanketing of the cargo may be necessary. Inerting and blanketing of the cargo are defined as follows:

– Inerting: cargo tanks and the corresponding piping and other spaces for which this process is prescribed in column (20) of Table C of Chapter 3.2 are filled with gases or vapours which prevent combustion, do not react with the cargo and maintain this state;

– Blanketing of the cargo: spaces in the cargo tanks above the cargo and the corresponding piping are filled with a liquid, gas or vapour so that the cargo is separated from the air and this state is maintained.

7.2.4.18.2 For certain substances the requirements for inerting and blanketing of the cargo in cargo tanks, in the corresponding piping and in adjacent empty spaces are given in column (20) of Table C of Chapter 3.2.

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7.2.4.18.3 (*Reserved*)

7.2.4.18.4 Inerting or blanketing of flammable cargoes shall be carried out in such a way as to reduce the electrostatic charge as far as possible when the inerting agent is added.

7.2.4.19 (*Deleted*)

7.2.4.20 *(Reserved)*

7.2.4.21 *Filling of cargo tanks*

7.2.4.21.1 The degree of filling given in column (11) of Table C of Chapter 3.2 or calculated in accordance with 7.2.4.21.3 for the individual cargo tank shall not be exceeded.

7.2.4.21.2 The provisions of 7.2.4.21.1 above do not apply to cargo tanks the contents of which are maintained at the filling temperature during carriage by means of heating equipment. In this case calculation of the degree of filling at the beginning of carriage and control of the temperature shall be such that, during carriage, the maximum allowable degree of filling is not exceeded.

7.2.4.21.3 For carriage of substances having a relative density higher than that stated in the certificate of approval, the maximum permissible degree of filling of the cargo tanks shall be calculated in accordance with the following formula:

maximum permissible degree of filling (%) = a * 100/b

a = relative density stated in the certificate of approval,

b = relative density of the substance.

The degree of filling given in column (11) of Table C of Chapter 3.2 shall, however, not be exceeded.

NOTE: *Furthermore, the requirements concerning stability, longitudinal strength and the deepest permissible draught of the vessel shall be observed when filling the cargo tanks*.

7.2.4.21.4 If the degree of filling of 97.5% is exceeded a technical installation shall be authorized to pump off the overflow. During such an operation an automatic visual alarm shall be activated on deck.

7.2.4.22 *Opening of openings of cargo tanks*

7.2.4.22.1 Opening of cargo tanks apertures shall be permitted only after the tanks have been relieved of pressure.

Pressure relief of cargo tanks is permitted only when using the device for safe pressure relief prescribed in 9.3.2.22.4 (a) and 9.3.2.22.4 (b) or 9.3.3.22.4 (a) and 9.3.3.22.4 (b). When explosion protection is required under column (17) of Table C of Chapter 3.2, the opening of cargo tank covers shall be permitted only if the cargo tanks in question have been degassed and the concentration of flammable gases in the tanks is less than 10% of the lower explosive limit of the cargo/previous cargo. The results of the measurements shall be recorded in writing. Entry into these cargo tanks is not permitted for the purpose of measuring.

7.2.4.22.2 Opening of sampling outlets is only permitted for sampling and control or cleaning of empty cargo tanks.

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7.2.4.22.3 Sampling shall be permitted only if a device prescribed in column (13) of Table C of Chapter 3.2 or a device ensuring a higher level of safety is used.

Opening of sampling outlets of cargo tanks loaded with substances for which marking with one or two blue cones or one or two blue lights is prescribed in column (19) of Table C of Chapter 3.2 shall be permitted only when loading has been interrupted for not less than 10 minutes.

7.2.4.22.4 The sampling receptacles including all accessories such as ropes, etc., shall consist of electrostatically conductive material and shall, during sampling, be electrically connected to the vessel's hull.

7.2.4.22.5 Opening of the housing of the flame arresters is permitted only for the cleaning of the flame arrester plate stack or replacement by flame arrester plate stacks of the same design.

Opening is permitted only when the relevant cargo tanks are empty and the concentration of flammable gases in the cargo tank is less than 10% of the lower explosive limit of the cargo/previous cargo.

The results of the measurements shall be recorded in writing.

Cleaning and replacing of the flame arrestor plate stack shall be carried out only by trained and qualified personnel.

7.2.4.22.6 For the operations referred to in 7.2.4.22.4 and 7.2.4.22.5, only low-sparking hand tools (e.g. chromium vanadium steel screwdrivers and wrenches) shall be used.

7.2.4.22.7 The duration of opening shall be limited to the time necessary for control, cleaning, replacing the flame arrester or sampling.

7.2.4.22.8 The provisions of 7.2.4.22.1 to 7.2.4.22.7 above shall not apply to oil separator or supply vessels.

7.2.4.23 *(Reserved)*

7.2.4.24 *Simultaneous loading and unloading*

During loading or unloading of cargo tanks, no other cargo shall be loaded or unloaded. The competent authority may grant exceptions during unloading.

7.2.4.25 *Loading and unloading piping and venting piping*

7.2.4.25.1 Loading and unloading as well as stripping of cargo tanks shall be carried out by means of the fixed cargo piping of the vessel.

The metal fittings of the connections to the shore piping shall be electrically earthed so as to prevent the accumulation of electrostatic charges.

7.2.4.25.2 The loading and unloading piping shall not be extended by pipes or hose assemblies fore or aft beyond the cofferdams.

This requirement shall not apply to hose assemblies used for the reception of oily and greasy wastes resulting from the operation of vessels and the delivery of products for the operation of vessels.

7.2.4.25.3 *(Reserved)*

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7.2.4.25.4 The liquid remaining in the piping shall be completely drained into the cargo tanks, if possible, or safely removed. This requirement shall not apply to supply vessels.

7.2.4.25.5 The gas/air mixtures released during loading operations shall be returned ashore through a vapour return piping if:

– A closed cargo tank is required according to column (7) of Table C of Chapter 3.2; or

– A closed cargo tank was required for the previous cargo in column (7) of Table C of Chapter 3.2 and before the loading the concentration of flammable gases of the previous cargo in the cargo tank is above 10% of the LEL or the cargo tank contains toxic gases, corrosive gases (packing group I or II) or gases with CMR-characteristics (Categories 1A or 1B) in a concentration above national accepted exposure levels, the results of these measurements shall be recorded in writing.

If the substance to be loaded requires explosion protection according to column (17) of Table C of Chapter 3.2, and the use of the vapour return piping is prescribed, the connection of the vapour return piping shall be designed such that the vessel is protected against detonations and the passage of flames from the shore. The protection of the vessel against detonations and the passage of flames from the shore is not required when the cargo tanks are inerted in accordance with 7.2.4.18.

7.2.4.25.6 When substances of Class 2 are carried the requirements of 7.2.4.25.4 shall be deemed to have been satisfied if the piping for loading and unloading have been purged with the cargo gas or with nitrogen.

7.2.4.25.7 For connecting or disconnecting loading or unloading piping and venting piping, only low-sparking hand tools (e.g. chromium vanadium steel screwdrivers and wrenches) shall be used.

7.2.4.26 and 7.2.4.27 *(Reserved)*

7.2.4.28 *Water-spray system*

7.2.4.28.1 If a gas or vapour water-spray system is required in column (9) of Table C of Chapter 3.2, it shall be kept ready for operation during loading, unloading and carriage. If a water-spray system is required to cool the tank-deck, it shall be kept ready for operation during the carriage.

7.2.4.28.2 When water-spraying is required in column (9) of Table C of Chapter 3.2 and the pressure of the gaseous phase in the cargo tanks may reach 80% of the relief pressure of the pressure relief devices/high-velocity vent valves, the master shall take all measures compatible with safety to prevent the pressure from reaching that value. He shall in particular activate the water-spray system.

7.2.4.28.3 If a water-spray system is required in column (9) of Table C of Chapter 3.2 and remark 23 is indicated in column (20) of Table C of Chapter 3.2, the instrument measuring the internal pressure shall activate an alarm when the internal pressure reaches 40 kPa (0.4 bar). The water-spray system shall immediately be activated and remain in operation until the internal pressure drops to 30 kPa (0.3 bar).

7.2.4.29 *Transport of refrigerated liquefied gases*

During loading or unloading the drip tray as mentioned in 9.3.1.21.11 shall be placed under the shore connection of the piping for loading and unloading in use, and a water film as mentioned in 9.3.1.21.11 shall be activated.

7.2.4.30 to 7.2.4.39 *(Reserved)*

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7.2.4.40 ***Fire-extinguishing arrangements***

During loading and unloading, the fire extinguishing systems, the fire main with hydrants complete with couplings and jet/spray nozzles or with couplings and hose assemblies with couplings and jet/spray nozzles shall be kept ready for operation in the cargo area on deck.

The freezing of fire-mains and hydrants shall be prevented.

7.2.4.41 ***Smoking, fire or naked light***

During loading, unloading or degassing operations, fires, naked lights, and smoking are prohibited on board the vessel.

However, the provisions of 7.2.3.42.3 and 7.2.3.42.4 are applicable.

7.2.4.42 ***Cargo heating system***

The maximum allowable temperature for carriage indicated in column (20) of Table C of Chapter 3.2 shall not be exceeded.

7.2.4.43 to 7.2.4.50 *(Reserved)*

7.2.4.51 ***Electrical installations and equipment***

7.2.4.51.1 and 7.2.4.51.2 *(Deleted)*

7.2.4.51.3 Equipment for active cathodic corrosion protection shall be disconnected before berthing and may not be re-connected until after the departure of the vessel, at earliest.

7.2.4.52 *(Reserved)*

7.2.4.53 ***Lighting***

If loading or unloading is performed at night or in conditions of poor visibility, effective lighting shall be provided. If provided from the deck, it shall be effected by properly secured electrical lighting appliances which shall be positioned in such a way that they cannot be damaged.

7.2.4.54 to 7.2.4.59 *(Reserved)*

7.2.4.60 ***Special equipment***

The shower and the eye and face bath prescribed in the rules for construction shall be kept ready in all weather conditions for use during loading and unloading operations and cargo transfer operations by pumping.

7.2.4.61 to 7.2.4.73 *(Reserved)*

7.2.4.74 *(Deleted)*

7.2.4.75 ***Risk of sparking***

All electrically continuous connections between the vessel and the shore shall be so designed that they do not present a source of ignition. If the vessel substance list as referred to in 1.16.1.2.5 includes substances that require anti-explosion protection in accordance with column (17) of Table C of Chapter 3.2, taking off clothes not sufficiently dissipative shall be prohibited in zone 1.

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7.2.4.76 ***Synthetic ropes***

During loading and unloading operations, the vessel may be moored by means of synthetic ropes only when steel cables are used to prevent the vessel from going adrift.

Steel cables sheathed in synthetic material or natural fibres are considered as equivalent when the minimum tensile strength required in accordance with the Regulations referred to in 1.1.4.6 is obtained from the steel strands.

Oil separator vessels may, however, be moored by means of appropriate synthetic ropes during the reception of oily and greasy wastes resulting from the operation of vessels, as may supply vessels and other vessels during the delivery of products for the operation of vessels.

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7.2.4.77 Possible means of evacuation in case of an emergency

		Tank vessel/tank barge				
		Class				
		2, 3 (except second and third entries of UN No. 1202, packing group III, in Table C)	**3 (only for the second and third entries of UN No. 1202, packing group III, in Table C), 4.1**	**5.1, 6.1**	**8**	**9**
1	Two escape routes inside or outside the cargo area in opposite directions	•	•	•	•	•
2	One escape route outside the cargo area and one safe haven outside the vessel including the escape route towards it from the opposite end	•	•	•	•	•
3	One escape route outside the cargo area and one safe haven on the vessel at the opposite end	•	•	•**	•	•
4	One escape route outside the cargo area and one life boat at the opposite end		•		•	•
5	One escape route outside the cargo area and one escape boat at the opposite end	•	•	•	•	•
6	One escape route inside the cargo area and one escape route outside the cargo area at the opposite end	•	•	•	•	•
7	One escape route inside the cargo area and one safe haven outside the vessel in the opposite direction	•	•	•	•	•
8	One escape route inside the cargo area and one safe haven on the vessel in the opposite direction	•	•	•**	•	•
9	One escape route inside the cargo area and one life boat at the opposite end		•		•	•
10	One escape route inside the cargo area and one escape boat at the opposite end	•	•	•	•	•
11	One escape route inside or outside the cargo area and two safe havens on the vessel at opposite ends	•	•	•**	•	•
12	One escape route inside or outside the cargo area and two safe areas on the vessel at opposite ends	•	•	•**	•	•
13	One escape route outside the cargo area		•		*•	•
14	One escape route inside the cargo area		•		*•	•
15	One or more safe havens outside the vessel, including the escape route towards it	•	•	•	*•	•

• = Possible option.

** = Not accepted in case of classification codes TFC, CF or CFT.*

***= Not accepted if there is a risk that oxidizing substances in combination with flammable liquids may cause an explosion.*

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Based on local circumstances, competent authorities may prescribe additional requirements for the availability of means of evacuation.

7.2.4.78 to 7.2.4.99 *(Reserved)*

7.2.5 Additional requirements concerning the operation of vessels

7.2.5.0 *Marking*

7.2.5.0.1 Vessels carrying dangerous goods listed in Table C of Chapter 3.2 shall display the number of blue cones or blue lights indicated in column (19) and in accordance with CEVNI. When because of the cargo carried no marking with blue cones or blue lights is prescribed but the concentration of flammable or toxic gases and vapours in the cargo tanks, given off by the last cargo for which marking was required, is higher than 20% of the LEL or exceeds the national accepted exposure levels, the number of blue cones or blue lights to be carried is determined by the last cargo for which this marking was required.

7.2.5.0.2 When more than one marking should apply to a vessel, the first of the options below shall apply:

– two blue cones or two blue lights; or

– one blue cone or one blue light.

7.2.5.0.3 By derogation from 7.2.5.0.1 above, and in accordance with the footnotes to article 3.14 of the CEVNI, the competent authority of a Contracting Party may authorize seagoing vessels temporarily operating in an inland navigation area on the territory of this Contracting Party, the use of the day and night signals prescribed in the Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas adopted by the Maritime Safety Committee of the International Maritime Organization (by night an all-round fixed red light and by day flag “B” of the International Code of Signals), instead of the signals prescribed in 7.2.5.0.1. The competent authority which has taken the initiative with respect to the derogation granted shall notify the Executive Secretary of the UNECE, who shall bring this derogation to the attention of the Administrative Committee.

7.2.5.1 *Mode of navigation*

The competent authorities may impose restrictions on the inclusion of tank vessels in pushed convoys of large dimension.

7.2.5.2 *(Reserved)*

7.2.5.3 *Mooring*

Vessels shall be moored securely, but in such a way that they can be released quickly in an emergency and the electric cables and hose assemblies are not compressed, folded or subject to tensile strain.

7.2.5.4 *Berthing*

7.2.5.4.1 The distances from other vessels to be kept by berthed vessels carrying dangerous goods shall be not less than those prescribed by the Regulations referred to in 1.1.4.6.

7.2.5.4.2 An expert, as required by 7.2.3.15 shall be permanently on board berthed vessels carrying dangerous substances. The competent authority may, however, exempt from this obligation those vessels which are berthed in the harbour basin or in a permitted berthing position.

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7.2.5.4.3 Outside the berthing areas specifically designated by the competent authority, the distances to be kept by berthed vessels shall not be less than:

– 100 m from residential areas, civil engineering structures or storage tanks, if the vessel is required to be marked with one blue cone or blue light in accordance with column (19) of Table C of Chapter 3.2;

– 100 m from civil engineering structures and storage tanks; and 300 m from residential areas if the vessel is required to be marked with two blue cones or two blue lights in accordance with column (19) of Table C of Chapter 3.2.

While waiting in front of locks or bridges, vessels are allowed to keep distances less than those given above. In no case shall the distance be less than 100 m.

7.2.5.4.4 The competent authority may prescribe distances less than those given in 7.2.5.4.3 above.

7.2.5.5 to 7.2.5.7 *(Reserved)*

7.2.5.8 *Reporting duty*

7.2.5.8.1 In the States where the reporting duty is in force, the master of the vessel shall provide information in accordance with paragraph 1.1.4.6.1.

7.2.5.8.2 to 7.2.5.8.4 (*Deleted*)

7.2.5.9 to 7.2.9.99 *(Reserved)*

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PART 8

Provisions for vessel crews, equipment, operation and documentation

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CHAPTER 8.1

GENERAL REQUIREMENTS APPLICABLE TO VESSELS AND EQUIPMENT

8.1.1 (*Reserved*)

8.1.2 Documents

8.1.2.1 In addition to the documents required by other regulations, the following documents shall be kept on board:

(a) The vessel's certificate of approval referred to in 1.16.1.1 or the vessel's provisional certificate of approval referred to in 1.16.1.3 and the annex referred to in 1.16.1.4;

(b) Transport documents referred to in 5.4.1 for all dangerous goods on board and, where necessary the container/vehicle packing certificate (see 5.4.2);

(c) The instructions in writing prescribed in 5.4.3;

(d) A copy of the ADN with the latest version of its annexed Regulations which may be a copy which can be consulted by electronic means at any time;

(e) The inspection certificate of the insulation resistance of the electrical installations prescribed in 8.1.7.1 and the certificates prescribed in 8.1.7.2 concerning the inspection of all installations, equipment and self-contained protection systems and the conformity of the documents required in 8.1.2.2 (e) to (h) and 8.1.2.3 (r) to (v) with the circumstances on board;

(f) A certificate concerning the inspection of the fire-extinguishing hoses prescribed in 8.1.6.1 and a certificate concerning the inspection of the special equipment prescribed in 8.1.6.3;

(g) A book in which all required measurement results are recorded;

(h) A copy of the relevant text of the special authorizations referred to in 1.5 if the transport operation is performed under this/these special authorization(s);

(i) Means of identification, which include a photograph, for each crew member, in accordance with 1.10.1.4; and

(j) (*Deleted*)

8.1.2.2 In addition to the documents prescribed in 8.1.2.1, the following documents shall be carried on board dry cargo vessels:

(a) The stowage plan prescribed in 7.1.4.11;

(b) The ADN specialized knowledge certificate prescribed in 8.2.1.2;

(c) For vessels complying with the additional requirements for double-hull vessels:

– a damage-control plan;

– the documents concerning intact stability as well as all conditions of intact stability taken into account for the damaged stability calculation in a form the master understands;

– the certificate of the recognized classification society (see 9.1.0.88 or 9.2.0.88);

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(d) The inspection certificates concerning the fixed fire extinguishing systems prescribed in 9.1.0.40.2.9;

(e) A list of or a general plan indicating the fixed installations and equipment suitable for use at least in zone 1 and the installations and equipment complying with 9.1.0.51;

(f) A list of or a general plan indicating the fixed installations and equipment which are not authorized for use during loading and unloading, during a stay near to or within an onshore assigned zone (marked in red according to 9.1.0.52.2);

(g) A plan indicating the boundaries of the zones and the location of the electrical and non-electrical equipment installed in the relevant zones intended for used in explosion hazardous areas;

(h) A list of the installations and equipment referred to under (g) with the following information:

– Installation/equipment, location, marking (explosion protection level according to IEC 60079-0, equipment category according to Directive 2014/34/EU[1] or equivalent protection level, explosion group, temperature class, type of protection, test body) in case of electrical equipment for use in zone 1 (alternatively, a copy of the certificate of conformity according to Directive 2014/34/EU[1]);

– Installation/equipment, location, marking (explosion protection level according to IEC 60079-0, equipment category according to Directive 2014/34/EU[1] or equivalent protection level, including explosion group and temperature class, type of protection, identification number) in case of electrical equipment for use in zone 2 and in the case of non-electrical equipment for use in zone 1 and zone 2 (alternatively, a copy of the certificate of conformity according to Directive 2014/34/EU[1]);

The documents listed above shall bear the stamp of the competent authority issuing the certificate of approval.

8.1.2.3 In addition to the documents prescribed in 8.1.2.1, the following documents shall be carried on board tank vessels:

(a) The cargo stowage plan prescribed in 7.2.4.11.2;

(b) The ADN specialized knowledge certificate prescribed in 8.2.1.2;

(c) For vessels which have to conform to the conditions of damage-control (see 9.3.1.15, 9.3.2.15 or 9.3.3.15)

– a damage-control plan;

– the documents concerning intact stability as well as all conditions of intact stability taken into account for the damaged stability calculation in a form the master understands; the stability booklet and the proof of the loading instrument having been approved by the recognized classification society;

(d) (*Deleted*)

(e) The certificate of class issued by the recognized classification society prescribed in 9.3.1.8.1, 9.3.2.8.1 or 9.3.3.8.1;

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[1] *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

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(f) The certificates concerning the inspection of the special equipment, the gas detection systems and the oxygen measuring system prescribed in 8.1.6.3;

(g) The vessel substance list prescribed in 1.16.1.2.5;

(h) The inspection certificate for the hose assemblies for loading and unloading prescribed in 8.1.6.2;

(i) The instructions relating to the loading and unloading flows prescribed in 9.3.2.25.9 or 9.3.3.25.9;

(j) The inspection certificate of the cargo pump-rooms prescribed in 8.1.8;

(k) In the event of the carriage of goods having a melting point ≥ 0° C, heating instructions;

(l) (*Deleted*)

(m) The registration document referred to in 8.1.11;

(n) For the carriage of refrigerated substances, the instruction required in 7.2.3.28;

(o) The certificate concerning the refrigeration system, prescribed in 9.3.1.27.10, 9.3.2.27.10 or 9.3.3.27.10;

(p) The inspection certificates concerning the fixed fire extinguishing systems prescribed in 9.3.1.40.2.9, 9.3.2.40.2.9 or 9.3.3.40.2.9; and

(q) When carrying refrigerated liquefied gases and the temperature is not controlled in accordance with 9.3.1.24.1 (a) and 9.3.1.24.1 (c), the determination of the holding time (7.2.4.16.16, 7.2.4.16.17 and documentation on the heat transmission coefficient);

(r) A list of or a general plan indicating the fixed installations and equipment suitable to be used at least in zone 1 and the installations and equipment complying with 9.3.x.51;

(s) A list of or a general plan indicating the fixed installations and equipment which are not authorized for use during loading and unloading, gas-freeing or during a stay near to or within an onshore assigned zone (marked in red according to 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3);

(t) A plan approved by a recognized classification society indicating the boundaries of the zones and the location of the electrical and non-electrical equipment installed in the relevant zone intended to be used in explosion hazardous areas, as well as self-contained protection systems;

(u) A list of the installations/equipment referred to under (t) and of the self-contained protection systems, with the following information:

– Installations/equipment, location, marking (explosion protection level according to IEC 60079-0, equipment category according to Directive 2014/34/EU[1] or at least equivalent), including explosion group and temperature class, type of protection and test body, in the case of electrical equipment for use in zone 0 or zone 1 and, in the case of non-electrical equipment for use in zone 0;

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(alternatively, a copy of the inspection certificate, for example the declaration of conformity under Directive 2014/34/EU[1]);

– Installation/equipment, location, marking (explosion protection level according to IEC 60079-0, equipment category according to Directive 2014/34/EU[1] or equivalent protection level, including explosion group and temperature class, type of protection, identification number) in the case of electrical equipment for use in zone 2 and in the case of non-electrical equipment for use in zone 1 and zone 2 (alternatively, a copy of the inspection certificate, for example, the certificate of conformity according to Directive 2014/34/EU[1]);

– Self-protection system, place of installation, marking (explosion group/subgroup):

(v) A list of or general plan indicating the fixed installations and equipment installed outside the explosion hazardous areas that may be used during loading, unloading, gas-freeing, berthing or during a stay in the immediate vicinity of or within an onshore assigned zone, if not referred to in (*r*) and (*u*).

The documents listed in (*r*) to (*v*) shall bear the stamp of the competent authority issuing the certificate of approval.".

(w) The certificates required under 3.2.3.1, Explanations concerning Table C, explanatory note for column (20), remark 12 subparagraphs (p) and (q), if appropriate;

(x) The certificates required under 3.2.3.1, Explanations concerning Table C, explanatory note for column (20), remark 33 subparagraphs (i), (n) and (o), if appropriate.

8.1.2.4 The instructions in writing referred to in 5.4.3 shall be handed to the master before loading. They shall be kept readily at hand in the wheelhouse.

On board dry cargo vessels, the transport documents shall be handed to the master before loading and on board tank vessels they shall be handed to him after loading and before the journey commences.

8.1.2.5 (*Reserved*)

8.1.2.6 The presence on board of the certificate of approval is not required in the case of pusher barges which are not carrying dangerous goods, provided that the following additional particulars are indicated, in identical lettering, on the plate furnished by CEVNI:

Number of the certificate of approval: …

issued by: …

valid until: …

The barge–owner shall thereafter keep the certificate of approval and the annex covered by 1.16.1.4 in his possession.

The similarity of the particulars on the plate and those contained in the certificate of approval shall be certified by a competent authority which shall affix its stamp to the plate.

[1] *Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.*

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8.1.2.7 The presence on board of the certificate of approval is not required in the case of dry cargo barges or tank barges carrying dangerous goods provided that the plate furnished by CEVNI is supplemented by a second metal or plastic plate reproducing by photo–optical means a copy of the entire certificate of approval. A photo–optical copy of the annex referred to in 1.16.1.4 is not required.

The barge–owner shall thereafter keep the certificate of approval and the annex referred to in 1.16.1.4 in his possession.

The similarity of the particulars on the plate and the certificate of approval shall be certified by a competent authority which shall affix its stamp to the plate.

8.1.2.8 All documents shall be on board in a language the master is able to read and understand. If that language is not English, French or German, all documents, with the exception of the copy of ADN with its annexed Regulations and those for which the Regulations include special provisions concerning languages, shall be on board also in English, French or German, unless agreements concluded between the countries concerned in the transport operation provide otherwise.

8.1.2.9 8.1.2.1 (b), 8.1.2.1 (g), 8.1.2.4 and 8.1.2.5 do not apply to oil separator vessels or supply vessels. 8.1.2.1 (c) does not apply to oil separator vessels.

8.1.3 (*Reserved*)

8.1.4 Fire-extinguishing arrangements

In addition to the fire-extinguishing appliances prescribed in the Regulations referred to in 1.1.4.6, each vessel shall be equipped with at least two additional hand fire-extinguishers having the same capacity. The fire-extinguishing agent contained in these additional hand fire-extinguishers shall be suitable for fighting fires involving the dangerous goods carried.

8.1.5 Special equipment

8.1.5.1 Insofar as the provisions of Chapter 3.2, Tables A or C require, the following equipment shall be available on board:

PP: for each member of the crew, a pair of protective goggles, a pair of protective gloves, a protective suit and a suitable pair of protective shoes (or protective boots, if necessary). On board tank vessels, protective boots are required in all cases;

EP: a suitable escape device for each person on board;

EX: a gas detector;

TOX: a toximeter appropriate for the current and previous cargo, with the accessories and instructions for its use;

A: a breathing apparatus ambient air-dependent.

8.1.5.2 For operations carried out in explosion hazardous areas or during stay in the vicinity of or within a shoreside assigned zone only low-sparking hand-tools (e.g. chromium vanadium steel screwdrivers and wrenches) shall be used.

8.1.5.3 For pushed convoys or side–by–side formations under way, it shall be sufficient, however, if the pusher tug or the vessel propelling the formation is equipped with the special equipment referred to in 8.1.5.1 above, when this is required in Chapter 3.2, Tables A or C.

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8.1.6 Checking and inspection of equipment

8.1.6.1 Hand fire-extinguishers and fire-extinguishing hoses shall be inspected at least once every two years by persons authorized for this purpose by the competent authority. Proof of inspection shall be affixed to the hand fire-extinguishers. A certificate concerning the inspection of fire extinguishing hoses shall be carried on board.

8.1.6.2 Hose assemblies used for loading, unloading or delivering products for the operation of the vessel and residual cargo shall comply with European standard EN 12115:2011-04 (Rubber and thermoplastics hoses and hose assemblies) or EN 13765:2010-08 (Thermoplastic multilayer (non-vulcanized) hoses and hose assemblies) or EN ISO 10380:2003-10 (Corrugated metal hoses and hose assemblies). They shall be checked and inspected in accordance with table A.1 of standard EN 12115:2011-04 or table K.1 of standard EN 13765:2010-08 or paragraph 7 of standard EN ISO 10380:2003-10 at least once a year, according to the manufacturer's instructions, by persons authorized for this purpose by the competent authority. A certificate concerning this inspection shall be carried on board.

8.1.6.3 The proper functioning of the special equipment referred to in 8.1.5.1, the gas detection systems referred to in 9.3.1.12.4, 9.3.2.12.4 and 9.3.3.12.4 and the oxygen measuring system referred to in 9.3.1.17.6, 9.3.2.17.6 and 9.3.3.17.6 must be checked in accordance with the instructions of the manufacturer by persons authorized for this purpose by the manufacturer. A certificate concerning the latest inspection of the special equipment must be carried on board. The certificate must provide details of the result and date of the checks.

The gas detection systems and the oxygen measuring systems must also be inspected by a recognized classification society whenever the certificate of approval is renewed and during the third year of validity of the certificate. This inspection must include at least a general visual inspection of the installations and confirmation that the checks mentioned in the preceding sentence have been carried out.

An inspection certificate from the recognized classification society concerning the latest inspection conducted must be carried on board. All inspection certificates must provide at least the abovementioned details regarding the inspection, its results and the date on which it was conducted.

8.1.6.4 The measuring instruments prescribed in 8.1.5.1 shall be checked each time before use by the expert in accordance with the instructions for use.

8.1.6.5 and 8.1.6.6 *(Deleted)*

8.1.7 Installations, equipment and self-contained protection systems

8.1.7.1 *Electrical installations and equipment*

The insulation resistance of the fixed electrical installations and equipment and their earthing shall be inspected whenever the certificate of approval is renewed and, in addition, within the third year from the date of issue of the certificate of approval by a person authorized for this purpose by the competent authority.

A certificate concerning this inspection shall be carried on board.

8.1.7.2 *Installations and equipment intended for use in explosion hazardous areas, "limited explosion risk" type equipment, installations and equipment complying with 9.3.1.51, 9.3.2.51 and 9.3.3.51 and autonomous protective systems*

Such installations, equipment and autonomous protective systems and their compliance with the documents referred to in 8.1.2.2 (e) to (h) or 8.1.2.3 (r) to (v) in respect of the situation on board shall be inspected whenever the certificate of approval is renewed and, in addition,

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within the third year from the date of issue of the certificate of approval, by a person authorized for this purpose by the classification society that classified the vessel or by the competent authority. A certificate concerning this inspection shall be carried on board.

The marking on the installations and equipment intended for use in explosion hazardous areas showing that they are appropriate for use in explosion hazardous areas and marking on self-contained protection systems with their conditions of use should remain in place throughout the period of use on board.

The manufacturer's instruction on flame arresters or high-velocity vent valves/safety valves may require a more regular frequency of inspection.

8.1.7.3 ***Repair of explosion-protected installations and equipment and autonomous protection systems***

Repair of explosion-protected installations and equipment and autonomous protection systems is permitted only by an expert from a specialized company. Following repairs, a certificate must be issued attesting to their reusability in explosion hazardous areas. The certificate must be available on board.

8.1.8 Inspection of the cargo pump-rooms of tank vessels

The cargo pump-room must be inspected by a recognized classification society whenever the certificate of approval is renewed and during the third year of validity of the certificate.

The inspection must include at least the following:

– An inspection of the entire system, focusing on its state, corrosion, leaks and any unauthorized modifications;

– A general visual inspection of the state of the gas detection system in the cargo pump-room;

– Confirmation of the presence of the certificate referred to in 8.1.6.3 issued by the manufacturer or an authorized person.

The inspection certificates signed by the recognized classification society concerning the inspection of the cargo pump-room must be carried on board and provide at least the abovementioned details regarding the inspection, its results and the date on which it was conducted.

8.1.9 and 8.1.10 *(Deleted)*

8.1.11 Register of operations during carriage relating to the carriage of UN 1203

Tank vessels accepted for the carriage of UN No. 1203 petrol shall have on board a register of operations during carriage. This register may consist of other documents containing the information required. This register or these other documents shall be kept on board for not less than three months and cover at least the last three cargoes.

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CHAPTER 8.2

REQUIREMENTS CONCERNING TRAINING

8.2.1 General requirements concerning training of experts

8.2.1.1 An expert shall not be less than 18 years of age.

8.2.1.2 An expert is a person who has a special knowledge of the ADN. Proof of this knowledge shall be furnished by means of a certificate from a competent authority or from an agency recognized by the competent authority.

This certificate shall be issued to persons who, after training, have passed a qualifying ADN examination.

8.2.1.3 The experts referred to in 8.2.1.2 shall take part in a basic training course. Training shall take place in the context of classes approved by the competent authority. The primordial objective of the training is to make the experts aware of the hazards of the carriage of dangerous goods and provide them with the necessary basic knowledge to reduce the dangers of an incident to a minimum, to enable them to take the necessary measures to ensure their own safety, general safety and the protection of the environment and to limit the consequences of the incident. This training, which shall include individual practical exercises, takes the form of a basic course; it shall cover at least the objectives referred to in 8.2.2.3.1.1 and in 8.2.2.3.1.2 or 8.2.2.3.1.3.

8.2.1.4 After five years, the certificate shall be renewed by the competent authority or by a body recognized by it if the expert furnishes proof , of successful completion of a refresher course taken in the last year prior to the expiry of the certificate, covering at least the objectives referred to in 8.2.2.3.1.1 and in 8.2.2.3.1.2 or 8.2.2.3.1.3 and comprising current new developments in particular. A refresher course shall be considered to have been successfully completed if a final written test conducted by the course organizer under 8.2.2.2 has been passed. The test can be retaken two times during the validity of the certificate. If the test is not passed after two times then, within the period of validity of the certificate, the refresher course may be taken again.

8.2.1.5 Experts for the carriage of gases shall take part in a specialization course covering at least the objectives referred to in 8.2.2.3.3.1. Training shall take place in the context of classes approved by the competent authority. An expert certificate shall be issued to persons who, after training, have successfully passed an examination concerning the carriage of gases and have produced evidence of not less than one year’s work on board a type G vessel during a period of two years prior to or following the examination.

8.2.1.6 After five years, the certificate shall be renewed by the competent authority or by a body recognized by it if the expert on the carriage of gases furnishes proof:

– that during the year preceding the expiry of the certificate, he has participated in a refresher course covering at least the objectives referred to in 8.2.2.3.3.1 and comprising current new developments in particular; or

– that during the previous two years he has performed a period of work of not less than one year on board a type G tank vessel.

8.2.1.7 Experts for the carriage of chemicals shall take part in a specialization course covering at least the objectives referred to in 8.2.2.3.3.2. Training shall take place in the context of classes approved by the competent authority. An expert certificate shall be issued to persons who, after training, have successfully passed an examination concerning the carriage of chemicals and have produced evidence of not less than one year’s work on board a type C vessel during a period of two years prior to or following the examination.

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8.2.1.8 After five years, the certificate shall be renewed by the competent authority or by a body recognized by it if the expert on the carriage of chemicals furnishes proof:,

– that during the year preceding the expiry of the certificate, he has participated in a refresher course covering at least the objectives referred to in 8.2.2.3.3.2 and comprising current new developments in particular, or

– that during the previous two years he had performed a period of work of not less than one year on board a type C tank vessel.

8.2.1.9 The document attesting training and experience in accordance with the requirements of Chapter V of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers of 7 July 1978 (STCW Convention), as amended; on liquefied gas tankers shall be equivalent to the certificate referred to in 8.2.1.5, provided it has been recognized by a competent authority. No more than five years shall have passed since the date of issue or renewal of such a document.

8.2.1.10 The document attesting training and experience in accordance with the requirements of Chapter V of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers of 7 July 1978 (STCW Convention), as amended; on chemical tankers shall be equivalent to the certificate referred to in 8.2.1.7, provided it has been recognized by a competent authority. No more than five years shall have passed since the date of issue or renewal of such a document.

8.2.1.11 *(Deleted)*

8.2.2 Special requirements for the training of experts

8.2.2.1 Theoretical knowledge and practical abilities shall be acquired as a result of training in theory and practical exercises. The theoretical knowledge shall be tested by an examination. During the refresher course exercises and tests shall ensure that the participant takes an active role in the training.

8.2.2.2 The training organizer shall ensure that training instructors have a good knowledge of the subject and shall take into account the latest developments concerning the Regulations and the requirements for training in the transport of dangerous goods. Teaching shall relate closely to practice. In accordance with the approval, the teaching syllabus shall be drawn up on the basis of the objectives referred to in 8.2.2.3.1.1 to 8.2.2.3.1.3 and in 8.2.2.3.3.1 or 8.2.2.3.3.2. Basic training and their refresher courses shall comprise individual practical exercises (see 8.2.2.3.1.1).

8.2.2.3 ***Organization of training***

Initial basic training and the refresher courses shall be organized in the context of basic courses (see 8.2.2.3.1) and if necessary specialization courses (see 8.2.2.3.3). The courses referred to in 8.2.2.3.1 may comprise three variants: transport of dry cargo, transport in tank vessels and a combination of transport of dry cargo and transport in tank vessels.

8.2.2.3.1 *Basic course*

Basic course on the transport of dry cargo

Prior training: none

Knowledge: ADN in general, except Chapter 3.2, Table C, Chapters 7.2 and 9.3

Authorized for: dry cargo vessel

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Training:	general 8.2.2.3.1.1 and dry cargo vessels 8.2.2.3.1.2

Basic course on transport by tank vessels

Prior training:	none
Knowledge:	ADN in general, except Chapter 3.2, Tables A and B, Chapters 7.1, 9.1, 9.2 and sections 9.3.1 and 9.3.2
Authorized for:	tank vessels for the transport of substances for which a type N tank vessel is prescribed
Training:	general 8.2.2.3.1.1 and tank vessels 8.2.2.3.1.3

Basic course – combination of transport of dry cargo and transport in tank vessels

Prior training:	none
Knowledge:	ADN in general, except sections 9.3.1 and 9.3.2
Authorized for:	dry cargo vessels and tank vessels for the transport of substances for which a type N tank vessel is prescribed
Training:	general 8.2.2.3.1.1, dry cargo vessels 8.2.2.3.1.2 and tank vessels 8.2.2.3.1.3

8.2.2.3.1.1 The general part of the basic training course shall comprise at least the following objectives:

General:

– Objectives and structure of ADN.

Construction and equipment:

– Construction and equipment of vessels subject to ADN.

Measurement techniques:

– Measurements of toxicity, oxygen content and the concentration of flammable gases.

Knowledge of products:

– Classification and hazard characteristics of the dangerous goods.

Loading, unloading and transport:

– Loading, unloading, general service requirements and requirements relating to transport.

Documents:

– Documents which must be on board during transport.

Hazards and measures of prevention:

– General safety measures.

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Practical exercises:

– Practical exercises, in particular with respect to entry into spaces, use of fire-extinguishers, fire–fighting equipment and personal protective equipment as well as gas detectors, oxygen meters and toximeters.

Stability:

– parameters of relevance to stability;

– heeling moments;

– exemplary calculations;

– damage stability, intermediate states and final state of flooding;

– influence of free surfaces;

– evaluation of stability on the basis of existing stability criteria (text of Regulations);

– evaluation of intact stability with the help of the lever arm curve

– application of loading instruments;

– use of loading instruments;

– application of the stability booklet according to 9.3.13.3.

Basics of explosion protection:

– according to the definition of ‘explosion protection’;

– selection of appropriate devices and installations.

8.2.2.3.1.2 The “dry cargo vessels” part of the basic training course shall comprise at least the following objectives:

Construction and equipment:

– Construction and equipment of dry cargo vessels.

Treatment of holds and adjacent spaces:

– degassing, cleaning, maintenance,

– ventilation of holds and spaces outside the protected area.

Loading, unloading and transport:

– loading, unloading, general service and transport requirements,

– labelling of packages.

Documents:

– documents which must be on board during transport.

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Hazards and measures of prevention:

– general safety measures,

– personal protective and safety equipment.

8.2.2.3.1.3 The “tank vessel” part of the basic training course shall comprise at least the following objectives:

Construction and equipment:

– construction and equipment of tank vessels,

– ventilation,

– loading and unloading systems.

Treatment of cargo tanks and adjacent spaces:

– degassing into the atmosphere and to reception facilities, cleaning, maintenance,

– heating and cooling of cargo,

– handling of receptacles for residual products.

Measurement and sampling techniques:

– measurements of toxicity, oxygen content and the concentration of flammable gases.

– sampling.

Loading, unloading and transport:

– loading, unloading, general service and transport requirements.

Documents:

– documents which must be on board during transport.

Hazards and measures of prevention:

– prevention and general safety measures,

– spark formation,

– personal protective and safety equipment,

– fires and fire–fighting.

Basics of explosion protection:

– according to the definition of ‘explosion protection’;

– selection of appropriate devices and installations.

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8.2.2.3.2 *Refresher training courses*

Refresher training course on transport of dry cargo

Prior training:	valid ADN "dry cargo vessels" or combined "dry cargo vessels/tank vessels" certificate
Knowledge:	ADN in general, except Chapter 3.2, Table C, Chapters 7.2 and 9.3
Authorized for:	dry cargo vessel
Training:	general 8.2.2.3.1.1 and dry cargo vessels 8.2.2.3.1.2

Refresher training course on transport in tank vessels

Prior training:	valid ADN "tank vessels" or combined "dry cargo vessels/tank vessels" certificate
Knowledge:	ADN in general, except Chapter 3.2, Tables A and B, Chapters 7.1, 9.1 and 9.2 and sections 9.3.1 and 9.3.2
Authorized for:	tank vessels for the transport of substances for which a type N tank vessel is prescribed
Training:	general 8.2.2.3.1.1 and tank vessels 8.2.2.3.1.3

Refresher training course – combination of transport of dry cargo and transport in tank vessels

Prior training:	valid ADN combined "dry cargo vessels and tank vessels" certificate
Knowledge:	ADN in general, including sections 9.3.1 and 9.3.2
Authorized for:	dry cargo vessels and tank vessels for the transport of substances for which a type N tank vessel is prescribed
Training:	general 8.2.2.3.1.1, dry cargo vessels 8.2.2.3.1.2 and tank vessels 8.2.2.3.1.3

8.2.2.3.3 *Specialization courses*

Specialization course on gases

Prior training:	valid ADN "tank vessels" or combined "dry cargo vessels/tank vessels" certificate
Knowledge:	ADN, in particular knowledge relating to loading, transport, unloading and handling of gases
Authorization for:	tank vessels for the transport of substances for which a type G tank vessel is required and transport in type G of substances for which a type C is required with cargo tank design 1 required in column (7) of Table C of Chapter 3.2.
Training:	gases 8.2.2.3.3.1

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Specialization course on chemicals

Prior training:	valid ADN "tank vessels" or combined "dry cargo vessels/tank vessels" certificate
Knowledge:	ADN, in particular knowledge relating to loading, transport, unloading and handling of chemicals
Authorized for:	tank vessels for the transport of substances for which a type C tank vessel is required
Training:	chemicals 8.2.2.3.3.2

8.2.2.3.3.1 The specialization course on gases shall comprise at least the following objectives:

Knowledge of physics and chemistry:

– laws of gases, e.g. Boyle, Gay–Lussac and fundamental law

– partial pressures and mixtures, e.g. definitions and simple calculations, pressure increase and gas release from cargo tanks

– Avogadro's number and calculation of masses of ideal gas and application of the mass formula

– mass density, relative density and volume of liquids, e.g. mass density, relative density, volume in terms of temperature increase and maximum degree of filling

– critical pressure and temperature

– polymerization, e.g. theoretical and practical questions, conditions of carriage

– vaporization, condensation, e.g. definition, liquid volume and vapour volume ratio

– mixtures, e.g. vapour pressure, composition and hazard characteristics

– chemical bonds and formulae.

Practice:

– flushing of cargo tanks, e.g. flushing in the event of a change of cargo, addition of air to the cargo, methods of flushing (degassing) before entering cargo tanks

– sampling

– danger of explosion

– health risks

– gas concentration measures, e.g. which apparatus to use and how to use it

– monitoring of closed spaces and entry to these spaces

– certificates for the status of being gas free and permitted work

– degree of filling and over–filling

– safety installations

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– pumps and compressors

– handling refrigerated liquefied gases.

Emergency measures:

– physical injury, e.g. substances on the skin, breathing in gas, assistance

– irregularities relating to the cargo, e.g. leak in a connection, over-filling, polymerization and hazards in the vicinity of the vessel.

8.2.2.3.3.2 The specialization course on chemicals shall comprise at least the following objectives:

Knowledge of physics and chemistry:

– chemical products, e.g. molecules, atoms, physical state, acids, bases, oxidation

– mass density, relative density, pressure and volume of liquids, e.g. mass density, relative density, volume and pressure in terms of temperature increase, maximum degree of filling

– critical temperature

– polymerization, e.g. theoretical and practical questions, conditions of carriage

– mixtures, e.g. vapour pressure, composition and hazard characteristics

– chemical bonds and formulae.

Practice:

– cleaning of cargo tanks, e.g. degasing, washing, residual cargo and receptacles for residual products

– loading and unloading, e.g. venting piping systems, rapid closing devices, effects of temperature

– sampling

– danger of explosion

– health risks

– gas concentration measures, e.g. which apparatus to use and how to use it

– monitoring of closed spaces and entry to these spaces

– certificates for the status of being gas free and permitted work

– degree of filling and over–filling

– safety installations

– pumps and compressors.

Emergency measures:

– physical injury, e.g. contact with the cargo, breathing in gas, assistance

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– irregularities relating to the cargo, e.g. leak in a connection, over–filling, polymerization and hazards in the vicinity of the vessel.

8.2.2.3.4 *Refresher courses*

Refresher course on gases

Prior training:	valid ADN "gases" and "tank vessels" certificate or combined "dry cargo/tank vessels" certificate;
Knowledge:	ADN, in particular, loading, transport, unloading and handling of gases;
Authorization for:	tank vessels for the transport of substances for which a type G tank vessel is required and transport in type G of substances for which a type C is required with cargo tank design 1 required in column (7) of Table C of Chapter 3.2.
Training:	gases 8.2.2.3.3.1.

Refresher course on chemicals

Prior training:	valid ADN “chemicals” and “tank vessels” certificate or combined “dry cargo/tank vessels” certificate;
Knowledge:	ADN, in particular, loading, transport, unloading and handling of gases;
Authorization for:	tank vessels for the transport of substances for which a type C tank vessel is required;
Training:	chemicals 8.2.2.3.3.2.

8.2.2.4 ***Planning of refresher and specialization courses***

The following minimum periods of training shall be observed:

Basic “dry cargo vessels course”	32 lessons of 45 minutes each
Basic “tank vessels” course	32 lessons of 45 minutes each
Basic combined course	40 lessons of 45 minutes each
Specialization course on gases	16 lessons of 45 minutes each
Specialization course on chemicals	16 lessons of 45 minutes each

Each day of training may comprise not more than eight lessons.

If the theoretical training is by correspondence, equivalences to the above–mentioned lessons shall be determined. Training by correspondence shall be completed within a period of nine months.

Approximately 30% of basic training shall be devoted to practical exercises. Practical exercises shall, where possible, be undertaken during the period of theoretical training; in any event, they shall be completed not later than three months following the completion of theoretical training.

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8.2.2.5 ***Planning of refresher course***

The refresher course shall take place before the expiry of the deadline referred to in 8.2.1.4, 8.2.1.6 or 8.2.1.8.

The following minimum periods of training shall be observed:

Basic refresher course:

–	dry cargo vessels	16 lessons of 45 minutes each
–	tank vessels	16 lessons of 45 minutes each
–	combined dry cargo vessels and tank vessels	16 lessons of 45 minutes each
Specialization refresher course on gases		8 lessons of 45 minutes each
Specialization refresher course on chemicals		8 lessons of 45 minutes each

Each day of training may comprise not more than eight lessons.

Approximately 30% of basic training shall be devoted to practical exercises. Practical exercises shall, where possible, be undertaken during the period of theoretical training; in any event, they shall be completed not later than three months following the completion of theoretical training. The proportion of stability training in the refresher course shall amount to at least 2 lessons.

8.2.2.6 ***Approval of training courses***

8.2.2.6.1 Training courses shall be approved by the competent authority.

8.2.2.6.2 Approval shall be granted only on written application.

8.2.2.6.3 Applications for approval shall be accompanied by:

(a) the detailed course curriculum showing the course topics and the length of time to be devoted to them, as well as the teaching methods envisaged;

(b) the roster of training instructors, listing their qualifications and the subjects to be taught by each one;

(c) information on classrooms and teaching materials, as well as on the facilities available for practical exercises;

(d) enrolment requirements, e.g. the number of participants;

(e) detailed plan for final tests, including, if necessary, the infrastructure and organisation of electronic examinations in accordance with 8.2.2.7.1.7, if these are to be carried out.

8.2.2.6.4 The competent authority shall be responsible for monitoring training courses and examinations.

8.2.2.6.5 The approval comprises the following conditions, inter alia:

(a) training courses shall conform to the information accompanying the application for approval;

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(b) the competent authority may send inspectors to attend training courses and examinations;

(c) the timetables for the various training courses shall be notified in advance to the competent authority.

Approval shall be granted in writing for a limited period. It may be withdrawn in the event of failure to comply with the conditions of approval.

8.2.2.6.6 The approval document shall indicate whether the course in question is a basic training course, a specialization course or a refresher course.

8.2.2.6.7 If, after approval is granted, the training body wishes to change conditions affecting the approval, it shall seek the prior agreement of the competent authority. This provision shall apply in particular to amendments to syllabuses.

8.2.2.6.8 Training courses shall take account of the current developments in the various subjects taught. The course organizer shall be responsible for ensuring that recent developments are brought to the attention of, and properly understood by, training instructors.

8.2.2.7 ***Examinations and final tests***

8.2.2.7.0 The examination shall be organized by the competent authority or by an examining body designated by the competent authority. The examining body shall not be a training provider.

The examining body shall be designated in writing. This approval may be of limited duration and should be based on the following criteria:

– Competence of the examining body;

– Specifications of the form of the examinations the examining body is proposing, including, if necessary, the infrastructure and organisation of electronic examinations in accordance with 8.2.2.7.1.7, if these are to be carried out;

– Measures intended to ensure that examinations are impartial;

– Independence of the body from all natural or legal persons employing ADN experts.

8.2.2.7.1 *Basic training courses*

8.2.2.7.1.1 After initial training an ADN basic training examination shall be taken. This examination shall be held either immediately after the training or within six months following the completion of such training.

8.2.2.7.1.2 In the examination the candidate shall furnish evidence that, in accordance with the basic training course, he has the knowledge, understanding and capabilities required of an expert on board a vessel.

8.2.2.7.1.3 The Administrative Committee shall establish a catalogue of questions comprising the objectives set out in 8.2.2.3.1.1 to 8.2.2.3.1.3 and a directive on the use of the catalogue of questions.[1] The examination questions shall be selected from this list. The candidate shall not have advance knowledge of the questions selected.

[1] *Note by the secretariat: the catalogue of questions and the directive for its application are available on the website of the secretariat of the United Nations Economic Commission for Europe (http://www.unece.org/trans/danger/publi/adn/catalog_of_questions.html.*

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8.2.2.7.1.4 The model attached to the directive on the use of the catalogue of questions is to be used to compile the examination questions.

8.2.2.7.1.5 The examination shall be written. Candidates shall be asked 30 questions. The examination shall last 60 minutes. It is deemed to have been passed if at least 25 of the 30 questions have been answered correctly.

8.2.2.7.1.6 The competent authority or an examining body designated by the competent authority shall invigilate every examination. Any manipulation and deception shall be ruled out as far as possible. Authentication of candidates shall be ensured.

The use in the written test of documentation other than the texts of regulations on dangerous goods, CEVNI and related police regulations, is not permitted. Non–programmable pocket calculators are authorized for use during specialization courses and shall be supplied by the competent authority or by the examining body designated by the competent authority.

Examination documents (questions and answers) shall be recorded and kept as a print–out or electronically as a file.

8.2.2.7.1.7 Written examinations may be performed, in whole or in part, as electronic examinations, where the answers are recorded and evaluated using electronic data processing (EDP) processes, provided the following conditions are met:

(a) The hardware and software shall be checked and accepted by the competent authority or by the examining body designated by the competent authority.

(b) Electronic media may be used only if provided by the competent authority or by the examining body designated by the competent authority.

(c) Proper technical functioning shall be ensured. Arrangements as to whether and how the examination can be continued shall be made in the case of a failure of the devices and applications. No aids shall be available on the input devices (e.g. electronic search function); the electronic data processing equipment provided shall not allow the candidates to communicate with any other device during the examination.

(d) There shall be no means of a candidate introducing further data to the electronic media provided; the candidate may only answer the questions posed.

(e) The final inputs of each candidate shall be logged. The determination of the results shall be transparent.

8.2.2.7.2 *Specialization course on gases and chemicals*

8.2.2.7.2.1 Candidates who are successful in the ADN basic training examination may apply for enrolment in a “gases” and/or “chemicals” specialization course, to be followed by an examination. The examination shall be based on the Administrative Committee’s list of questions.

8.2.2.7.2.2 During the examination the candidate shall furnish proof that, in accordance with the “gases” and/or “chemicals” specialization course, he has the knowledge, understanding and capabilities required of the expert on board vessels carrying gases or chemicals, respectively.

8.2.2.7.2.3 The Administrative Committee shall prepare a catalogue of questions for the examination, comprising the objectives set out in 8.2.2.3.3.1 or 8.2.2.3.3.2 and a directive on the use of the

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catalogue of questions.[1] The examination questions shall be selected from the list. The candidate shall not have advance knowledge of the questions selected.

8.2.2.7.2.4 The model attached to the directive on the use of the catalogue of questions is to be used to compile the examination questions.

8.2.2.7.2.5 The examination shall be written.

The candidate is to be asked 30 multiple–choice questions and one substantive question. The examination shall last a total of 150 minutes, of which 60 minutes for the multiple–choice questions and 90 minutes for the substantive questions.

The examination shall be marked out of a total of 60, of which 30 marks will go to the multiple–choice questions (one mark per question) and 30 to the substantive question (the distribution of marks is left to the appreciation of the competent authority). A total of 44 marks must be achieved to pass. However, not less than 20 marks must be obtained in each part. If the candidate obtains 44 but does not achieve 20 in one part, the part in question may be resat once.

The provisions of 8.2.2.7.1.6 and 8.2.2.7.1.7 shall apply by analogy.

8.2.2.7.3 *Refresher training course*

8.2.2.7.3.1 At the end of the refresher course in accordance with paragraph 8.2.1.4, the course organizer shall conduct a test.

8.2.2.7.3.2 The test shall be in writing. Candidates shall be asked 20 multiple–choice questions. At the end of every refresher course, a fresh question paper shall be prepared. The test shall last 40 minutes. It shall be deemed to have been passed if at least 16 of the 20 questions have been answered correctly.

8.2.2.7.3.3 The provisions of 8.2.2.7.1.2, 8.2.2.7.1.3, 8.2.2.1.7.6 and 8.2.2.1.7.7 shall apply to the administration of the tests (outside the provisions of the directive on the use of the catalogue of questions for examining authorities and bodies).

8.2.2.7.3.4 The course organizer shall deliver to successful candidates a written certificate for presentation to the competent authority under paragraph 8.2.2.8.

8.2.2.7.3.5 The course organizer shall keep test papers of candidates for five years from the date of the test.

8.2.2.8 ***ADN specialized knowledge certificate***

8.2.2.8.1 The issue and renewal of the ADN specialized knowledge certificate conforming to the model in 8.6.2 shall be the responsibility of the competent authority or a body authorized by such authority.

8.2.2.8.2 The certificate's dimensions shall be in accordance with ISO/IEC 7810:2003, card size ID-1, and it shall be made of plastic. The colour shall be white, with black lettering. The certificate shall include an additional security feature such as a hologram, UV printing or engraved patterns. Its text shall be in the language(s) or in one of the languages of the State whose competent authority has issued it. If none of these languages is English, French or German, the title of the certificate, the title of item 8 and the titles on the back, and if applicable the

[1] *Note by the secretariat: the catalogue of questions and the directive for its application are available on the website of the secretariat of the United Nations Economic Commission for Europe (http://www.unece.org/trans/danger/publi/adn/catalog_of_questions.html).*

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additions under “tank vessels” or “dry cargo vessels” shall also be drawn up in English, French or German.

8.2.2.8.3 Certificates shall be issued to:

(a) candidates who have met the conditions of the second sentence of 8.2.1.2 and 8.2.1.3 (basic training course); they shall be valid for five years from the date when the examination has been passed following basic training;

(b) Candidates who meet the conditions of 8.2.1.5 or of 8.2.1.7 (“gas” or “chemicals” specialization course); in this case, a new certificate shall be issued containing certificates for the basic training and specialization courses. The new certificate to be issued shall be valid for five years from the date when the examination has been passed following basic training.

8.2.2.8.4 The certificate shall be renewed:

(a) when the proof required under 8.2.1.4 is provided (basic training; the new duration of validity shall begin on the expiry date of the previous certificate. If the test has been taken more than one year before the certificate’s expiry date, it shall begin on the date of the certificate of participation in the course;

(b) when the proof required under 8.2.1.6 and 8.2.1.8 are provided (“gas” or “chemicals” specialization courses). In this case, a new certificate containing all the certificates relating to the basic training and specialization courses shall be issued. The new certificate to be issued shall have a period of validity of five years from the date of the successfully completed refresher course for basic training. When the refresher course is taken in the year before the certificate’s expiry date, the new period of validity shall begin on the expiry date of the previous certificate; otherwise it shall begin on the date of the certificate of participation in the course.

8.2.2.8.5 If the refresher course for the renewal of the certificate has not been fully and successfully completed before the expiry of the period of validity of the certificate, or if the work on board a vessel for one year has not been certified during the two years preceding the certificate’s expiry, a new certificate shall be issued, for which participation in a further initial basic training course and an examination in accordance with 8.2.2.7 shall be required.

8.2.2.8.6 If a new certificate is issued in accordance with 8.2.2.8.3 (b) or a certificate is renewed in accordance with 8.2.2.8.4 and the previous certificate had been issued by another authority or by a body authorized to do so by such an authority, the issuing authority or body approved by that authority that has issued the previous certificate shall be informed without delay.

8.2.2.8.7 Contracting Parties shall provide the UNECE secretariat with a model for any certificate intended for issue in accordance with this section, along with models of certificates which are still valid. Contracting Parties may additionally provide explanatory notes. The UNECE secretariat shall make the information received available to all Contracting Parties.

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CHAPTER 8.3

MISCELLANEOUS REQUIREMENTS TO BE COMPLIED WITH BY THE CREW OF THE VESSEL

8.3.1 Persons authorized on board

8.3.1.1 Unless otherwise provided for in Part 7, only the following persons are authorized to be on board:

(a) members of the crew;

(b) persons who, although not being members of the crew, normally live on board; and

(c) persons who are on board for duty reasons.

8.3.1.2 The persons referred to in 8.3.1.1 (b) are not authorized to remain in the protected area of dry cargo vessels or in the cargo area of tank vessels except for short periods.

8.3.1.3 When the vessel is required to carry two blue cones or two blue lights in accordance with column (19) of Table C of Chapter 3.2, persons under 14 years of age are not permitted on board.

8.3.2 Portable lighting apparatus

On board, only portable lighting appliances with their own source of power are permitted in explosion hazardous areas and on deck.

In explosion hazardous areas, they shall meet at least the requirements for use in the relevant area.

8.3.3 Admittance on board

No unauthorized person shall be permitted on board. This prohibition shall be displayed on notice boards at appropriate places.

8.3.4 Prohibition on smoking, fire and naked light

Smoking, including of electronic cigarettes and similar devices, fire and naked light are prohibited on board. However, the provisions of 7.1.3.41.1 and 7.2.3.41.1 are applicable.

This prohibition shall be displayed on notice boards at appropriate places.

The prohibition does not apply in the accommodation or the wheelhouse, provided that their windows, doors, skylights and hatches are closed or the ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa.

8.3.5 Work on board

No work requiring the use of an open flame or electric current or liable to cause sparks may be carried out on board.

This provision does not apply:

– to berthing operations;

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– in the service spaces outside the protected area or the cargo area, provided the doors and openings of those areas are closed for the duration of the work and the vessel is not being loaded, unloaded or gas-freed; or

– when the vessel is not in the vicinity of or within an onshore assigned zone and, in the case of a tank vessel, has a certificate attesting to the totally gas-free condition of the vessel in accordance with 7.2.3.7.6 or an authorization from the competent authority or in the case of a dry cargo vessel, has a certificate attesting to the totally gas-free condition of the protected area or an authorization from the competent authority.

The use of low-sparking hand-tools (chromium vanadium steel screwdrivers and wrenches or screwdrivers and wrenches of equivalent material from the point of view of spark formation) and appropriate equipment at least for the zone concerned is permitted.

NOTE: *In addition, all other applicable regulations regarding workplace safety and safety of operations must be observed.*

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CHAPTER 8.4

(*Reserved*)

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CHAPTER 8.5

(*Reserved*)

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CHAPTER 8.6

DOCUMENTS

8.6.1 Certificate of approval

8.6.1.1 *Model for a certificate of approval for dry cargo vessels*

1

Competent authority: ……..
Space reserved for the emblem and name of the State

ADN certificate of approval No.:

1. Name of vessel .....…
2. Official number .....
3. Type of vessel .....
4. Additional requirements:
   - Vessel referred to in 7.1.2.19.1[1]
   - Vessel referred to in 7.2.2.19.3[1]
   - The vessel complies with the additional rules of construction referred to in 9.1.0.80 to 9.1.0.95/9.2.0.80 to 9.2.0.95[1]
   - Vessel complies with the rules of construction referred to in 9.1.0.12.3 (b) or (c), 9.1.0.51 or 9.1.0.52[1]
   - Ventilation system referred to in 9.1.0.12.3 (b)[1] in ……..
   - Vessel complies with the rules of construction referred to in 9.1.0.53[1]
   - Electrical and non-electrical installations and equipment for use in protected areas:
     Temperature classification: .....
     Explosion group: .....
5. Permitted derogations[1]: .....
   .....
   .....
   .....
   .....
6. The validity of this certificate of approval expires on ..... (date)
7. The previous certificate of approval No. .....was issued on .....
   by ..... (competent authority)
8. The vessel is approved for the carriage of dangerous goods based on:
   – inspection on[1] (date)…….
   – The inspection report of a recognized classification society [1]
   (name of the classification society) ……..……. (date)……
   – The inspection report of a recognized inspection body [1]
   (name of the inspection body) …… (date)……
9. Subject to permitted equivalence:[1] .....….....
   .....
   .....
   .....

[1] Delete as appropriate

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Extension of the validity of the certificate of approval

10. Subject to special authorizations:[1] .....
.....
.....
.....

11. Issued at: ..... on .....
(place) (date)

12. (Stamp) .....
(competent authority)

.....
(signature)

13. The validity of this certificate is extended under Chapter 1.16 of ADN

until .....
(date)

14. ..... on .....
(place) (date)

.....
15. (Stamp) (competent authority)

.....
(signature)

[1] Delete as appropriate

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8.6.1.2 ***Model for a provisional certificate of approval for dry cargo vessels***

1

Competent authority: ……
Space reserved for the emblem and name of the State

ADN provisional certificate of approval No: ……

1. Name of vessel ……..
2. Official number ……..
3. Type of vessel ……..…….
4. Additional requirements:

Vessel referred to in 7.1.2.19.1[1]
Vessel referred to in 7.2.2.19.3[1]
The vessel complies with the additional rules of construction referred to in 9.1.0.80 to 9.1.0.95/9.2.0.80 to 9.2.0.95[1]
Vessel complies with the rules of construction referred to in 9.1.0.12.3 (b) or (c), 9.1.0.51 or 9.1.0.52[1]
Ventilation system referred to in 9.1.0.12.3 (b)[1]
in ……..
Vessel complies with the rules of construction referred to in 9.1.0.53[1]
Electrical and non-electrical installations and equipment for use in protected areas:
Temperature classification: .....
Explosion group: .....

5. Permitted derogations[1]: .....
   .....
   .....
6. The provisional certificate of approval is valid……..……
   6.1 until ……[1]

   6.2 for a single journey from …….. to ……[1]

7. Issued at …… on ….……..
   (place) (date)

8. (Stamp) ….……..
   (competent authority)

   ….…….
   (signature)

……

[1] Delete as appropriate.

NOTE*: This model provisional certificate of approval may be replaced by a single certificate model combining a provisional certificate of inspection and the provisional certificate of approval, provided that this single certificate model contains the same particulars as the model above and is approved by the competent authority.*

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8.6.1.3 *Model for a certificate of approval for tank vessels*

1

Competent authority: .....
Space reserved for the emblem and name of the State

ADN certificate of approval No.:

1. Name of vessel .....
2. Official number .....
3. Type of vessel .....
4. Type of tank vessel .....
5. Cargo tank design
   1. Pressure cargo tanks[1 2]
   2. Closed cargo tanks[1 2]
   3. Open cargo tanks with flame arresters[1 2]
   4. Open cargo tanks[1 2]
6. Types of cargo tanks
   1. Independent cargo tanks[1 2]
   2. Integral cargo tanks[1 2]
   3. Cargo tank wall distinct from the hull[1 2]
7. Opening pressure of the pressure relief valves/high-velocity vent valves/safety valves ..... kPa[1 2]
8. Additional equipment:
   - Sampling device
     connection for a sampling device.....…...yes/no[1 2]
     sampling opening .....…. yes/no[1 2]
   - Water–spray system ..... yes/no[1 2]
     Internal pressure alarm 40 kPa ..... yes/no[1 2]
   - Cargo heating system:
     possibility of cargo heating from shore ..... yes/no[1 2]
     cargo heating installation on board ....…..... yes/no[1 2]
   - Cargo refrigeration system .....…. yes/no[1 2]
   - Inerting facilities .....…….. yes/no[1 2]
   - Pump–room below deck .....….. yes/no[1]
   - Ventilation system according to 9.3.x.12.4 (b) yes/no[1, 3]
     in .....
   - Conforms to the rules of construction referred to in 9.3.x.12.4 (b) or 9.3.x.12.4 (c), 9.3.x.51 and 9.3.x.52 Yes/No[1, 3]
   - Venting piping and heated installation Yes/No[1, 2]
   - Conforms to the rules of construction resulting from the remark(s) ... in column (20) of Table C of Chapter 3.2[1 2]
9. Electrical and non-electrical installations and equipment for use in explosion hazardous areas:
   - Temperature class: .....….
   - Explosion group: .....….
10. Autonomous protection systems:
    Explosion group/subgroup of explosion group II B: …….
11. Loading/unloading rate: ..... m^3/h [1] or see loading instructions on loading and unloading[1]

[1] Delete as appropriate.
[2] If the tanks are not all of the same type, see page 3.
[3] For "x", note the relevant information

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12. Permitted relative density: .....

13. Additional observations
Vessel complies with the rules of construction referred to in 9.3.x.12, 9.3.x.51, 9.3.x.52 Yes/No[1, 3]
.....
.....

14. The validity of this certificate of approval expires on ..... (date)

15. The previous certificate of approval No. ..... was issued on .....
by ..... (competent authority)

16. The vessel is approved for the carriage of the dangerous goods entered in the vessel substance list according to 1.16.1.2.5 based on:
– Inspection on[1] (date).....
– The inspection report of a recognized classification society [1]
(name of the classification society) ……..……. (date)……
– The inspection report of a recognized inspection body [1]
(name of the inspection body) …… (date)……

17. Subjected to permitted equivalence:[1]
.....
.....

18. Subject to special authorizations:[1]
.....
.....

19. Issued at: ..... on .....
(place) (date)

20. (Stamp) .....…
(competent authority)

.....…
(signature)

Extension of the validity of the certificate of approval

21. The validity of this certificate is extended under Chapter 1.16 of ADN

Until .....
(date)

22. ..... on .....
(place) (date)

23. (Stamp) .....
(competent authority)

.....….....
(signature)

[1] Delete as appropriate.
[3] For “x”, note the relevant information

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3

If the cargo tanks of the vessel are not all of the same type or the same design or the equipment is not the same, their type, their design and their equipment shall be indicated below:

Cargo tank number	1	2	3	4	5	6	7	8	9	10	11	12
pressure cargo tank												
closed cargo tank												
open cargo tank with flame arrester												
open cargo tank												
independent cargo tank												
integral cargo tank												
cargo tank wall distinct from the hull												
opening pressure of the pressure relief device/high velocity vent valve /safety valve in kPa												
connection for a sampling device												
sampling opening												
water–spray system												
internal pressure alarm 40 kPa ……..												
possibility of cargo heating from shore												
cargo heating installation on board												
cargo refrigeration installation												
inerting facilities												
venting piping and heated installation												
Conforms to the rules of construction resulting from the remark(s) …...of column (20) of Table C of Chapter 3.2												

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8.6.1.4 *Model for a provisional certificate of approval for tank vessels*

1

Competent authority: ……
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ADN provisional certificate of approval No: ……..…

1. Name of vessel……..
2. Official number……..
3. Type of vessel…….….
4. Type of tank vessel ……
5. Cargo tank design
   1. Pressure cargo tanks [1] [2]
   2. Closed cargo tanks [1] [2]
   3. Open cargo tanks with flame arresters [1] [2]
   4. Open cargo tanks [1] [2]
6. Types of cargo tanks
   1. Independent cargo tanks [1] [2]
   2. Integral cargo tanks [1] [2]
   3. Cargo tank wall distinct from the hull [1] [2]
7. Opening pressure of the pressure relief valves/high-velocity vent valves/ safety valves …… kPa [1] [2]
8. Additional equipment:
   - Sampling device
     connection for a sampling device …….. yes/no[1] [2]
     sampling opening …… yes/no[1] [2]
   - Water–spray system …… yes/no[1] [2]
     Internal pressure alarm 40 kPa …….. yes/no[1] [2]
   - Cargo heating system:
     possibility of cargo heating from shore ……. yes/no[1] [2]
     cargo heating installation on board …… yes/no[1] [2]
   - Cargo refrigeration system …….. yes/no[1] [2]
   - Inerting facilities .....…….. yes/no[1] [2]
   - Pump–room below deck .....….. yes/no[1]
   - Ventilation system according to 9.3.x.12.4 (b) yes/no[1, 3] in .....
   - Conforms to the rules of construction referred to in 9.3.x.12.4 (b) or 9.3.x.12.4 (c), 9.3.x.51 and 9.3.x.52 Yes/No[1, 3]
   - Venting piping and heated installation Yes/No[1, 2]
   - Conforms to the rules of construction resulting from the remark(s) ... in column (20) of Table C of Chapter 3.2[1] [2]
9. Electrical and non-electrical installations and equipment for use in explosion hazardous areas:
   - Temperature class: ……
   - Explosion group: ……..
10. Autonomous protection systems:
    Explosion group/subgroup of explosion group II B: …….

[1] Delete as appropriate.
[2] If the tanks are not all of the same type, see page 3.
[3] For “x”, note the relevant information

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11. Loading/unloading rate …… m^3/h[1] or see loading instructions[1] or see instructions on loading and unloading[1].

12. Permitted relative density: …….

13. Additional observations:
Vessel complies with the rules of construction referred to in 9.3.x.12, 9.3.x.51, 9.3.x.52 Yes/No[1, 3]

……

14. The provisional certificate of approval is valid……..……
14.1 until [1]……

14.2 for a single journey from [1]…….. to ……

15. Issued at …… on ….……..
(place) (date)

16. (Stamp) ….……..
(competent authority)

….…….
(signature)

---

[1] Delete as appropriate.
[2] If the tanks are not all of the same type, see page 3.
[3] For "x", note the relevant information

NOTE: *This model provisional certificate of approval may be replaced by a single certificate model combining a provisional certificate of inspection and the provisional certificate of approval, provided that this single certificate model contains the same particulars as the model above and is approved by the competent authority.*

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3

If the cargo tanks of the vessel are not all of the same type or the same design or the equipment is not the same, their type, their design and their equipment shall be indicated below:

Cargo tank number	1	2	3	4	5	6	7	8	9	10	11	12
pressure cargo tank												
closed cargo tank												
open cargo tank with flame arrester												
open cargo tank												
independent cargo tank												
integral cargo tank												
cargo tank wall distinct from the hull												
opening pressure relief device/high velocity vent valve/safety valve in kPa												
connection for a sampling device												
sampling opening												
water–spray system												
internal pressure alarm 40 kPa ……..												
possibility of cargo heating from shore												
cargo heating installation on board												
cargo refrigeration installation												
inerting facilities												
venting piping and heated installation												
Conforms to the rules of construction resulting from the remark(s) …….. of column (20) of Table C of Chapter 3.2												

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8.6.1.5 Annex to the certificate of approval and provisional certificate of approval according to 1.16.1.3.1 (a)

Annex to the certificate of approval 1. Official number ..... 2. Type of vessel ..... 3. Transitional provisions applicable as from				
ADN certificate of approval No.:	Competent authority	Issued on	Valid until	Stamp and signature]

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ADN certificate of approval No.:	Competent authority	Issued on	Valid until	Stamp and signature

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8.6.2 Certificate of special knowledge of ADN according to 8.2.1.2, 8.2.1.5 or 8.2.1.7

(Recto)

(**)

Certificate of special knowledge of ADN

1. (No. of certificate)
2. (Name)
3. (First name(s))
4. (Born on DD/MM/YYYY)
5. (Nationality)
6. (Signature of holder)
7. (Issued by)
8. VALID UNTIL: (DD/MM/YYYY)

Photo of holder

(Verso)

1. (No. of certificate)

The certificate is valid for special knowledge of ADN according to: (Insert the corresponding subsection of ADN 8.2.1, if applicable with the mention “only for dry cargo vessels” or “only for tank vessels”.)

** Letter code(s) used for international navigation (CEVNI – Annex 1).

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8.6.3 ADN Checklist

1

ADN Checklist

concerning the observance of safety provisions and the implementation of the necessary measures for loading/unloading

– **Particulars of vessel**

…….. No. ……...
(name of vessel) (official number)

……..
(vessel type)

– **Particulars of loading or unloading operations**

……... ……..
(shore loading or unloading installation) (place)

……... ……..
(date) (time)

– **Particulars of the cargo as indicated in the transport document**

Quantity m^3	Proper shipping name***	UN Number or Identification number	Dangers* ……	Packing Group
……..	……	……..	……	……
...……...	……	……..	……	……
……..	….……	……..	……	……

– **Particulars of last cargo****

Proper shipping name ***	UN Number or Identification number	Dangers* ……	Packing Group
……	……..	……	……
……	……..	……	……
……	……..	……	……

** Dangers indicated in column (5) of Table C, as relevant (as mentioned in the transport document in accordance with 5.4.1.1.2 (c)).*
***To be filled in only if vessel is to be loaded.*
**** The proper shipping name given in column (2) of Table C of Chapter 3.2, supplemented, when applicable, by the technical name in parenthesis.*

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Loading/unloading rate (not to be filled in if vessel is to be loaded with gas or have gas unloaded)

Proper shipping name**	Cargo tank number	agreed rate of loading/unloading					
		start		half way		end	
		rate m^3/h	quantity m^3	rate m^3/h	quantity m^3	rate m^3/h	quantity m^3
...……	……	……..	……...	…..….	……..	……	……...
……...	…….	…..…	……...	……...	……..	……	……...
……...	…….	…..…	……...	…….	……...	……	……...

Will the cargo piping be drained after loading or unloading by stripping or by blowing residual quantities to the shore installation/to the vessel?*

by blowing*
by stripping*

If drained by blowing, how?

……
(e.g. air, inert gas, sleeve)

……. kPa
(permissible maximum pressure in the cargo tank)

…….litres
(estimated residual quantity)

Questions to the master or the person mandated by him and the person in charge at the loading/unloading place

Loading/unloading may only be started after all questions on the checklist have been checked off by "X", i.e. answered with YES and the list has been signed by both persons.

Non–applicable questions have to be deleted.

If not all questions can be answered with YES, loading/unloading is only allowed with consent of the competent authority.

* *Delete as appropriate.*
** *The proper shipping name given in column (2) of Table C of Chapter 3.2, supplemented, when applicable, by the technical name in parenthesis.*

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		3 vessel	3 loading/ unloading place
1.	Is the vessel permitted to carry this cargo?	O*	O*
2.	(*Reserved*)		
3.	Is the vessel well moored in view of local circumstances?	O	–
4.	Have suitable means in accordance with 7.2.4.77 been provided for leaving the vessel, including in cases of emergency?	O	O
5.	Are the escape routes and the loading/unloading place adequately lighted?	O	O
6.	Vessel/shore connection		
	6.1 Is the piping for loading or unloading between vessel and shore in satisfactory condition?	–	O
	Is it correctly connected?	–	O
	6.2 Are all the connecting flanges fitted with suitable gaskets?	–	O
	6.3 Are all the connecting bolts fitted and tightened?	O	O
	6.4 Are the shoreside loading arms free to move in all directions and do the hose assemblies have enough room for easy movement?	–	O
7.	Are all flanges of the connections of the piping for loading and unloading and of the venting piping not in use, correctly blanked off?	O	O
8.	Are suitable means of collecting leakages placed under the pipe connections which are in use and are they empty??	O	O
9.	Are the movable connecting pieces between the ballast and bilge piping on the one hand and the piping for loading and unloading on the other hand disconnected?	O	–
10.	Is continuous and suitable supervision of loading/unloading ensured for the whole period of the operation?	O	O
11.	Is communication between vessel and shore ensured?	O	O
12.1	For the loading of the vessel, is the venting piping, where required, or if it exists, connected with the vapour return piping?	O	O
12.2	Is it ensured that the shore installation is such that the pressure at the connecting-point of the vapour return piping and the venting piping cannot exceed the opening pressure of the pressure relief devices/high velocity vent valves (pressure at connecting point __ kPa)?	–	O*
12.3	When anti–explosion protection is required in Chapter 3.2, Table C, column (17) does the shore installation ensure that its vapour return piping is such that the vessel is protected against detonations and flame fronts from the shore.	–	O
13.	Is it known what actions are to be taken in the event of an “Emergency–stop” and an “Alarm”?	O	O

* *To be filled in only if vessel is to be loaded.*

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		4 vessel	loading/ unloading place
14.	Check on the most important operational requirements:		
	– Are the required fire extinguishing systems and appliances operational?	O	O
	– Have all valves and other closing devices been checked for correct open – or closed position?	O	O
	– Has smoking been generally prohibited?	O	O
	– Are the flame operated heating applications on board turned off?	O	–
	– Is the voltage cut off from the radar installations?	O	–
	– Is all electrical equipment marked red switched off?	O	–
	– Are all windows and doors closed?	O	–
15.1	Has the starting working pressure of the vessel's cargo discharge pump been adjusted to the permissible working pressure of the shore installation? (agreed pressure __ kPa)	O	–
15.2	Has the starting working pressure of the shore pump been adjusted to the permissible working pressure of the on–board installation? (agreed pressure __ kPa)	–	O
16.	Is the liquid level alarm–installation operational?	O	–
17.	Is the following system plugged in, in working order and tested?		
	Overflow prevention device □ when loading □ when unloading	O	O
	Device for switching off the on–board pump from the shore facility (only when unloading the vessel)	O	O
18.	To be filled in only in the case of loading or unloading of substances for the carriage of which a closed cargo tank or an open cargo tank with flame arrester is required:		
	Are the cargo tank hatches and cargo tank inspection and sampling openings closed or protected by flame arresters fulfilling the requirements of column (16) of Table C of Chapter 3.2?	O	–
19.	When transporting refrigerated liquefied gases, has the holding time been determined according to 7.2.4.16.16, and is known and documented on board?	O**	O**

Checked, filled in and signed	
for the vessel:	for the installation of loading and unloading:
.....	.....
(name in capital letters)	(name in capital letters)
.....	.....
(signature)	(signature)

** *To be filled in only if the vessel is to be loaded.*

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Explanation

Question 3

"Well moored" means that the vessel is fastened to the pier or the cargo transfer station in such a way that, without intervention of a third person, movements of the vessel in any direction that could hamper the operation of the cargo transfer gear will be prevented. Established or predictable variations of the water–level at that location and special factors have to be taken into account.

Question 4

It must be possible to escape safely from the vessel at any time. If there is none or only one protected escape route available at the shoreside for a quick escape from the vessel in case of emergency, a suitable means of escape has to be provided on the vessel side if required in accordance with 7.2.4.77.

Question 6

A valid inspection certificate for the hose assemblies must be available on board. The material of the piping for loading and unloading must be able to withstand the expected loads and be suitable for cargo transfer of the respective substances. The piping for loading and unloading between vessel and shore must be placed so that it cannot be damaged by ordinary movements of the vessel during the loading and unloading process or by variations of the water. In addition, all flanged joints must be fitted with appropriate gaskets and sufficient bolt connections in order to exclude the possibility of leakage.

Question 10

Loading/unloading must be supervised on board and ashore so that dangers which may occur in the vicinity of piping for loading and unloading between vessel and shore can be recognized immediately. When supervision is effected by additional technical means it must be agreed between the shore installation and the vessel how it is to be ensured.

Question 11

For a safe loading/unloading operation good communications between vessel and shore are required. For this purpose telephone and radio equipment may be used only if of an explosion protected type and located within reach of the supervisor.

Question 13

Before the start of the loading/unloading operation the representative of the shore installation and the master or the person mandated by him must agree on the applicable procedure. The specific properties of the substances to be loaded/unloaded have to be taken into account.

Question 17

To prevent backflow from the shore, it is also necessary to activate the overflow prevention device on the vessel under certain circumstances when unloading. It is obligatory during loading and optional during unloading. Delete this item if it is not necessary during unloading.

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8.6.4 Checklist degassing to reception facilities

1

ADN Checklist

concerning the observance of safety provisions and the implementation of the necessary measures for degassing to reception facilities

– **Particulars of vessel**

…….. No. ……...
(name of vessel) (official number)

……..
(vessel type)

– **Particulars of reception facility**

……... ……..
(reception facility) (place)

……... ……..
(date) (time)

Reception facility approved according CDNI ☐ Yes ☐ No

– **Particulars of the previous cargo in the tank before degassing as indicated in the transport document**

Cargo tank #	Quantity m^3	Proper shipping name**	UN Number or Identification number	Dangers* ……	Packing Group
……	……	……	……..	……	……
……	……..	……	……..	……	……
……		……	……..	……	

* *Dangers indicated in column (5) of Table C, as relevant (as mentioned in the transport document in accordance with 5.4.1.1.2 (c)).*

** *The proper shipping name given in column (2) of Table C of Chapter 3.2, supplemented, when applicable, by the technical name in parenthesis.*

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		2
Degassing rate		
Proper shipping name**	Cargo tank number	agreed rate of degassing
		rate m^3/h
...……	……	……..
……...	…….	…..…
……...	…….	…..…

Questions to the master or the person mandated by him and the person in charge at the reception facility

Degassing may only be started after all questions on the checklist have been checked off by "X", i.e. answered with YES and the list has been signed by both persons.

Non–applicable questions have to be deleted.

If not all questions can be answered with YES, degassing is only allowed with consent of the competent authority.

** *The proper shipping name given in column (2) of Table C of Chapter 3.2, supplemented, when applicable, by the technical name in parenthesis.*

		vessel	3 reception facility
1.	Is the vessel well moored in view of local circumstances?	O	–
2.	Are the pipings for degassing between vessel and reception facility in satisfactory condition?	–	O
	Are they correctly connected and are appropriate flame arresters fitted in the piping between the vessel and the reception facility?	O	O
3.	Are all flanges of the connections of the piping for loading and unloading and of the venting piping not in use, correctly blanked off?	O	O
4.	Is continuous and suitable supervision of degassing ensured for the whole period of the operation?	O	O
5.	Is communication between vessel and reception facility ensured?	O	O
6.1	Is it ensured that the reception facility is such that the pressure at the connecting point cannot exceed the opening pressure of the high–velocity vent valves (pressure at connecting point __ kPa)?	–	O*
6.2	Is the air inlet part of a closed system or equipped with a spring-loaded low-pressure valve?	–	O**
6.3	When anti–explosion protection is required in Chapter 3.2, Table C, column (17) does the reception facility ensure that its piping is such that the vessel is protected against detonations and passage of flames from the reception facility.	–	O
7.	Is it known what actions are to be taken in the event of an "Emergency–stop" and an "Alarm"?	O	O

* *Not applicable if vacuum is used to generate air flows.*

** *Only applicable is vacuum is used to generate air flows.*

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			4
		vessel	reception facility
8.	Check on the most important operational requirements:		
	– Are the required fire extinguishing systems and appliances operational?	O	O
	– Have all valves and other closing devices been checked for correct open or closed position?	O	O
	– Has smoking been generally prohibited?	O	O
	– Are the flame operated heating applications on board turned off?	O	–
	– Is the voltage cut off from the radar installations?	O	–
	– Is all electrical equipment marked red switched off?	O	–
	– Are all windows and doors closed?	O	–
9.1	Has the pressure of the vessel's piping been adjusted to the permissible working pressure of the reception facility? (agreed pressure __ kPa)	O	–
9.2	Has the pressure of the reception facility piping been adjusted to the permissible working pressure of the on–board installation? (agreed pressure __ kPa)	–	O
10.	Are the cargo tank hatches and cargo tank inspection, gauging and sampling openings closed or protected by flame arresters in good condition?	O	–

Checked, filled in and signed	
for the vessel:	for the reception facility:
.....	.....
(name in capital letters)	(name in capital letters)
.....	.....
(signature)	(signature)

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Explanation

Question 1

"Well moored" means that the vessel is fastened to the pier or the reception facility in such a way that, without intervention of a third person, movements of the vessel in any direction that could hamper the degassing operation will be prevented. Established or predictable variations of the water–level at that location and special factors have to be taken into account.

Question 2

The material of the piping must be able to withstand the expected rates and be suitable for degassing. The piping between vessel and reception facility must be placed so that it cannot be damaged by ordinary movements of the vessel during the degassing process or by variations of the water.

Question 4

Degassing must be supervised on board and at the reception facility so that dangers which may occur in the vicinity of the piping between vessel and reception facility can be recognized immediately. When supervision is effected by additional technical means it must be agreed between the reception facility and the vessel how it is to be ensured.

Question 5

For a safe degassing operation good communications between vessel and shore are required. For this purpose telephone and radio equipment may be used only if of an explosion protected type and located within reach of the supervisor.

Question 7

Before the start of the degassing operation the representative of the reception facility and the master or the person mandated by him must agree on the applicable procedure. The specific properties of the substances to be degassed have to be taken into account.

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PART 9

Rules for construction

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CHAPTER 9.1

RULES FOR CONSTRUCTION OF DRY CARGO VESSELS

9.1.0 Rules for construction applicable to dry cargo vessels

Provisions of 9.1.0.0 to 9.1.0.79 apply to dry cargo vessels.

9.1.0.0 *Materials of construction*

The vessel's hull shall be constructed of shipbuilding steel or other metal, provided that this metal has at least equivalent mechanical properties and resistance to the effects of temperature and fire.

9.1.0.1 *Vessel record*

NOTE: *For the purpose of this paragraph, the term "owner" has the same meaning as in 1.16.0.*

The vessel record shall be retained by the owner who shall be able to provide this documentation at the request of the competent authority and the recognized classification society.

The vessel record shall be maintained and updated throughout the life of the vessel and shall be retained for 6 months after the vessel is taken out of service.

Should a change of owner occur during the life of the vessel the vessel record shall be transferred to the new owner.

Copies of the vessel record or all necessary documents shall be made available on request to the competent authority for the issuance of the certificate of approval and for the recognized classification society or inspection body for first inspection, periodic inspection, special inspection or exceptional checks.

9.1.0.2 to 9.1.0.10 (*Reserved*)

9.1.0.11 Holds

9.1.0.11.1 (a) Each hold shall be bounded fore and aft by watertight metal bulkheads.

(b) The holds shall have no common bulkhead with the oil fuel tanks.

9.1.0.11.2 The bottom of the holds shall be such as to permit them to be cleaned and dried.

9.1.0.11.3 The hatchway covers shall be spraytight and weathertight or be covered by waterproof tarpaulins.

Tarpaulins used to cover the holds shall not readily ignite.

9.1.0.11.4 No heating appliances shall be installed in the holds.

9.1.0.12 *Ventilation*

9.1.0.12.1 It must be possible to ventilate each hold by means of two mutually independent extraction ventilators having a capacity of not less than five changes of air per hour based on the volume of the empty hold. The extraction ducts shall be positioned at the extreme ends of the

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hold and extend down to not more than 50 mm above the bottom. The extraction of gases and vapours through the duct shall also be ensured for carriage in bulk.

If the extraction ducts are movable they shall be suitable for the ventilator assembly and capable of being firmly fixed. Protection shall be ensured against bad weather and spray. The air intake shall be ensured during ventilation.

9.1.0.12.2 The ventilation system of a hold shall be arranged so that dangerous gases cannot penetrate into the accommodation, wheelhouse or engine rooms.

9.1.0.12.3 (a) Ventilation shall be provided for the accommodation, wheelhouse and for service spaces;

(b) The ventilation system in such spaces shall meet the following requirements:

(i) The air intakes of the ventilation system shall be located as far away as possible, and not less than 6.00 m from the protected area and not less than 2.00 m above the deck;

(ii) Overpressure of at least 0.1 kPa (0.001 bar) may be maintained in the premises;

(iii) A breakdown alarm is integrated;

(iv) The ventilation system, including the breakdown alarm, shall be at least of the 'limited explosion risk' type;

(v) A gas detection system conforming to conditions 1. to 4. below is connected to the ventilation system:

1. It is appropriate at least for use in zone 1, explosion group IIC and temperature class T6;
2. It is equipped with sensors:
   - On the suction inlets of the ventilation systems; and
   - Directly below the top edge of the sill of the entrance doors;
3. Its t90-time is lower than or equal to 4 s;
4. Measurement shall be continuous;

(vi) In the service spaces, the ventilation system is linked to the emergency lighting, which shall be at least of the 'limited explosion risk' type;

This emergency lighting is not necessary if the lighting installations in the service spaces are of at least the 'limited explosion risk' type;

(vii) The suction of the ventilation system and installations and equipment that do not meet the requirements of 9.1.0.51 and 9.1.0.52.1 shall be shut down when a concentration equal to 20% of the LEL of n-Hexane is reached;

The switching-off shall be indicated in the accommodation and wheelhouse by visual and audible signals;

(viii) In the event of failure of the ventilation system or of the gas detection installations in the accommodation, installations and equipment in the accommodation that do not comply with the requirements of 9.1.0.51 and 9.1.0.52.1 shall be switched off;

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The switching-off shall be indicated in the accommodation, the wheelhouse and on the deck by visual and audible signals;

(ix) In the event of failure of the ventilation system or of the gas detection installations in the wheelhouse or the service spaces, installations and equipment in those spaces that do not comply with the requirements of 9.1.0.51 and 9.1.0.52.1 shall be switched off;

The switching-off shall be indicated in the wheelhouse and on the deck by visual and audible signals. The alarm must be relayed to the accommodation automatically if it has not been switched off;

(x) Any switching-off shall take place immediately and automatically and, if necessary, shall switch on the emergency lighting;

The automatic switch-off device is set so that no automatic switching-off may occur while the vessel is under way;

(c) If there is no ventilation system or the ventilation system of a space does not comply with all the requirements set out in (b) above, any installations or equipment present in that space that may, if switched on, give rise to surface temperatures higher than those mentioned in 9.1.0.51 or that do not meet the requirements set out in 9.1.0.52.1 must be capable of being switched off.

9.1.0.12.4 Notice boards shall be fitted at the ventilation inlets indicating the conditions under which they shall be closed. All ventilation inlets of accommodation, wheelhouse and service spaces leading into the open air outside of the protected area shall be located not less than 2.00 m from the protected area.

All ventilation inlets shall be fitted with fixed devices according to 9.1.0.40.2.2 (c) enabling them to be closed rapidly. It shall be clear whether they are open or closed.

9.1.0.12.5 Ventilators including their motors used within the protected area and motors for hold ventilators which are arranged in the air flow shall fulfil at least the requirements for use in zone 1. They shall meet at least the requirements for temperature class T4 and explosion group II B.

9.1.0.12.6 The requirements of 9.1.0.12.3 (b) or (c) must be met only if the vessel is located within or in the immediate vicinity of a shoreside assigned zone.

9.1.0.13 to 9.1.0.16 (*Reserved*)

9.1.0.17 ***Accommodation and service spaces***

9.1.0.17.1 The accommodation shall be separated from the holds by metal bulkheads having no openings.

9.1.0.17.2 Gastight closing appliances shall be provided for openings in the accommodation and wheelhouse facing the holds.

9.1.0.17.3 No entrances or openings of the engine rooms and service spaces shall face the protected area.

9.1.0.18 and 9.1.0.19 (*Reserved*)

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9.1.0.20 ***Water ballast***

The double-hull spaces and double bottoms may be arranged for being filled with water ballast.

9.1.0.21 to 9.1.0.30 (*Reserved*)

9.1.0.31 ***Engines***

9.1.0.31.1 Only internal combustion engines running on fuel having a flashpoint above 55 °C are allowed. This provision does not apply to internal combustion engines which are part of propulsion and auxiliary systems. These systems shall meet the requirements of Chapter 30 and Annex 8, Section 1 of the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) as amended.[1]

9.1.0.31.2 The air vents in the engine rooms and the air intakes of the engines which do not take air in directly from the engine room shall be located not less than 2.00 m from the protected area.

9.1.0.31.3 Sparking shall not be possible in the protected area.

9.1.0.32 ***Oil fuel tanks***

9.1.0.32.1 Double bottoms within the hold area may be arranged as oil fuel tanks provided their depth is not less than 0.6 m. Oil fuel pipes and openings to such tanks are not permitted in the holds.

9.1.0.32.2 The open ends of the air pipes of each oil fuel tanks shall be extended to not less than 0.50 m above the open deck. These open ends and the open ends of overflow pipes leading to the deck shall be fitted with a protective device consisting of a gauze diaphragm or a perforated plate.

9.1.0.33 (*Reserved*)

9.1.0.34 ***Exhaust pipes***

9.1.0.34.1 Exhausts shall be evacuated from the vessel into the open air either upwards through an exhaust pipe or through the shell plating. The exhaust outlet shall be located not less than 2.00 m from the hatchway openings. The exhaust pipes of engines shall be arranged so that the exhausts are led away from the vessel. The exhaust pipes shall not be located within the protected area.

9.1.0.34.2 Exhaust pipes shall be provided with a device preventing the escape of sparks, e.g. spark arresters.

9.1.0.35 ***Stripping installation***

The stripping pumps intended for the holds shall be located in the protected area. This requirement shall not apply when stripping is effected by eductors.

9.1.0.36 to 9.1.0.39 (*Reserved*)

9.1.0.40 ***Fire-extinguishing arrangements***

9.1.0.40.1 A fire-extinguishing system shall be installed on the vessel. This system shall comply with the following requirements:

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[1] *As available on the website of the Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI, https://www.cesni.eu/en/documents/es-trin/*

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- It shall be supplied by two independent fire or ballast pumps one of which shall be ready for use at any time. These pumps and their means of propulsion and electrical equipment shall not be installed in the same space;

- It shall be provided with a water main fitted with at least three hydrants in the protected area above deck. Three suitable and sufficiently long hoses with jet/spray nozzles having a diameter of not less than 12 mm shall be provided. Alternatively one or more of the hose assemblies may be substituted by directable jet/spray nozzles having a diameter of not less than 12 mm. It shall be possible to reach any point of the deck in the protected area simultaneously with at least two jets of water which do not emanate from the same hydrant. A spring-loaded non-return valve shall be fitted to ensure that no gases can escape through the fire-extinguishing system into the accommodation or service spaces outside the protected area;

- The capacity of the system shall be at least sufficient for a jet of water to reach a distance of not less than the vessel's breadth from any location on board with two spray nozzles being used at the same time;

- The water supply system shall be capable of being put into operation from the wheelhouse and from the deck;

- Measures shall be taken to prevent the freezing of fire-mains and hydrants.

A single fire or ballast pump shall suffice on board pushed barges without their own means of propulsion.

9.1.0.40.2 In addition, the engine rooms shall be provided with a permanently fixed fire-extinguishing system meeting the following requirements:

9.1.0.40.2.1 *Extinguishing agents*

For the protection of spaces in engine rooms, boiler rooms and pump rooms, only permanently fixed fire-extinguishing systems using the following extinguishing agents are permitted:

(a) CO_2 (carbon dioxide);

(b) HFC 227 ea (heptafluoropropane);

(c) IG-541 (52% nitrogen, 40% argon, 8% carbon dioxide);

(d) FK-5-1-12 (dodecafluoro 2–methylpentane–3–one);

(e) (*Reserved*)

(f) K_2CO_3 (potassium carbonate).

Other extinguishing agents are permitted only on the basis of recommendations by the Administrative Committee.

9.1.0.40.2.2 *Ventilation, air extraction*

(a) The combustion air required by the combustion engines which ensure propulsion should not come from spaces protected by permanently fixed fire-extinguishing systems. This requirement is not mandatory if the vessel has two independent main engine rooms with a gastight separation or if, in addition to the main engine room, there is a separate engine room installed with a bow thruster that can independently ensure propulsion in the event of a fire in the main engine room.

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(b) All forced ventilation systems in the space to be protected shall be shut down automatically as soon as the fire-extinguishing system is activated.

(c) All openings in the space to be protected which permit air to enter or gas to escape shall be fitted with devices enabling them to be closed rapidly. It shall be clear whether they are open or closed.

(d) Air escaping from the pressure–relief valves of the pressurised air tanks installed in the engine rooms shall be evacuated to the open air.

(e) Overpressure or negative pressure caused by the diffusion of the extinguishing agent shall not destroy the constituent elements of the space to be protected. It shall be possible to ensure the safe equalisation of pressure.

(f) Protected spaces shall have a facility for extracting the extinguishing agent and the combustion gases. Such facilities shall be capable of being operated from positions outside the protected rooms and which must not be made inaccessible by a fire within such spaces. If there are permanently installed extractors, it shall not be possible for these to be switched on while the fire is being extinguished.

9.1.0.40.2.3 *Fire alarm system*

The space to be protected shall be monitored by an appropriate fire alarm system. The alarm signal shall be audible in the wheelhouse, the accommodation and the space to be protected.

9.1.0.40.2.4 *Piping system*

(a) The extinguishing agent shall be routed to and distributed in the space to be protected by means of a permanent piping system. Piping installed in the space to be protected and their fittings shall be made of steel. This shall not apply to the connecting nozzles of tanks and compensators provided that the materials used have equivalent fire–retardant properties. Piping shall be protected against corrosion both internally and externally.

(b) The discharge nozzles shall be so arranged as to ensure the regular diffusion of the extinguishing agent. In particular, the extinguishing agent must also be effective beneath the floor.

9.1.0.40.2.5 *Triggering device*

(a) Automatically activated fire-extinguishing systems are not permitted.

(b) It shall be possible to activate the fire-extinguishing system from a suitable point located outside the space to be protected.

(c) Triggering devices shall be so installed that they can be activated in the event of a fire and so that the risk of their breakdown in the event of a fire or an explosion in the space to be protected is reduced as far as possible.

Systems which are not mechanically activated shall be supplied from two energy sources independent of each other. These energy sources shall be located outside the space to be protected. The control lines located in the space to be protected shall be so designed as to remain capable of operating in the event of a fire for a minimum of 30 minutes. The electrical installations are deemed to meet this requirement if they conform to the IEC 60331–21:1999 standard.

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When the triggering devices are so placed as not to be visible, the component concealing them shall carry the "Fire-fighting system" symbol, each side being not less than 10 cm in length, with the following text in red letters on a white ground:

Fire-extinguishing system

(d) If the fire-extinguishing system is intended to protect several spaces, it shall comprise a separate and clearly–marked triggering device for each space;

(e) The instructions shall be posted alongside all triggering devices and shall be clearly visible and indelible. The instructions shall be in a language the master can read and understand and if this language is not English, French or German, they shall be in English, French or German. They shall include information concerning:

(i) the activation of the fire-extinguishing system;

(ii) the need to ensure that all persons have left the space to be protected;

(iii) The correct behaviour of the crew in the event of activation and when accessing the space to be protected following activation or diffusion, in particular in respect of the possible presence of dangerous substances;

(iv) the correct behaviour of the crew in the event of the failure of the fire-extinguishing system to function properly.

(f) The instructions shall mention that prior to the activation of the fire-extinguishing system, combustion engines installed in the space and aspirating air from the space to be protected, shall be shut down.

9.1.0.40.2.6 *Alarm device*

(a) Permanently fixed fire-extinguishing systems shall be fitted with an audible and visual alarm device;

(b) The alarm device shall be set off automatically as soon as the fire-extinguishing system is first activated. The alarm device shall function for an appropriate period of time before the extinguishing agent is released; it shall not be possible to turn it off;

(c) Alarm signals shall be clearly visible in the spaces to be protected and their access points and be clearly audible under operating conditions corresponding to the highest possible sound level. It shall be possible to distinguish them clearly from all other sound and visual signals in the space to be protected;

(d) Sound alarms shall also be clearly audible in adjoining spaces, with the communicating doors shut, and under operating conditions corresponding to the highest possible sound level;

(e) If the alarm device is not intrinsically protected against short circuits, broken wires and drops in voltage, it shall be possible to monitor its operation;

(f) A sign with the following text in red letters on a white ground shall be clearly posted at the entrance to any space the extinguishing agent may reach:

Warning, fire-extinguishing system!
Leave this space immediately when the … (description) alarm is activated!

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9.1.0.40.2.7 *Pressurised tanks, fittings and piping*

(a) Pressurised tanks, fittings and piping shall conform to the requirements of the competent authority or, if there are no such requirements, to those of a recognized classification society.

(b) Pressurised tanks shall be installed in accordance with the manufacturer's instructions.

(c) Pressurised tanks, fittings and piping shall not be installed in the accommodation.

(d) The temperature of cabinets and storage spaces for pressurised tanks shall not exceed 50 °C.

(e) Cabinets or storage spaces on deck shall be securely stowed and shall have vents so placed that in the event of a pressurised tank not being gastight, the escaping gas cannot penetrate into the vessel. Direct connections with other spaces are not permitted.

9.1.0.40.2.8 *Quantity of extinguishing agent*

If the quantity of extinguishing agent is intended for more than one space, the quantity of extinguishing agent available does not need to be greater than the quantity required for the largest of the spaces thus protected.

9.1.0.40.2.9 *Installation, maintenance, monitoring and documents*

(a) The mounting or modification of the system shall only be performed by a company specialised in fire-extinguishing systems. The instructions (product data sheet, safety data sheet) provided by the manufacturer of the extinguishing agent or the system shall be followed.

(b) The system shall be inspected by an expert:

(i) before being brought into service;

(ii) each time it is put back into service after activation;

(iii) after every modification or repair;

(iv) regularly, not less than every two years.

(c) During the inspection, the expert is required to check that the system conforms to the requirements of 9.1.0.40.2.

(d) The inspection shall include, as a minimum:

(i) an external inspection of the entire system;

(ii) an inspection to ensure that the piping is leakproof;

(iii) an inspection to ensure that the control and activation systems are in good working order;

(iv) an inspection of the pressure and contents of tanks;

(v) an inspection to ensure that the means of closing the space to be protected are leakproof;

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(vi) an inspection of the fire alarm system;

(vii) an inspection of the alarm device.

(e) The person performing the inspection shall establish, sign and date a certificate of inspection.

(f) The number of permanently fixed fire-extinguishing systems shall be mentioned in the vessel certificate.

9.1.0.40.2.10 *Fire-extinguishing system operating with CO_2*

In addition to the requirements contained in 9.1.0.40.2.1 to 9.1.0.40.2.9, fire-extinguishing systems using CO_2 as an extinguishing agent shall conform to the following provisions:

(a) Tanks of CO_2 shall be placed in a gastight space or cabinet separated from other spaces. The doors of such storage spaces and cabinets shall open outwards; they shall be capable of being locked and shall carry on the outside the symbol "Warning: general danger," not less than 5 cm high and "CO_2" in the same colours and the same size;

(b) Storage cabinets or spaces for CO_2 tanks located below deck shall only be accessible from the outside. These spaces shall have an artificial ventilation system with extractor hoods and shall be completely independent of the other ventilation systems on board;

(c) The level of filling of CO_2 tanks shall not exceed 0.75 kg/l. The volume of depressurised CO_2 shall be taken to be 0.56 m^3/kg;

(d) The concentration of CO_2 in the space to be protected shall be not less than 40% of the gross volume of the space. This quantity shall be released within 120 seconds. It shall be possible to monitor whether diffusion is proceeding correctly;

(e) The opening of the tank valves and the control of the diffusing valve shall correspond to two different operations;

(f) The appropriate period of time mentioned in 9.1.0.40.2.6 (b) shall be not less than 20 seconds. A reliable installation shall ensure the timing of the diffusion of CO_2.

9.1.0.40.2.11 *Fire-extinguishing system operating with HFC-227 ea (heptafluoropropane)*

In addition to the requirements of 9.1.0.40.2.1 to 9.1.0.40.2.9, fire-extinguishing systems using HFC-227 ea as an extinguishing agent shall conform to the following provisions:

(a) Where there are several spaces with different gross volumes, each space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing HFC-227 ea placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Every tank shall be fitted with a device permitting control of the gas pressure;

(d) The level of filling of tanks shall not exceed 1.15 kg/l. The specific volume of depressurised HFC-227 ea shall be taken to be 0.1374 m^3/kg;

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(e) The concentration of HFC-227 ea in the space to be protected shall be not less than 8% of the gross volume of the space. This quantity shall be released within 10 seconds;

(f) Tanks of HFC-227 ea shall be fitted with a pressure monitoring device which triggers an audible and visual alarm in the wheelhouse in the event of an unscheduled loss of propellant gas. Where there is no wheelhouse, the alarm shall be triggered outside the space to be protected;

(g) After discharge, the concentration in the space to be protected shall not exceed 10.5% (volume);

(h) The fire-extinguishing system shall not comprise aluminium parts.

9.1.0.40.2.12 *Fire-extinguishing system operating with IG-541*

In addition to the requirements of 9.1.0.40.2.1 to 9.1.0.40.2.9, fire-extinguishing systems using IG-541 as an extinguishing agent shall conform to the following provisions:

(a) Where there are several spaces with different gross volumes, every space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing IG-541 placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Each tank shall be fitted with a device for checking the contents;

(d) The filling pressure of the tanks shall not exceed 200 bar at a temperature of +15 °C;

(e) The concentration of IG-541 in the space to be protected shall be not less than 44% and not more than 50% of the gross volume of the space. This quantity shall be released within 120 seconds.

9.1.0.40.2.13 *Fire-extinguishing system operating with FK-5-1-12*

In addition to the requirements of 9.1.0.40.2.1 to 9.1.0.40.2.9, fire-extinguishing systems using FK-5-1-12 as an extinguishing agent shall comply with the following provisions:

(a) Where there are several spaces with different gross volumes, every space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing FK-5-1-12 placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Every tank shall be fitted with a device permitting control of the gas pressure;

(d) The level of filling of tanks shall not exceed 1.00 kg/l. The specific volume of depressurized FK-5-1-12 shall be taken to be 0.0719 m^3/kg;

(e) The volume of FK-5-1-12 in the space to be protected shall be not less than 5.5% of the gross volume of the space. This quantity shall be released within 10 seconds;

(f) Tanks of FK-5-1-12 shall be fitted with a pressure monitoring device which triggers an audible and visual alarm in the wheelhouse in the event of an unscheduled loss of

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extinguishing agent. Where there is no wheelhouse, the alarm shall be triggered outside the space to be protected;

(g) After discharge, the concentration in the space to be protected shall not exceed 10.0%.

9.1.0.40.2.14 *(Reserved)*

9.1.0.40.2.15 *Fire-fighting systems using K_2CO_3 as the extinguishing agent*

In addition to the requirements laid down in 9.1.0.40.2.1 to 9.1.0.40.2.3, 9.1.0.40.2.5, 9.1.0.40.2.6, and 9.1.0.40.2.9, fire-fighting systems using K_2CO_3 as the extinguishing agent shall comply with the following provisions:

(a) The fire-fighting system shall have a type-approval pursuant to Directive 2014/90/EU[2] or to MSC/Circ. 1270[3];

(b) Each room shall be provided with its own firefighting system;

(c) The extinguishing agent must be stored in specially provided unpressurised tanks in the room to be protected. These tanks shall be fitted in such a way that the extinguishing agent is dispensed evenly in the room. In particular the extinguishing agent shall also work underneath the deck plates;

(d) Each tank is separately connected with the triggering device;

(e) The quantity of dry aerosol-forming extinguishing agent relative to the room to be protected shall be at least 120 g per m^3 of the net volume of this room. This net volume is calculated according to Directive 2014/90/EU[2] or to MSC/Circ. 1270[3]. It shall be possible to supply the extinguishing agent within 120 seconds.

9.1.0.40.2.16 *Fixed fire-extinguishing system for physical protection*

In order to ensure physical protection in the engine rooms, boiler rooms and pump rooms, permanently fixed fire-extinguishing systems are accepted solely on the basis of recommendations by the Administrative Committee.

9.1.0.40.3 The two hand fire–extinguishers referred to in 8.1.4 shall be located in the protected area or in proximity to it.

9.1.0.40.4 The fire-extinguishing agent in the permanently fixed fire-extinguishing system shall be suitable and sufficient for fighting fires.

9.1.0.41 *Fire and naked light*

9.1.0.41.1 The outlets of funnels shall be located not less than 2 m from the hatchway openings. Arrangements shall be provided to prevent the escape of sparks and the entry of water.

9.1.0.41.2 Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels. The installation in the engine room or other separate space of heating appliances fuelled with liquid fuel having a flashpoint above 55 °C is, however, permitted.

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[2] *Official Journal of the European Union, L 257 of 28 August 2014, p.146.*

[3] *International Maritime Organization Circular MSC/Circ. 1270 and corrigenda — Revised Guidelines for the approval of fixed aerosol fire-extinguishing systems equivalent to fixed gas extinguishing systems, as referred to in SOLAS 1974, for machinery spaces — adopted on 4 June 2008.*

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Cooking and refrigerating appliances are permitted only in wheelhouses with metal floor and in the accommodation.

9.1.0.41.3 Only electric lighting appliances are permitted outside the accommodation and the wheelhouse.

9.1.0.42 to 9.1.0.50 (*Reserved*)

9.1.0.51 ***Surface temperatures of electrical and non-electrical installations and equipment***

(a) The surface temperatures of electrical and non-electrical installations and equipment as well as the outer parts of engines and their inlets and exhaust ducts shall not exceed 200 °C;

(b) The following are exempt from the above provision:

– Accommodation, wheelhouse and service spaces where surface temperatures higher than 200 °C occur that are equipped with a ventilation system according to 9.1.0.12.3; or

– Installations and equipment which generate surface temperatures higher than 200 °C and that can be switched off. Such installations and equipment shall be marked in red;

(c) Within the protected area, 9.1.0.53.1 applies;

(d) The requirements of 9.1.0.51 (a) and (b) must be met only if the vessel is located within or in the immediate vicinity of a shoreside assigned zone.

9.1.0.52 ***Type and location of electrical installations and equipment***

9.1.0.52.1 Electrical installations and equipment outside the protected area shall be at least of the 'limited explosion risk' type. This provision does not apply to:

(a) Lighting installations in the accommodation and in the wheelhouse, except for switches located near to the entrances;

(b) Mobile phones, fixed telephone installations as well as stationary and portable computers in the accommodation or the wheelhouse;

(c) Electrical installations and equipment which, during a stay in the immediate vicinity of or within a shoreside assigned zone, are:

– Not live; or

– Installed in spaces which are equipped with a ventilation system according to 9.1.0.12.3;

(d) Radiotelephone installations and inland AIS (automatic identification systems) stations in the accommodation and in the wheelhouse if no part of an aerial for radiotelephone installations or AIS stations is situated above or within 2.00 m from the protected area.

9.1.0.52.2 Fixed electrical installations and equipment which do not meet the requirements set out in 9.1.0.52.1 and their switches shall be marked in red. The disconnection of such equipment shall be controlled from a centralized location on board.

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9.1.0.52.3 Sockets for the connection of signal lights and gangway lighting shall be solidly fitted to the vessel close to the signal mast or the gangway. Sockets intended to supply the submerged pumps, hold ventilators and containers shall be permanently fitted to the vessel in the vicinity of the hatches. The sockets shall be designed to ensure that it is only possible to connect or disconnect them when they are not live.

9.1.0.52.4 Accumulators shall be located outside the protected area.

9.1.0.52.5 Failure of the power supply for the safety and control equipment shall be immediately indicated by visual and audible signals in the wheelhouse and on the deck. The alarm must be relayed to the accommodation automatically if it has not been switched off.

9.1.0.52.6 Electrical switches, sockets and cables on deck shall be protected against mechanical damage.

9.1.0.52.7 The requirements of 9.1.0.52.1 and 9.1.0.52.2 shall be met only if the vessel is located within or in the immediate vicinity of an onshore assigned zone.

9.1.0.53 ***Type and location of electrical and non-electrical installations and equipment intended for use in the protected area***

9.1.0.53.1 It shall be possible to switch off the electrical installations and equipment in the protected area by means of centrally located isolation switches except where:

– In the holds, they are appropriate at least for use in zone 1, for temperature class T4 and explosion group II B; and

– In the protected area on the deck, they are of the limited explosion risk type.

The corresponding electrical circuits shall have control lamps to indicate whether or not the circuits are live.

The isolation switches shall be protected against unintended operation. Submerged pumps installed or used in the holds shall be appropriate at least for use in zone 1, temperature class T4 and explosion group II B.

9.1.0.53.2 The sockets used in the protected area shall be designed so as to prevent connection or disconnection except when they are not live.

9.1.0.53.3 Except in the case of optical fibres, electrical cables within the protected area shall be armoured or placed in a metallic sheath or in protective tubes.

9.1.0.53.4 Movable electric cables are prohibited in the protected area, except electric cables for intrinsically safe electric circuits or for connecting:

(a) Signal lights and lighting for gangways, provided the connection point (for example, the socket) is permanently fitted to the vessel close to the signal mast or gangway;

(b) Containers;

(c) Electrically operated hatch cover gantries;

(d) Submerged pumps;

(e) Hold ventilators;

(f) The power network on a vessel to a land-based power network; provided that:

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– The electric cables and the power supply unit conform to a valid standard (for example, EN 15869-03: 2010);

– The power supply unit and connectors are located outside of the protected area.

Connecting and disconnecting sockets/connectors shall only be possible when they are not live.

9.1.0.53.5 For movable electrical cables permitted in accordance with 9.1.0.53.4, only rubber-sheathed electrical cables of type H07 RN-F in accordance with IEC-60245-4:2011[4] or electrical cables of at least equivalent design having conductors with a cross-section of not less than 1.5 mm^2, shall be used.

9.1.0.53.6 Non-electrical installations and equipment in the protected area which are intended for use during loading and unloading or stay in the immediate vicinity of or within a shoreside assigned zone shall meet at least the requirements for use in the area concerned. They shall meet at least the requirements for temperature class T4 and explosion group II B.

9.1.0.54 and 9.1.0.55 (*Reserved*)

9.1.0.56 *(Deleted)*

9.1.0.57 to 9.1.0.69 (*Reserved*)

9.1.0.70 ***Metal wires, masts***

All metal wires passing over the holds and all masts shall be earthed, unless they are electrically bonded to the metal hull of the vessel through their installation.

9.1.0.71 ***Admittance on board***

The notice boards displaying the prohibition of admittance in accordance with 8.3.3 shall be clearly legible from either side of the vessel.

9.1.0.72 and 9.1.0.73 (*Reserved*)

9.1.0.74 ***Prohibition of smoking, fire and naked light***

9.1.0.74.1 The notice boards displaying the prohibition of smoking in accordance with 8.3.4 shall be clearly legible from either side of the vessel.

9.1.0.74.2 Notice boards indicating the circumstances under which the prohibition applies shall be fitted near the entrances to the spaces where smoking or the use of fire or naked light is not always prohibited.

9.1.0.74.3 Ashtrays shall be provided close to each exit of the accommodation and the wheelhouse.

9.1.0.75 to 9.1.0.79 (*Reserved*)

[4] *Identical to EN 50525-2-21: 2011*

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9.1.0.80 ***Additional rules applicable to double-hull vessels***

The rules of 9.1.0.88 to 9.1.0.99 are applicable to double-hull vessels intended to carry dangerous goods of Classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 or 9, except those for which label No. 1 is prescribed in column (5) of Table A of Chapter 3.2, in quantities exceeding those of 7.1.4.1.1.

9.1.0.81 to 9.1.0.87 (*Reserved*)

9.1.0.88 ***Classification***

9.1.0.88.1 Double-hull vessels intended to carry dangerous goods of Classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 or 9 except those for which label No. 1 is prescribed in column (5) of Table A of Chapter 3.2, in quantities exceeding those referred to in 7.1.4.1.1 shall be built or transformed under survey of a recognised classification society in accordance with the rules established by that classification society to its highest class. This shall be confirmed by the classification society by the issue of an appropriate certificate.

9.1.0.88.2 Continuation of class is not required.

9.1.0.88.3 Future conversions and major repairs to the hull shall be carried out under survey of this classification society.

9.1.0.89 and 9.1.0.90 (*Reserved*)

9.1.0.91 ***Holds***

9.1.0.91.1 The vessel shall be built as a double-hull vessel with double-hull spaces and double bottom within the protected area.

9.1.0.91.2 The distance between the sides of the vessel and the longitudinal bulkheads of the hold shall be not less than 0.80 m. Regardless of the requirements relating to the width of walkways on deck, a reduction of this distance to 0.60 m is permitted, provided that, compared with the scantlings specified in the rules for construction published by a recognised classification society, the following reinforcements have been made:

(a) Where the vessel's sides are constructed according to the longitudinal framing system, the frame spacing shall not exceed 0.60 m.

The longitudinals shall be supported by web frames with lightening holes similar to the floors in the double bottom and spaced not more than 1.80 m apart. These intervals may be increased if the construction is correspondingly reinforced;

(b) Where the vessel's sides are constructed according to the transverse framing system, either:

– two longitudinal side shell stringers shall be fitted. The distance between the two stringers and between the uppermost stringer and the gangboard shall not exceed 0.80 m. The depth of the stringers shall be at least equal to that of the transverse frames and the cross-section of the face plate shall be not less than 15 cm^2.

The longitudinal stringers shall be supported by web frames with lightening holes similar to plate floors in the double bottom and spaced not more than 3.60 m apart. The transverse shell frames and the hold bulkhead vertical stiffeners shall be connected at the bilge by a bracket plate with a height of not less than 0.90 m and thickness equal to the thickness of the floors; or

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– web frames with lightening holes similar to the double bottom plate floors shall be arranged on each transverse frame;

(c) The gangboards shall be supported by transverse bulkheads or cross-ties spaced not more than 32 m apart.

As an alternative to compliance with the requirements of (c) above, a proof by calculation, issued by a recognised classification society confirming that additional reinforcements have been fitted in the double-hull spaces and that the vessel's transverse strength may be regarded as satisfactory.

9.1.0.91.3 The depth of the double bottom shall be at least 0.50 m. The depth below the suction wells may, however, be locally reduced, but the space between the bottom of the suction well and the bottom of the vessel floor shall be at least 0.40 m. If spaces are between 0.40 m and 0.49 m, the surface area of the suction well shall not exceed 0.5 m^2.

The capacity of the suction wells must not exceed 0.120 m^3.

9.1.0.92 ***Emergency exit***

Spaces the entrances or exits of which are partly or fully immersed in damaged condition shall be provided with an emergency exit not less than 0.10 m above the waterline. This does not apply to forepeak and afterpeak.

9.1.0.93 ***Stability (general*)**

9.1.0.93.1 Proof of sufficient stability shall be furnished including stability in the damaged condition.

9.1.0.93.2 The basic values for the stability calculation – the vessel's lightweight and the location of the centre of gravity – shall be determined either by means of an inclining experiment or by detailed mass and moment calculation. In the latter case the lightweight shall be checked by means of a lightweight test with a resulting difference of not more than ± 5% between the mass determined by the calculation and the displacement determined by the draught readings.

9.1.0.93.3 Proof of sufficient intact stability shall be furnished for all stages of loading and unloading and for the final loading condition.

Floatability after damage shall be proved for the most unfavourable loading condition. For this purpose calculated proof of sufficient stability shall be established for critical intermediate stages of flooding and for the final stage of flooding. Negative values of stability in intermediate stages of flooding may be accepted only if the continued range of curve of righting lever in damaged condition indicates adequate positive values of stability.

9.1.0.94 ***Stability (intact*)**

9.1.0.94.1 The requirements for intact stability resulting from the damaged stability calculation shall be fully complied with.

9.1.0.94.2 For the carriage of containers, proof of sufficient stability shall also be furnished in accordance with the provisions of the Regulations referred to in 1.1.4.6.

9.1.0.94.3 The most stringent of the requirements of 9.1.0.94.1 and 9.1.0.94.2 above shall prevail for the vessel.

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9.1.0.95 ***Stability (damaged condition)***

9.1.0.95.1 The following assumptions shall be taken into consideration for the damaged condition:

(a) The extent of side damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	0.59 m inboard from the vessel's side at right angles to the centreline at the level corresponding to the maximum draught;
vertical extent:	from the baseline upwards without limit;

(b) The extent of bottom damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	3.00 m;
vertical extent:	from the base 0.49 m upwards, the sump excepted;

(c) Any bulkheads within the damaged area shall be assumed damaged, which means that the location of bulkheads shall be chosen so as to ensure that the vessel remains afloat after the flooding of two or more adjacent compartments in the longitudinal direction.

The following provisions are applicable:

– For bottom damage also two adjacent athwartships compartments shall be assumed as flooded;

– The lower edge of any openings that cannot be closed watertight (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.10 m above the damage waterline;

– In general, permeability shall be assumed to be 95%. Where an average permeability of less than 95% is calculated for any compartment, this calculated value may be used.

However, the following minimum values shall be used:

– engine rooms:	85%
– accommodation:	95%
– double bottoms, oil fuel tanks, ballast tanks, etc., depending on whether, according to their function, they have to be assumed as full or empty for the vessel floating at the maximum permissible draught:	0% or 95%

For the main engine room only the one–compartment standard needs to be taken into account, i.e. the end bulkheads of the engine room shall be assumed as not damaged.

9.1.0.95.2 At the stage of equilibrium (final stage of flooding) the angle of heel shall not exceed 12°. Non-watertight openings shall not be immersed before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of stability calculation.

The positive range of the righting lever curve beyond the position of equilibrium shall have a righting lever of ≥ 0.05 m in association with an area under the curve of ≥ 0.0065 m.rad. The minimum values of stability shall be satisfied up to immersion of the first non-

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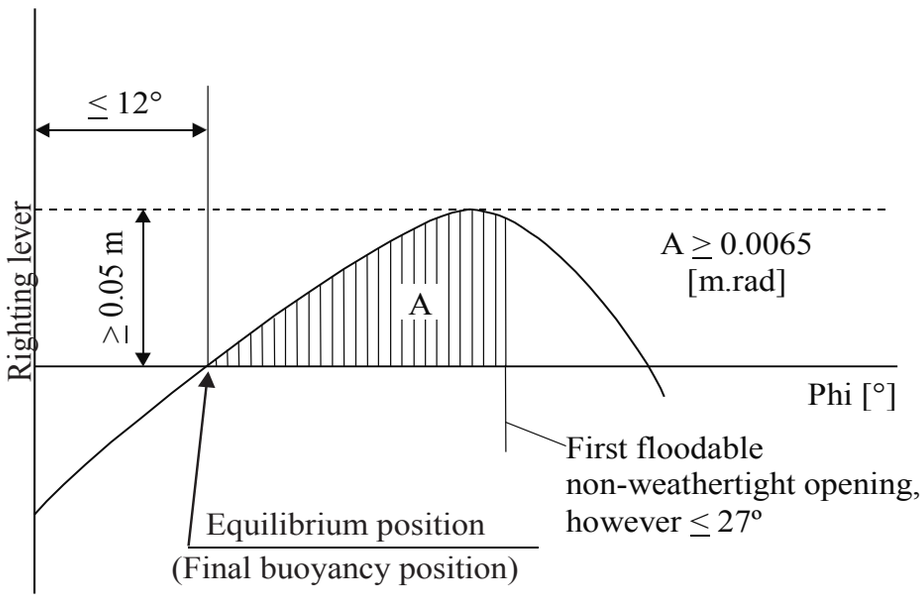
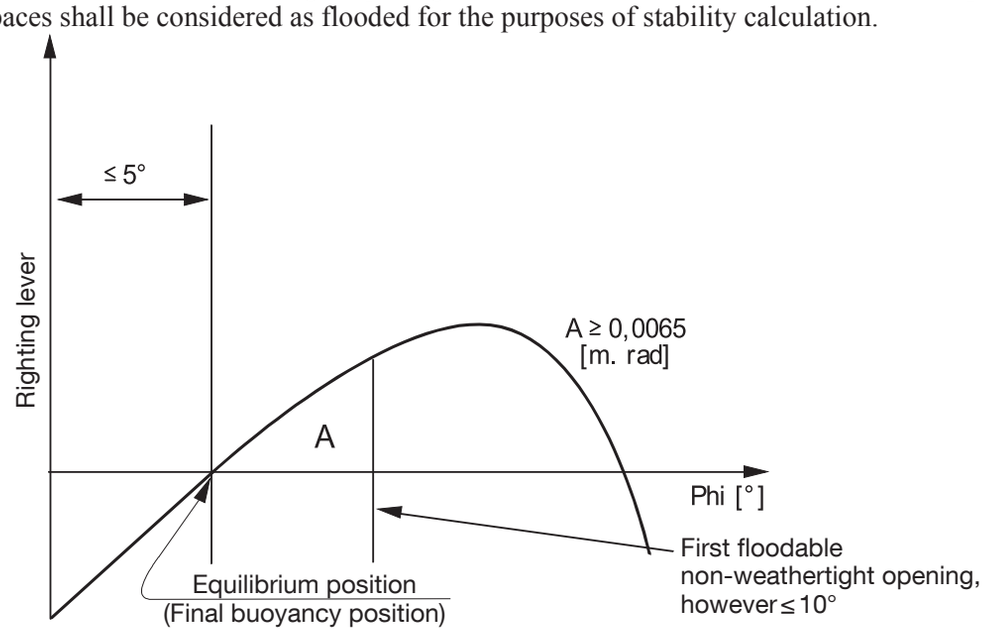
weathertight opening and in any event up to an angle of heel ≤ 27°. If non-weathertight openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purposes of stability calculation.



9.1.0.95.3 Inland navigation vessels carrying containers which have not been secured shall satisfy the following damage stability criteria:

At the stage of equilibrium (final stage of flooding) the angle of heel shall not exceed 5°. Non-watertight openings shall not be immersed before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of stability calculation;

The positive range of the righting lever curve beyond the position of equilibrium shall have an area under the curve of ≥ 0.0065 m.rad. The minimum values of stability shall be satisfied up to immersion of the first non-weathertight opening and in any event up to an angle of heel ≤ 10°. If non-weathertight openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purposes of stability calculation.



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9.1.0.95.4 If openings through which undamaged compartments may become additionally flooded are capable of being closed watertight, the closing devices shall be appropriately marked.

9.1.0.95.5 Where cross- or down-flooding openings are provided for reduction of unsymmetrical flooding, the time for equalisation shall not exceed 15 minutes if during the intermediate stages of flooding sufficient stability has been proved.

9.1.0.96 to 9.1.0.99 (*Reserved*)

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CHAPTER 9.2

RULES FOR CONSTRUCTION APPLICABLE TO SEAGOING VESSELS WHICH COMPLY WITH THE REQUIREMENTS OF THE SOLAS 74 CONVENTION, CHAPTER II-2, REGULATION 19 OR SOLAS 74, CHAPTER II-2, REGULATION 54

9.2.0 The requirements of 9.2.0.0 to 9.2.0.79 are applicable to seagoing vessels which comply with the following requirements:

– SOLAS 74, Chapter II-2, Regulation 19 in its amended version; or

– SOLAS 74, Chapter II-2, Regulation 54 in its amended version in accordance with the resolutions mentioned in Chapter II-2, Regulation 1, paragraph 2.1, provided that the vessel was constructed before 1 July 2002.

Seagoing vessels which do not comply with the above–mentioned requirements of the SOLAS 74 Convention shall meet the requirements of 9.1.0.0 to 9.1.0.79.

9.2.0.0 ***Materials of construction***

The vessel's hull shall be constructed of shipbuilding steel or other metal, provided that this metal has at least equivalent mechanical properties and resistance to the effects of temperature and fire.

9.2.0.1 to 9.2.0.19 (*Reserved*)

9.2.0.20 ***Water ballast***

The double-hull spaces and double bottoms may be arranged for being filled with water ballast.

9.2.0.21 to 9.2.0.30 (*Reserved*)

9.2.0.31 ***Engines***

9.2.0.31.1 Only internal combustion engines running on a fuel having a flashpoint above 60 °C, are allowed.

9.2.0.31.2 Ventilation inlets of the engine rooms and the air intakes of the engines which do not take air in directly from the engine room shall be located not less than 2 m from the protected area.

9.2.0.31.3 Sparking shall not be possible in the protected area.

9.2.0.32 and 9.2.0.33 (*Reserved*)

9.2.0.34 ***Exhaust pipes***

9.2.0.34.1 Exhausts shall be evacuated from the vessel into the open–air either upwards through an exhaust pipe or through the shell plating. The exhaust outlet shall be located not less than 2.00 m from the hatchway openings. The exhaust pipes of engines shall be arranged so that the exhausts are led away from the vessel. The exhaust pipes shall not be located within the protected area.

9.2.0.34.2 Exhaust pipes shall be provided with a device preventing the escape of sparks, e.g. spark arresters.

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9.2.0.35 to 9.2.0.40 (*Reserved*)

9.2.0.41 ***Fire and naked light***

9.2.0.41.1 The outlets of funnels shall be located not less than 2.00 m from the hatchway openings. Arrangements shall be provided to prevent the escape of sparks and the entry of water.

9.2.0.41.2 Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels. The installation in the engine room or other separate space of heating appliances fuelled with liquid fuel having a flashpoint above 55 °C shall, however, be permitted.

Cooking and refrigerating appliances are permitted only in wheelhouses with metal floor and in the accommodation.

9.2.0.41.3 Only electric lighting appliances are permitted outside the accommodation and the wheelhouse.

9.2.0.42 to 9.2.0.70 (*Reserved*)

9.2.0.71 ***Admittance on board***

The notice boards displaying the prohibition of admittance in accordance with 8.3.3 shall be clearly legible from either side of the vessel.

9.2.0.72 and 9.2.0.73 (*Reserved*)

9.2.0.74 ***Prohibition of smoking, fire and naked light***

9.2.0.74.1 The notice boards displaying the prohibition of smoking in accordance with 8.3.4 shall be clearly legible from either side of the vessel.

9.2.0.74.2 Notice boards indicating the circumstances under which the prohibition applies shall be fitted near the entrances to the spaces where smoking or the use of fire or naked light is not always prohibited.

9.2.0.74.3 Ashtrays shall be provided close to each exit of the wheelhouse.

9.2.0.75 to 9.2.0.79 (*Reserved*)

9.2.0.80 ***Additional rules applicable to double-hull seagoing vessels***

The rules of 9.2.0.88 to 9.2.0.99 are applicable to double-hull seagoing vessels intended to carry dangerous goods of Classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 or 9, except those for which label No. 1 is prescribed in column (5) of Table A of Chapter 3.2, in quantities exceeding those of 7.1.4.1.1.

9.2.0.81 to 9.2.0.87 (*Reserved*)

9.2.0.88 ***Classification***

9.2.0.88.1 Double-hull seagoing vessels intended to carry dangerous goods of Classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 or 9 except those for which label No. 1 is prescribed in column (5) of Table A of Chapter 3.2, in quantities exceeding those referred to in 7.1.4.1, shall be built under survey of a recognised classification society in accordance with the rules established by that classification society to its highest class. This shall be confirmed by the classification society by the issue of an appropriate certificate.

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9.2.0.88.2 The vessel's highest class shall be continued.

9.2.0.89 and 9.2.0.90 (*Reserved*)

9.2.0.91 ***Holds***

9.2.0.91.1 The vessel shall be built as a double-hull vessel with double–wall spaces and double bottom within the protected area.

9.2.0.91.2 The distance between the sides of the vessel and the longitudinal bulkheads of the hold shall be not less than 0.80 m. A locally reduced distance at the vessel's ends shall be permitted, provided the smallest distance between vessel's side and the longitudinal bulkhead (measured perpendicular to the side) is not less than 0.60 m. The sufficient structural strength of the vessel (longitudinal, transverse and local strength) shall be confirmed by the certificate of class.

9.2.0.91.3 The depth of the double bottom shall be not less than 0.50 m.

The depth below the suction wells may however be locally reduced to 0.40 m, provided the suction well has a capacity of not more than 0.03 m^3.

9.2.0.92 (*Reserved*)

9.2.0.93 ***Stability (general)***

9.2.0.93.1 Proof of sufficient stability shall be furnished including stability in the damaged condition.

9.2.0.93.2 The basic values for the stability calculation – the vessel's lightweight and the location of the centre of gravity – shall be determined either by means of an inclining experiment or by detailed mass and moment calculation. In the latter case the lightweight shall be checked by means of a lightweight test with a resulting difference of not more than ± 5% between the mass determined by the calculation and the displacement determined by the draught readings.

9.2.0.93.3 Proof of sufficient intact stability shall be furnished for all stages of loading and unloading and for the final loading condition.

Floatability after damage shall be proved for the most unfavourable loading condition. For this purpose calculated proof of sufficient stability shall be established for critical intermediate stages of flooding and for the final stage of flooding. Negative values of stability in intermediate stages of flooding may be accepted only if the continued range of curve of righting lever in damaged condition indicates adequate positive values of stability.

9.2.0.94 ***Stability (intact)***

9.2.0.94.1 The requirements for intact stability resulting from the damaged stability calculation shall be fully complied with.

9.2.0.94.2 For the carriage of containers, additional proof of sufficient stability shall be furnished in accordance with the requirements of the Regulations referred to in 1.1.4.6.

9.2.0.94.3 The most stringent of the requirements of 9.2.0.94.1 and 9.2.0.94.2 shall prevail for the vessel.

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9.2.0.94.4 For seagoing vessels the provisions of 9.2.0.94.2 above may be regarded as having been complied with if the stability conforms to Resolution A.749 (18) of the International Maritime Organization and the stability documents have been checked by the competent authority. This applies only when all containers are secured as usual on seagoing vessels and a relevant stability document has been approved by the competent authority.

9.2.0.95 ***Stability (damaged condition*)**

9.2.0.95.1 The following assumptions shall be taken into consideration for the damaged condition:

(a) The extent of side damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	0.59 m inboard from the vessel's side at right angles to the centreline at the level corresponding to the maximum draught;
vertical extent:	from the baseline upwards without limit;

(b) The extent of bottom damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	3.00 m;
vertical extent:	from the base 0.49 m upwards, the sump excepted;

(c) Any bulkheads within the damaged area shall be assumed damaged, which means that the location of bulkheads shall be chosen so that the vessel will remain afloat after flooding of two or more adjacent compartments in the longitudinal direction.

The following provisions are applicable:

– For bottom damage, adjacent athwartship compartments shall also be assumed as flooded;

– The lower edge of any openings that cannot be closed watertight (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.10 m above the damage waterline;

– In general, permeability shall be assumed to be 95%. Where an average permeability of less than 95% is calculated for any compartment, this calculated value may be used.

However, the following minimum values shall be used:

– engine rooms	85%
– accommodation	95%
– double bottoms, oil fuel tanks, ballast tanks, etc., depending on whether according to their function, they have to be assumed as full or empty for the vessel floating at the maximum permissible draught	0% or 95%

For the main engine room only the one–compartment standard needs to be taken into account. (Consequently, the end bulkheads of the engine room shall be assumed as not damaged.)

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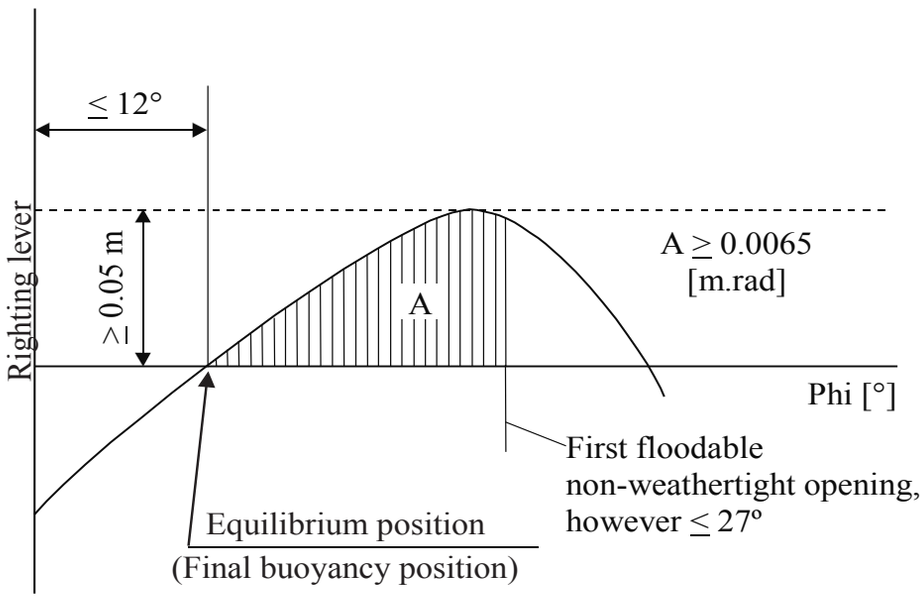
9.2.0.95.2 At the stage of equilibrium (final stage of flooding) the angle of heel shall not exceed 12°. Non-watertight openings shall not be immersed before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of stability calculation.

The positive range of the righting lever curve beyond the position of equilibrium shall have a righting lever of ≥ 0.05 m in association with an area under the curve of ≥ 0.0065 m.rad. The minimum values of stability shall be satisfied up to immersion of the first non-weathertight opening and in any event up to an angle of heel ≤ 27°. If non-weathertight openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purposes of stability calculation.



9.2.0.95.3 If openings through which undamaged compartments may become additionally flooded are capable of being closed watertight, the closing devices shall be appropriately marked.

9.2.0.95.4 Where cross- or down-flooding openings are provided for reduction of unsymmetrical flooding, the time for equalisation shall not exceed 15 minutes if during the intermediate stages of flooding sufficient stability has been proved.

9.2.0.96 to 9.2.0.99 (*Reserved*)

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CHAPTER 9.3

RULES FOR CONSTRUCTION OF TANK VESSELS

9.3.1 Rules for construction of type G tank vessels

The rules for construction of 9.3.1.0 to 9.3.1.99 apply to type G tank vessels.

9.3.1.0 *Materials of construction*

9.3.1.0.1 (a) The vessel's hull and the cargo tanks shall be constructed of shipbuilding steel or other at least equivalent metal.

The independent cargo tanks may also be constructed of other materials, provided these have at least equivalent mechanical properties and resistance against the effects of temperature and fire.

(b) Every part of the vessel including any installation and equipment which may come into contact with the cargo shall consist of materials which can neither be dangerously affected by the cargo nor cause decomposition of the cargo or react with it so as to form harmful or hazardous products. In case it has not been possible to examine this during classification and inspection of the vessel a relevant reservation shall be entered in the vessel substance list according to 1.16.1.2.5.

9.3.1.0.2 Except where explicitly permitted in 9.3.1.0.3 below or in the certificate of approval, the use of wood, aluminium alloys, plastic materials or rubber within the cargo area is prohibited.

9.3.1.0.3 The use of wood, aluminium alloys, plastic materials or rubber in the cargo area is permitted as shown in the following table:

The use of wood, aluminium alloys, plastic materials or rubber is permitted only for:				**(X indicates permitted)**
	Wood	**Aluminium alloys**	**Plastic material**	**Rubber**
Gangways	X	X	X	X
External ladders and passageways (gangways) *)		X	X	X
Cleaning equipment, e.g. brooms	X		X	X
Movable equipment e.g. fire extinguishers, portable gas detectors, rescue winches		X	X	X
Fenders	X		X	X
Mooring cables, fender ropes			X	
Chocking of cargo tanks which are independent of the vessel's hull and chocking of installations and equipment	X		X	
Masts and similar round timber	X	X	X	
Engine parts		X	X	
Protective covers of engines and pumps			X	
Parts of the electrical installation		X	X	
Parts of the loading and unloading installation, e.g., gaskets		X	X	X
Boxes, cabinets or other receptacles placed on the deck for storage of disposal and recovery equipment for		X	X	

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The use of wood, aluminium alloys, plastic materials or rubber is permitted only for:				**(X indicates permitted)**
	Wood	**Aluminium alloys**	**Plastic material**	**Rubber**
capstans, extinguishers, fire hoses, waste, etc.				
Supports and stops of any kind	X		X	
Ventilators, including hose assemblies for ventilation		X	X	
Parts of the water spray system, the shower and the eye and face bath		X	X	
Insulation of cargo tanks and of piping for loading and unloading, gas discharge pipes and heating pipes			X	X
Coating of cargo tanks and of piping for loading and unloading		X	X	X
All kinds of gaskets (e.g. for dome or hatch covers)			X	X
Cables for electrical equipment			X	X
Mat under hose assemblies for loading and unloading piping system			X	X
Fire hoses, air hoses, hoses for cleaning the deck, etc.			X	X
Sampling equipment and bottles			X	
Photo-optical copies of the certificate of approval according to 8.1.2.6 or 8.1.2.7, and of the vessel's certificate, the measurement certificate and the Rhine navigation membership certificate		X	X	
Drip trays			X	
(*) Take account of 9.3.1.0.5, 9.3.2.0.5 or 9.3.3.0.5, as appropriate				
Aluminium gauging rods are permitted, provided that they are fitted with brass feet or protected in another way to avoid sparking.				

All permanently fitted materials in the accommodation or wheelhouse, with the exception of furniture, shall not readily ignite. They shall not evolve fumes or toxic gases in dangerous quantities, if involved in a fire.

9.3.1.0.4 The paint used in the cargo area shall not be liable to produce sparks in case of impact.

9.3.1.0.5 The use of plastic material for a vessel's boats is permitted only if the material does not readily ignite. Except where explicitly permitted in 9.3.1.0.3 or in the certificate of approval, the use of wood, aluminium alloys, plastic materials or rubber is prohibited.

The use of aluminium alloys or plastic material for passageways (gangways) in the cargo area is permitted only if the material does not readily ignite or conduct electricity.

9.3.1.1 ***Vessel record***

NOTE: *For the purpose of this paragraph, the term "owner" has the same meaning as in 1.16.0.*

The vessel record shall be retained by the owner who shall be able to provide this documentation at the request of the competent authority and the recognized classification society.

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The vessel record shall be maintained and updated throughout the life of the vessel and shall be retained for 6 months after the vessel is taken out of service.

Should a change of owner occur during the life of the vessel the vessel record shall be transferred to the new owner.

Copies of the vessel record or all necessary documents shall be made available on request to the competent authority for the issuance of the certificate of approval and for the recognized classification society or inspection body for first inspection, periodic inspection, special inspection or exceptional checks.

9.3.1.2 to 9.3.1.7 (*Reserved*)

9.3.1.8 ***Classification***

9.3.1.8.1 The tank vessel shall be built under the survey of a recognised classification society and be classed in its highest class.

The vessel's highest class shall be continued. This shall be confirmed by an appropriate certificate issued by the recognized classification society (certificate of class).

The certificate of class shall confirm that the vessel is in conformity with its own additionally applicable rules and regulations that are relevant for the intended use of the vessel.

The design pressure and the test pressure of cargo tanks shall be entered in the certificate.

If a vessel has cargo tanks with different valve opening pressures, the design and test pressures of each tank shall be entered in the certificate.

The recognized classification society shall draw up a vessel substance list mentioning all the dangerous goods accepted for carriage by the tank vessel (see also 1.16.1.2.5).

9.3.1.8.2 and 9.3.1.8.3 *(Deleted)*

9.3.1.8.4 The conformity of the documents required in 8.1.2.3 (r) to (v) with the circumstances on board shall be inspected by a recognized classification society, an inspection body or by a person authorized for that purpose by the competent authority whenever the certificate of approval is renewed and, in addition, once during the third year of validity of the certificate of approval. A signed certificate must be available on board.

9.3.1.9 (*Reserved*)

9.3.1.10 ***Protection against the penetration of dangerous gases and the spreading of dangerous liquids***

9.3.1.10.1 The vessel shall be designed so as to prevent dangerous gases and liquids from penetrating into the accommodation, wheelhouse and service spaces. None of the windows in these spaces shall be capable of being opened unless its intended use is as an emergency exit and it is marked as such.

9.3.1.10.2 Liquid-tight protective coamings shall be fitted on deck at the height of the external bulkheads of the cargo tanks, at a maximum distance of 0.60 m from the outer cofferdam bulkheads or the hold end bulkheads. The protective coamings shall either extend over the entire width of the vessel or be fixed between the longitudinal spill coamings so as to prevent liquids from entering the forepeak and afterpeak. The height of the protective coamings and the spill coamings shall be at least 0.075 m. The protective coaming may correspond to the

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protection wall prescribed in 9.3.1.10.3 if the protection wall extends across the entire width of the vessel.

9.3.1.10.3 If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the use of installations and equipment that are not of at least the 'limited explosion risk' type is not permitted during loading and unloading operations in parts of the deck outside the cargo area, unless those parts are protected against the entry of gases and liquids by a gas- and liquid-tight protection wall. The wall must either extend from one side of the vessel to the other or surround the areas to protect in an U-shaped form. The wall must cover the whole width of the area to protect and at least 1.00 m in the direction opposite to the cargo area (see Classification of zones diagram). The height of the wall shall be at least 1.00 m above the adjacent cargo deck area in the cargo area. The outer wall and side walls of the accommodation can be considered as a protection wall if they do not include openings and if the dimensions are complied with.

A protection wall is not required where the distance between the areas to be protected and the safety valve, the shore connections of the piping for loading and unloading, and venting piping, the compressor on deck and the opening of the closest pressure tanks is at least 12.00 m.

9.3.1.10.4 On deck, the lower edges of door-openings in the sidewalls of superstructures and the sills of hatches and ventilation openings of premises located under the deck shall have a height of not less than 0.50 m above the deck.

This requirement does not apply to access openings to double-hull spaces and double bottoms.

9.3.1.10.5 The bulwarks, foot-rails, etc., shall be provided with sufficiently large openings which are located directly above the deck.

9.3.1.11 ***Hold spaces and cargo tanks***

9.3.1.11.1 (a) The maximum permissible capacity of a cargo tank shall be determined in accordance with the following table:

$L \times B \times H$ (m^3)	Maximum permissible capacity of a cargo tank (m^3)
up to 600	$L \times B \times H \times 0.3$
600 to 3 750	$180 + (L \times B \times H - 600) \times 0.0635$
> 3 750	380

Alternative constructions in accordance with 9.3.4 are permitted.

In the table above $L \times B \times H$ is the product of the main dimensions of the tank vessel in metres (according to the measurement certificate), where:

L = overall length of the hull in m;

B = extreme breadth of the hull in m;

H = shortest vertical distance between the top of the keel and the lowest point of the deck at the side of the vessel (moulded depth) within the cargo area in m;

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where:

For trunk vessels, H shall be replaced by H', where H' shall be obtained from the following formula:

$$H' = H + \left(ht \times \frac{bt}{B} \times \frac{lt}{L} \right)$$

where:

ht = trunk height (distance between trunk deck and main deck measured on trunk side at L/2) in m;

bt = trunk breadth in m;

lt = trunk length in m;

(b) Pressure tanks whose ratio of length to diameter exceeds 7 are prohibited.

(c) The pressure tanks shall be designed for a cargo temperature of + 40 °C.

9.3.1.11.2 (a) In the cargo area, the hull shall be designed as follows:[1]

– as a double-hull and double bottom vessel. The internal distance between the sideplatings of the vessel and the longitudinal bulkheads shall not be less than 0.80 m, the height of the double bottom shall be not less than 0.60 m, the cargo tanks shall be supported by saddles extending between the tanks to not less than 20° below the horizontal centreline of the cargo tanks.

Refrigerated cargo tanks and cargo tanks used for the transport of refrigerated liquefied gases shall be installed only in hold spaces bounded by double-hull spaces and double–bottom. Cargo tank fastenings shall meet the requirements of a recognised classification society; or

– as a single–hull vessel with the sideplatings of the vessel between gangboard and top of floor plates provided with side stringers at regular intervals of not more than 0.60 m which are supported by web frames spaced at intervals of not more than 2.00 m. The side stringers and the web frames shall have a height of not less than 10% of the depth, however, not less than 0.30 m. The side stringers and web frames shall be fitted with a face plate made of flat steel and having a cross-section of not less that 7.5 cm^2 and 15 cm^2, respectively.

The distance between the sideplating of the vessel and the cargo tanks shall be not less than 0.80 m and between the bottom and the cargo tanks not less than 0.60 m. The depth below the suction wells may be reduced to 0.50 m.

The lateral distance between the suction well of the cargo tanks and the bottom structure shall be not less than 0.10 m.

The cargo tank supports and fastenings should extend to not less than 10° below the horizontal centreline of the cargo tanks.

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[1] *For a different design of the hull in the cargo area, proof shall be furnished by way of calculation that in the event of a lateral collision with another vessel having a straight bow, an energy of 22 MJ can be absorbed without any rupture of the cargo tanks and the piping leading to the cargo tanks. Alternative constructions in accordance with 9.3.4 are permitted.*

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(b) The cargo tanks shall be fixed so that they cannot float.

(c) The capacity of a suction well shall be limited to not more than 0.10 m^3. For pressure cargo tanks, however, the capacity of a suction well may be of 0.20 m^3.

(d) Side–struts linking or supporting the load-bearing components of the sides of the vessel with the load-bearing components of the longitudinal walls of cargo tanks and side–struts linking the load-bearing components of the vessel's bottom with the tank-bottom are prohibited.

(e) Cargo tanks intended to contain products at a temperature below -10°C shall be suitably insulated to ensure that the temperature of the vessel's structure does not fall below the minimum allowable material design temperature. The insulation material shall be resistant to flame spread.

9.3.1.11.3 (a) The hold spaces shall be separated from the accommodation, engine rooms and service spaces outside the cargo area below deck by bulkheads of Class "A-60" as defined in SOLAS 74, Chapter II-2, Regulation 3. A space of not less than 0.20 m shall be provided between the cargo tanks and the end bulkheads of the hold spaces. Where the cargo tanks have plane end bulkheads this space shall be not less than 0.50 m.

(b) The hold spaces and cargo tanks shall be capable of being inspected.

(c) All spaces in the cargo area shall be capable of being ventilated. Means for checking their gas-free condition shall be provided.

9.3.1.11.4 The bulkheads bounding the hold spaces shall be watertight. The cargo tanks and the bulkheads bounding the cargo area shall have no openings or penetrations below deck.

The bulkhead between the engine room and the service spaces within the cargo area or between the engine room and a hold space may be fitted with penetrations provided that they conform to the requirements of 9.3.1.17.5.

9.3.1.11.5 Double-hull spaces and double bottoms in the cargo area shall be arranged for being filled with ballast water only. Double bottoms may, however, be used as oil fuel tanks, provided they comply with the requirements of 9.3.1.32.

9.3.1.11.6 (a) A space in the cargo area below deck may be arranged as a service space, provided that the bulkhead bounding the service space extends vertically to the bottom and the bulkhead not facing the cargo area extends from one side of the vessel to the other in one frame plane. This service space shall only be accessible from the deck.

(b) The service space shall be watertight with the exception of its access hatches and ventilation inlets.

(c) No piping for loading or unloading shall be fitted within the service space referred to under (a) above.

Piping for loading and unloading may be fitted in the cargo pump-rooms below deck only when they conform to the provisions of 9.3.1.17.6.

9.3.1.11.7 Where service spaces are located in the cargo area under deck, they shall be arranged so as to be easily accessible and to permit persons wearing protective clothing and breathing apparatus to safely operate the service equipment contained therein. They shall be designed so as to allow injured or unconscious personnel to be removed from such spaces without difficulty, if necessary by means of fixed equipment.

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9.3.1.11.8 Hold spaces and other accessible spaces within the cargo area shall be arranged so as to ensure that they may be completely inspected and cleaned in an appropriate manner. The dimensions of openings, except for those of double-hull spaces and double bottoms which do not have a wall adjoining the cargo tanks, shall be sufficient to allow a person wearing breathing apparatus to enter or leave the space without difficulty. These openings shall have a minimum cross-sectional area of 0.36 m^2 and a minimum side length of 0.50 m. They shall be designed so as to allow injured or unconscious persons to be removed from the bottom of such spaces without difficulties, if necessary by means of fixed equipment. In these spaces the distance between the reinforcements shall not be less than 0.50 m. In double bottoms this distance may be reduced to 0.45 m.

Cargo tanks may have circular openings with a diameter of not less than 0.68 m.

9.3.1.11.9 In case the vessel has insulated cargo tanks, the hold spaces shall only contain dry air to protect the insulation of the cargo tanks against moisture.

9.3.1.12 ***Ventilation***

9.3.1.12.1 Each hold space shall have two openings the dimensions and location of which shall be such as to permit effective ventilation of any part of the hold space. If there are no such openings, it shall be possible to fill the hold spaces with inert gas or dry air.

9.3.1.12.2 Double-hull spaces and double bottoms within the cargo area which are not arranged for being filled with ballast water and cofferdams between engine rooms and pump-rooms, if they exist, shall be provided with ventilation systems.

9.3.1.12.3 (a) A service space located within the cargo area below deck shall be provided with a ventilation system. The capacity of the fans shall be sufficient to ensure 20 complete changes of air per hour based on the volume of the service space.

The ventilation exhaust ducts shall extend down to 50 mm above the bottom of the service space. The air shall be supplied through a duct at the top of the service space.

(b) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the air inlets shall be located not less than 2.00 m above the deck, at a distance of not less than 2.00 m from tank openings and 6.00 m from the outlets of safety valves.

The extension pipes which may be necessary may be of the hinged type.

9.3.1.12.4 (a) Ventilation shall be provided for the accommodation, wheelhouse and service spaces.

(b) The ventilation system in such spaces shall meet the following requirements:

(i) The air intakes shall be located as far away as possible, and not less than 6.00 m from the protected area and not less than 2.00 m above the deck;

(ii) Pressure of at least 0.1 kPa (0.001 bar) may be maintained in the premises;

(iii) A breakdown alarm is integrated;

(iv) The ventilation system, including the breakdown alarm, shall be at least of the ‘limited explosion risk’ type;

(v) A gas detection system conforming to conditions 1. to 4. below is connected to the ventilation system:

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1. It is appropriate at least for use in zone 1, explosion group IIC and temperature class T6;
2. It is equipped with sensors;
   - On the suction inlets of the ventilation systems; and
   - Directly below the top edge of the sill of the entrance doors;
3. Its t90 response time is lower than or equal to 4 s;
4. Measurement shall be continuous;

(vi) In the service spaces, the ventilation system is linked to the emergency lighting, which shall be at least of the 'limited explosion risk' type;

This emergency lighting is not necessary if the lighting installations in the service spaces are of at least the 'limited explosion risk' type;

(vii) The suction of the ventilation system and installations and equipment that do not meet the requirements set out in 9.3.1.51 (a) and (b) and 9.3.1.52.1 must be shut down when a concentration of 20% of LEL of n-Hexane is reached;

The switching-off shall be indicated in the accommodation and wheelhouse by visual and audible signals;

(viii) In the event of failure of the ventilation system or the gas detection installations in the accommodation, installations and equipment in the accommodation that do not meet the requirements set out in 9.3.1.51 (a) and (b) and 9.3.1.52.1 must be stopped;

The failure shall be indicated in the accommodation, the wheelhouse and on the deck by visual and audible signals;

(ix) In the event of failure of the ventilation system or the gas detection installations in the wheelhouse or service spaces, installations and equipment in those spaces that do not meet the requirements set out in 9.3.1.51 (a) and (b) and 9.3.1.52.1 must be shut down;

The failure shall be indicated in the wheelhouse and on the deck by visual and audible signals. The alarm must be relayed to the accommodation automatically if it has not been switched off;

(x) Any switching-off shall take place immediately and automatically and, if necessary, shall activate the emergency lighting;

The automatic switch-off device is set so that no automatic switching-off may occur while the vessel is under way;

(c) If there is no ventilation system or the ventilation system of a space does not comply with all the requirements set out in (b) above, any installations or equipment present in that space that may, if switched on, give rise to surface temperatures higher than those mentioned in 9.3.1.51 (a) and (b) or that do not meet the requirements set out in 9.3.1.52.1 must be capable of being switched off.

9.3.1.12.5 *(Deleted)*

9.3.1.12.6 Notice boards shall be fitted at the ventilation inlets indicating the conditions under which they shall be closed. All ventilation inlets of accommodation, wheelhouse and service spaces leading to the open air outside the cargo area shall be fitted with devices permanently fixed

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according to 9.3.1.40.2.2 (c), enabling them to be closed rapidly. It shall be clear whether they are open or closed.

Such ventilation inlets shall be located not less than 2.00 m from the cargo area.

Ventilation inlets of service spaces in the cargo area may be located within that area.

Ventilation inlets of service spaces in the cargo area may be located within such area.

9.3.1.13 ***Stability (general)***

9.3.1.13.1 Proof of sufficient stability shall be furnished including for stability in damaged condition.

9.3.1.13.2 The basic values for the stability calculation – the vessel's lightweight and location of the centre of gravity – shall be determined either by means of an inclining experiment or by detailed mass and moment calculation. In the latter case the lightweight of the vessel shall be checked by means of a lightweight test with a tolerance limit of ± 5% between the mass determined by calculation and the displacement determined by the draught readings.

9.3.1.13.3 Proof of sufficient intact stability shall be furnished for all stages of loading and unloading and for the final loading condition for all the relative densities of the substances transported contained in the vessel substance list according to 1.16.1.2.5.

For every loading case, taking account of the actual fillings and floating position of cargo tanks, ballast tanks and compartments, drinking water and sewage tanks and tanks containing products for the operation of the vessel, the vessel shall comply with the intact and damage stability requirements.

Intermediate stages during operations shall also be taken into consideration.

The proof of sufficient stability shall be shown for every operating, loading and ballast condition in the stability booklet, to be approved by the recognized classification society, which classes the vessel. If it is unpractical to pre-calculate the operating, loading and ballast conditions, a loading instrument approved by the recognised classification society which classes the vessel shall be installed and used which contains the contents of the stability booklet.

NOTE: *A stability booklet shall be worded in a form comprehensible for the responsible master and containing the following details:*

General description of the vessel:

- *General arrangement and capacity plans indicating the assigned use of compartments and spaces (cargo tanks, stores, accommodation, etc.);*

- *A sketch indicating the position of the draught marks referring to the vessel's perpendiculars;*

- *A scheme for ballast/bilge pumping and overflow prevention systems;*

- *Hydrostatic curves or tables corresponding to the design trim, and, if significant trim angles are foreseen during the normal operation of the vessel, curves or tables corresponding to such range of trim are to be introduced;*

- *Cross curves or tables of stability calculated on a free trimming basis, for the ranges of displacement and trim anticipated in normal operating conditions, with an indication of the volumes which have been considered buoyant;*

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– *Tank sounding tables or curves showing capacities, centres of gravity, and free surface data for all cargo tanks, ballast tanks and compartments, drinking water and sewage water tanks and tanks containing products for the operation of the vessel;*

– *Lightship data (weight and centre of gravity) resulting from an inclining test or deadweight measurement in combination with a detailed mass balance or other acceptable measures. Where the above–mentioned information is derived from a sister vessel, the reference to this sister vessel shall be clearly indicated, and a copy of the approved inclining test report relevant to this sister vessel shall be included;*

– *A copy of the approved test report shall be included in the stability booklet;*

– *Operating loading conditions with all relevant details, such as:*

  – *Lightship data, tank fillings, stores, crew and other relevant items on board (mass and centre of gravity for each item, free surface moments for liquid loads);*

  – *Draughts amidships and at perpendiculars;*

  – *Metacentric height corrected for free surfaces effect;*

  – *Righting lever values and curve;*

  – *Longitudinal bending moments and shear forces at read–out points;*

  – *Information about openings (location, type of tightness, means of closure); and*

  – *Information for the master.*

– *Calculation of the influence of ballast water on stability with information on whether fixed level gauges for ballast tanks and compartments have to be installed or the ballast tanks, or compartments shall only be completely full or completely empty when underway.*

9.3.1.13.4 Floatability after damage shall be proved for the most unfavourable loading condition. For this purpose, calculated proof of sufficient stability shall be established for critical intermediate stages of flooding and for the final stage of flooding.

9.3.1.14 *Stability (intact*)

9.3.1.14.1 The requirements for intact stability resulting from the damaged stability calculation shall be fully complied with.

9.3.1.14.2 For vessels with cargo tanks of more than 0.70 B in width, proof shall be furnished that the following stability requirements have been complied with:

(a) In the positive area of the righting lever curve up to immersion of the first non-watertight opening there shall be a righting lever (GZ) of not less than 0.10 m;

(b) The surface of the positive area of the righting lever curve up to immersion of the first non-watertight opening and in any event up to an angle of heel < 27° shall not be less than 0.024 m.rad;

(c) The metacentric height (GM) shall be not less than 0.10 m.

These conditions shall be met bearing in mind the influence of all free surfaces in tanks for all stages of loading and unloading.

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9.3.1.14.3 The most stringent requirement of 9.3.1.14.1 and 9.3.1.14.2 is applicable to the vessel.

9.3.1.15 ***Stability (damaged condition)***

9.3.1.15.1 The following assumptions shall be taken into consideration for the damaged condition:

(a) The extent of side damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	0.79 m inboard from the vessel's side at right angles to the centreline at the level corresponding to the maximum draught, or when applicable, the distance allowed by section 9.3.4, reduced by 0.01 m;
vertical extent:	from the base line upwards without limit;

(b) The extent of bottom damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	3.00 m;
vertical extent:	from the base 0.59 m upwards, the well excepted;

(c) Any bulkheads within the damaged area shall be assumed damaged, which means that the location of bulkheads shall be chosen so as to ensure that the vessel remains afloat after the flooding of two or more adjacent compartments in the longitudinal direction.

The following provisions are applicable:

– For bottom damage, adjacent athwartship compartments shall also be assumed as flooded;

– The lower edge of any non-watertight openings (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.10 m above the damage waterline;

– In general, permeability shall be assumed to be 95%. Where an average permeability of less than 95% is calculated for any compartment, this calculated value obtained may be used.

However, the following minimum values shall be used:

– engine rooms:	85%;
– accommodation:	95%;
– double bottoms, oil fuel tanks, ballast tanks, etc., depending on whether, according to their function, they have to be assumed as full or empty for the vessel floating at the maximum permissible draught:	0% or 95%.

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For the main engine room only the one–compartment standard need be taken into account, i.e. the end bulkheads of the engine room shall be assumed as not damaged.

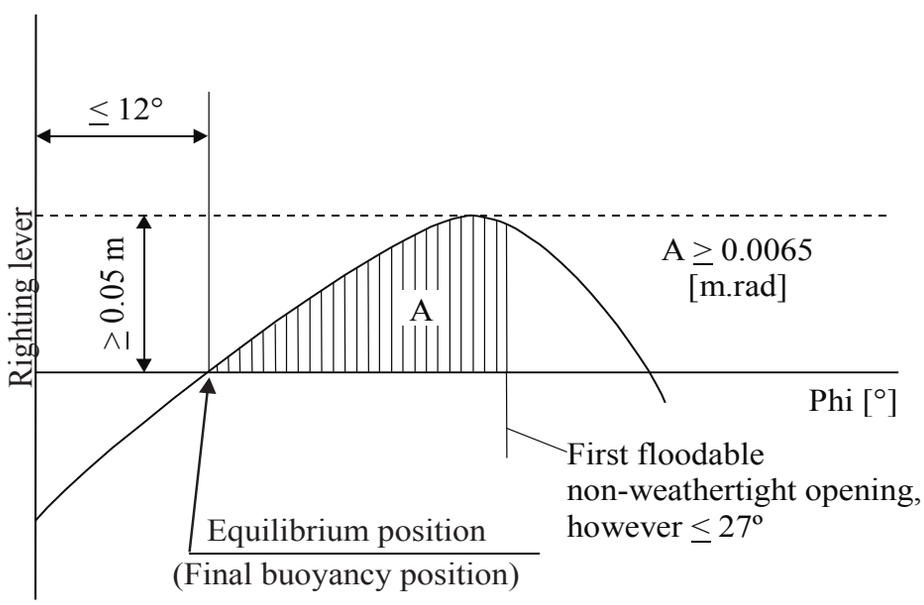
9.3.1.15.2 For the intermediate stage of flooding the following criteria have to be fulfilled:

GZ ≥ 0.03m

Range of positive GZ: 5°.

At the stage of equilibrium (final stage of flooding), the angle of heel shall not exceed 12°. Non-watertight openings shall not be flooded before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of stability calculation.

The positive range of the righting lever curve beyond the stage of equilibrium shall have a righting level of ≥ 0.05 m in association with an area under the curve of ≥ 0.0065 m.rad. The minimum values of stability shall be satisfied up to immersion of the first non-weathertight opening and in any event up to an angle of heel ≤ 27°. If non-watertight openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of stability calculation.



9.3.1.15.3 If openings through which undamaged compartments may additionally become flooded are capable of being closed watertight, the closing appliances shall be marked accordingly.

9.3.1.15.4 When cross- or down-flooding openings are provided for reduction of unsymmetrical flooding, the time for equalisation shall not exceed 15 minutes, if during the intermediate stages of flooding sufficient stability has been proved.

9.3.1.16 ***Engine rooms***

9.3.1.16.1 Internal combustion engines for the vessel's propulsion as well as internal combustion engines for auxiliary machinery shall be located outside the cargo area. Entrances and other openings of engine rooms shall be at a distance of not less than 2.00 m from the cargo area.

9.3.1.16.2 The engine room shall be accessible from the deck; the entrances shall not face the cargo area. When the doors are not located in a recess whose depth is at least equal to the door width, the hinges shall face the cargo area.

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9.3.1.17 ***Accommodation and service spaces***

9.3.1.17.1 Accommodation spaces and the wheelhouse shall be located outside the cargo area forward of the fore vertical plane or abaft the aft vertical plane bounding the part of the cargo area below deck. Windows of the wheelhouse which are located not less than 1.00 m above the bottom of the wheelhouse may tilt forward.

9.3.1.17.2 Entrances to spaces and openings of superstructures shall not face the cargo area. Doors opening outward and not located in a recess the depth of which is at least equal to the width of the doors shall have their hinges facing the cargo area.

9.3.1.17.3 Entrances from the deck and openings of spaces facing the weather shall be capable of being closed. The following instruction shall be displayed at the entrance of such spaces:

Do not open during loading, unloading and degassing
without the permission of the master.
Close immediately.

9.3.1.17.4 Entrances and windows of superstructures and accommodation spaces which can be opened as well as other openings of these spaces shall be located not less than 2.00 m from the cargo area. No wheelhouse doors and windows shall be located within 2.00 m from the cargo area, except where there is no direct connection between the wheelhouse and the accommodation.

9.3.1.17.5 (a) Driving shafts of the bilge or ballast pumps may penetrate through the bulkhead between the service space and the engine room, provided the arrangement of the service space is in compliance with 9.3.1.11.6.

(b) The penetration of the shaft through the bulkhead shall be gastight and shall have been approved by a recognised classification society.

(c) The necessary operating instructions shall be displayed.

(d) Penetrations through the bulkhead between the engine room and the service space in the cargo area, and the bulkhead between the engine room and the hold spaces may be provided for electrical cables, hydraulic lines and piping for measuring, control and alarm systems, provided that the penetrations have been approved by a recognised classification society. The penetrations shall be gastight. Penetrations through a bulkhead with an "A-60" fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3, shall have an equivalent fire protection.

(e) Pipes may pass through the bulkhead between the engine room and the service space in the cargo area provided that these are pipes between the mechanical equipment in the engine room and the service space which do not have any openings within the service space and which are provided with shut-off devices at the bulkhead in the engine room.

(f) Notwithstanding 9.3.1.11.4, pipes from the engine room may pass through the service space in the cargo area or a cofferdam or a hold space or a double-hull space to the outside provided that within the service space or cofferdam or hold space or double-hull space they are of the thick-walled type and have no flanges or openings.

(g) Where a driving shaft of auxiliary machinery penetrates through a wall located above the deck the penetration shall be gastight.

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9.3.1.17.6 A service space located within the cargo area below deck shall not be used as a cargo pump room for the vessel's own gas discharging system, e.g. compressors or the compressor/heat exchanger/pump combination, except where:

– the cargo pump-room is separated from the engine room or from service spaces outside the cargo area by a cofferdam or a bulkhead with an insulation of Class "A-60" as defined in SOLAS 74, Chapter II-2, Regulation 3, or by a service space or a hold space;

– the "A-60" bulkhead required above does not include penetrations referred to in 9.3.1.17.5 (a);

– ventilation exhaust outlets are located not less than 6.00 m from entrances and openings of the accommodation, wheelhouse and service spaces outside the cargo area;

– the access hatches and ventilation inlets can be closed from the outside;

– all piping for loading and unloading (at the suction side and the delivery side) are led through the deck above the pump-room. The necessary operation of the control devices in the pump-room, starting of pumps or compressors and control of the liquid flow rate shall be effected from the deck;

– the system is fully integrated in the gas and liquid piping system;

– the cargo pump room is provided with a permanent oxygen detection system which automatically indicates the amount of oxygen and which actuates a visual and audible alarm when the oxygen concentration has reached 19.5% by volume. The sensors of this system shall be placed at suitable positions at the bottom and at a height of 2.00 m. Measurement shall be continuous and displayed near to the entrance. Audible and visual alarms shall be installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system shall be shut down;

– failure of the oxygen measuring system shall actuate a visual and audible alarm in the wheelhouse and on deck. The alarm must be relayed to the accommodation automatically if it has not been switched off;

– the ventilation system prescribed in 9.3.1.12.3 has a capacity sufficient to ensure not less than 30 changes of air per hour based on the total volume of the service space.

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the cargo pump room shall also be provided with a permanent gas detection system which automatically indicates the presence of flammable gases and actuates a visual and audible alarm when the gas concentration has reached 20% of the LEL of the cargo or 20% of the LEL of n-Hexane, whichever gives the more critical value.

The sensors of this gas detection system shall be placed at suitable positions at the bottom and directly below the deck.

Measurement shall be continuous and displayed near to the entrance.

Audible and visual alarms shall be installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system shall be shut down.

Any failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by a visual and audible warning. The alarm must be relayed to the accommodation automatically if it has not been switched off.

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9.3.1.17.7 The following instruction shall be displayed at the entrance of the cargo pump-room:

Before entering the cargo pump-room check whether
it is free from gases and contains sufficient oxygen.
Do not open doors and entrance openings without
the permission of the master.
Leave immediately in the event of alarm.

9.3.1.18 ***Inerting facility***

In cases in which inerting or blanketing of the cargo is prescribed, the vessel shall be equipped with an inerting system.

This system shall be capable of maintaining a permanent minimum pressure of 7 kPa (0.07 bar) in the spaces to be inerted. In addition, the inerting system shall not increase the pressure in the cargo tank to a pressure greater than that at which the pressure valve is regulated. The set pressure of the vacuum-relief valve shall be 3.5 kPa (0.035 bar).

A sufficient quantity of inert gas for loading or unloading shall be carried or produced on board if it is not possible to obtain it on shore. In addition, a sufficient quantity of inert gas to offset normal losses occurring during carriage shall be on board.

The premises to be inerted shall be equipped with connections for introducing the inert gas and monitoring systems so as to ensure the correct atmosphere on a permanent basis.

When the pressure or the concentration of inert gas in the gaseous phase falls below a given value, this monitoring system shall activate an audible and visible alarm in the wheelhouse. When the wheelhouse is unoccupied, the alarm shall also be perceptible in a location occupied by a crew member.

9.3.1.19 and 9.3.1.20 (*Reserved*)

9.3.1.21 ***Safety and control installations***

9.3.1.21.1 Cargo tanks shall be provided with the following equipment:

(a) (*Reserved*)

(b) a level gauge;

(c) a level alarm device which is activated at the latest when a degree of filling of 86% is reached;

(d) a high level sensor for actuating the facility against overflowing at the latest when a degree of filling of 97.5% is reached;

(e) an instrument for measuring the pressure of the gas phase in the cargo tank;

(f) an instrument for measuring the temperature of the cargo;

(g) a connection for a closed-type sampling device.

9.3.1.21.2 When the degree of filling in per cent is determined, an error of not more than 0.5% is permitted. It shall be calculated on the basis of the total cargo tank capacity including the expansion trunk.

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9.3.1.21.3 The level gauge shall allow readings from the control position of the shut-off devices of the particular cargo tank. The permissible maximum filling levels of 91%, 95% and 97%, as given in the list of substances, shall be marked on each level gauge.

Permanent reading of the overpressure and vacuum shall be possible from a location from which loading or unloading operations may be interrupted. The permissible maximum overpressure and vacuum shall be marked on each level gauge.

Readings shall be possible in all weather conditions.

9.3.1.21.4 The level alarm device shall give a visual and audible warning on board when actuated. The level alarm device shall be independent of the level gauge.

9.3.1.21.5 (a) The high level sensor referred to in 9.3.1.21.1 (d) shall give a visual and audible alarm on board and at the same time actuate an electrical contact which in the form of a binary signal interrupts the electric current loop provided and fed by the shore facility, thus initiating measures at the shore facility against overflowing during loading operations.

The signal shall be transmitted to the shore facility via a watertight two–pin plug of a connector device in accordance with standard EN 60309–2:1999 + A1:2007 + A2:2012 for direct current of 40 to 50 volts, identification colour white, position of the nose 10 h.

The plug shall be permanently fitted to the vessel close to the shore connections of the loading and unloading piping.

The high level sensor shall also be capable of switching off the vessel's own discharging pump.

The high level sensor shall be independent of the level alarm device, but it may be connected to the level gauge.

(b) During discharging by means of the on-board pump, it shall be possible for the shore facility to switch it off. For this purpose, an independent intrinsically safe power line, fed by the vessel, shall be switched off by the shore facility by means of an electrical contact.

It shall be possible for the binary signal of the shore facility to be transmitted via a watertight two–pole socket or a connector device in accordance with standard EN 60309-2:1999 + A1:2007 + A2:2012, for direct current of 40 to 50 volts, identification colour white, position of the nose 10 h.

This socket shall be permanently fitted to the vessel close to the shore connections of the unloading piping.

9.3.1.21.6 The visual and audible signals given by the level alarm device shall be clearly distinguishable from those of the high level sensor.

The visual alarm shall be visible at each control position on deck of the cargo tank stop valves. It shall be possible to easily check the functioning of the sensors and electric circuits or these shall be of the "failsafe" design.

9.3.1.21.7 When the pressure or the temperature exceeds a set value, the instruments for measuring the pressure and the temperature of the cargo shall activate a visual and an audible alarm in the wheelhouse. When the wheelhouse is unoccupied the alarm shall also be perceptible in a location occupied by a crew member.

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When the pressure exceeds a set value during loading or unloading, the instrument for measuring the pressure shall simultaneously initiate an electrical contact which, by means of the plug referred to in 9.3.1.21.5 above, enables measures to be taken to interrupt the loading and unloading operation. When the vessel's own discharge pump is used, it shall be switched off automatically. The sensor for the alarms referred to above may be connected to the alarm installation.

9.3.1.21.8 Where the control elements of the shut-off devices of the cargo tanks are located in a control room, it shall be possible to stop the loading pumps and read the level gauges in the control room, and the visual and audible warning given by the level alarm device, the high level sensor referred to in 9.3.1.21.1 (d) and the instruments for measuring the pressure and temperature of the cargo shall be noticeable in the control room and on deck.

Satisfactory monitoring of the cargo area shall be ensured from the control room.

9.3.1.21.9 The vessel shall be so equipped that loading or unloading operations can be interrupted by means of switches, i.e. the quick closing valve located on the flexible vessel–to–shore connecting line must be capable of being closed. The switches shall be placed at two points on the vessel (fore and aft).

The interruption systems shall be designed according to the quiescent current principle.

9.3.1.21.10 When refrigerated substances are carried the opening pressure of the safety system shall be determined by the design of the cargo tanks. In the event of the transport of substances that must be carried in a refrigerated state the opening pressure of the safety system shall be not less than 25 kPa (0.25 bar) greater than the maximum pressure calculated according to 9.3.1.27.

9.3.1.21.11 On vessels certified to carry refrigerated liquefied gases the following protective measures shall be provided in the cargo area:

– Drips trays shall be installed under the shore connections of the piping for loading and unloading through which the loading and unloading operation is carried out. They must be made of materials which are able to resist the temperature of the cargo and be insulated from the deck. The drip trays shall have a sufficient volume and an overboard drain;

– A water spray system to cover:

1. exposed cargo tank domes and exposed parts of cargo tanks;

2. exposed on–deck storage vessels for flammable or toxic products;

3. parts of the cargo deck area where a leakage may occur.

The capacity of the water spray system shall be such that when all spray nozzles are in operation, the outflow is of 300 liters per square meter of cargo deck area per hour. The system shall be capable of being put into operation from the wheelhouse and from the deck;

– A water film around the shore connection of the piping for loading and unloading in use to protect the deck and the shipside in the way of the shore connection of the piping for loading and unloading in use during connecting and disconnecting the loading arm or hose. The water film shall have sufficient capacity. The system shall be capable of being put into operation from the wheelhouse and from the deck.

9.3.1.21.12 Vessels carrying refrigerated liquefied gases shall have on board, for the purpose of preventing damage to the cargo tanks during loading and the piping for loading and unloading during loading and unloading, a written instruction for pre–cooling. This

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instruction shall be applied before the vessel is put into operation and after long–term maintenance.

9.3.1.22 ***Cargo tank openings***

9.3.1.22.1 (a) Cargo tank openings shall be located on deck in the cargo area.

(b) Cargo tank openings with a cross-section greater than 0.10 m^2 shall be located not less than 0.50 m above the deck.

9.3.1.22.2 Cargo tank openings shall be fitted with gastight closures which comply with the provisions of 9.3.1.23.1.

9.3.1.22.3 The exhaust outlets of the pressure relief valves shall be located not less than 2.00 m above the deck at a distance of not less than 6.00 m from the accommodation and from the service spaces located outside the cargo area. This height may be reduced when within a radius of 1.00 m round the pressure relief valve outlet there is no equipment, no work is being carried out and signs indicate the area.

9.3.1.22.4 The closing devices normally used in loading and unloading operations shall not be capable of producing sparks when operated.

9.3.1.22.5 Each tank in which refrigerated substances are carried shall be equipped with a safety system to prevent unauthorized vacuum or overpressure.

9.3.1.23 ***Pressure test***

9.3.1.23.1 Cargo tanks and piping for loading and unloading shall comply with the provisions concerning pressure vessels which have been established by the competent authority or a recognised classification society for the substances carried.

9.3.1.23.2 Any cofferdams shall be subjected to initial tests before being put into service and thereafter at the prescribed intervals.

The test pressure shall be not less than 10 kPa (0.10 bar) gauge pressure.

9.3.1.23.3 The maximum intervals for the periodic tests referred to in 9.3.1.23.2 above shall be 11 years.

9.3.1.24 ***Regulation of cargo pressure and temperature***

9.3.1.24.1 Unless the entire cargo system is designed to resist the full effective vapour pressure of the cargo at the upper limits of the ambient design temperatures, the pressure of the tanks shall be kept below the permissible maximum set pressure of the safety valves, by one or more of the following means:

(a) a system for the regulation of cargo tank pressure using mechanical refrigeration;

(b) a system ensuring safety in the event of the heating or increase in pressure of the cargo. The insulation or the design pressure of the cargo tank, or the combination of these two elements, shall be such as to leave an adequate margin for the operating period and the temperatures expected; in each case the system shall be deemed acceptable by a recognized classification society and shall ensure safety for a minimum time of three times the operation period;

(c) For UN No. 1972 only, a system for the regulation of cargo tank pressure whereby the boil-off vapours are utilized as fuel;

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(d) other systems deemed acceptable by a recognized classification society.

9.3.1.24.2 The systems prescribed in 9.3.1.24.1 shall be constructed, installed and tested to the satisfaction of the recognized classification society. The materials used in their construction shall be compatible with the cargoes to be carried. For normal service, the upper ambient design temperature limits shall be:

air: +30° C;
water: +20° C.

9.3.1.24.3 The cargo storage system shall be capable of resisting the full vapour pressure of the cargo at the upper limits of the ambient design temperatures, whatever the system adopted to deal with the boil-off gas. This requirement is indicated by remark 37 in column (20) of Table C of Chapter 3.2.

9.3.1.25 ***Pumps and piping***

9.3.1.25.1 Pumps, compressors and accessory loading and unloading piping shall be placed in the cargo area. Cargo pumps and compressors shall be capable of being shut down from the cargo area and, in addition, from a position outside the cargo area. Cargo pumps and compressors situated on deck shall be located not less than 6.00 m from entrances to, or openings of, the accommodation and service spaces outside the cargo area.

9.3.1.25.2 (a) Piping for loading and unloading shall be independent of any other piping of the vessel. No cargo piping shall be located below deck, except those inside the cargo tanks and in the service spaces intended for the installation of the vessel's own gas discharging system.

(b) *(Reserved)*

(c) Piping for loading and unloading shall be clearly distinguishable from other piping, e.g. by means of colour marking.

(d) The piping for loading and unloading on deck, the venting piping with the exception of the shore connections but including the safety valves, and the valves shall be located within the longitudinal line formed by the outer boundaries of the domes and not less than one quarter of the vessel's breadth from the outer shell. This requirement does not apply to the relief pipes situated behind the safety valves. If there is, however, only one dome athwartships, these pipes and their valves shall be located at a distance not less than 2.70 m from the shell.

Where cargo tanks are placed side by side, all the connections to the domes shall be located on the inner side of the domes. The external connections may be located on the fore and aft centre line of the dome. The shut-off devices shall be located directly at the dome or as close as possible to it. The shut-off devices of the loading and unloading piping shall be duplicated, one of the devices being constituted by a quick closing valve. When the inside diameter of a shut-off device is less than 50 mm this device may be regarded as a safety device against bursts in the piping.

(e) The shore connections shall be located not less than 6.00 m from the entrances to or openings of, the accommodation and service spaces outside the cargo area.

(f) Each shore connection of the venting piping and shore connections of the piping for loading and unloading, through which the loading or unloading operation is carried out, shall be fitted with a shut-off device and a quick closing valve. However, each shore connection shall be fitted with a blind flange when it is not in operation.

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(g) Piping for loading and unloading, and venting piping, shall not have flexible connections fitted with sliding seals.

For transport of refrigerated liquefied gases

(h) The piping for loading and unloading and cargo tanks shall be protected from excessive stresses due to thermal movement and from movements of the tank and hull structure.

(i) Where necessary, piping for loading and unloading shall be thermally insulated from the adjacent hull structure to prevent the temperature of the hull falling below the design temperature of the hull material.

(j) All piping for loading and unloading, which may be closed off at each end when containing liquid (residue), shall be provided with safety valves. These safety valves shall discharge into the cargo tanks and shall be protected against inadvertent closing.

9.3.1.25.3 *(Deleted)*

9.3.1.25.4 Every component of the piping for loading and unloading shall be electrically connected to the hull.

9.3.1.25.5 The stop valves or other shut-off devices of the piping for loading and unloading shall indicate whether they are open or shut.

9.3.1.25.6 The piping for loading and unloading shall have, at the test pressure, the required elasticity, leakproofness and resistance to pressure.

9.3.1.25.7 The piping for unloading shall be fitted with pressure gauges at the inlet and outlet of the pump.

Reading of the pressure gauges shall be possible from the control position of the vessel's own gas discharging system. The maximum permissible overpressure or vacuum shall be indicated by a measuring device.

Readings shall be possible in all weather conditions.

9.3.1.25.8 Use of the cargo piping for ballasting purposes shall not be possible.

9.3.1.25.9 *(Reserved)*

9.3.1.25.10 Compressed air generated outside the cargo area can be used in the cargo area subject to the installation of a spring-loaded non-return valve to ensure that no gases can escape from the cargo area through the compressed air system into accommodation, wheelhouse or service spaces outside the cargo area.

9.3.1.26 *(Reserved)*

9.3.1.27 ***Refrigeration system***

9.3.1.27.1 The refrigeration system referred to in 9.3.1.24.1 (a) shall be composed of one or more units capable of keeping the pressure and temperature of the cargo at the upper limits of the ambient design temperatures at the prescribed level. Unless another means of regulating cargo pressure and temperature deemed satisfactory by a recognized classification society is provided, provision shall be made for one or more stand-by units with an output at least equal to that of the largest prescribed unit. A stand-by unit shall include a compressor, its engine, its control system and all necessary accessories to enable it to operate independently of the units normally used. Provision shall be made for a stand-by heat-exchanger unless the

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system's normal heat-exchanger has a surplus capacity equal to at least 25% of the largest prescribed capacity. It is not necessary to make provision for separate piping.

Cargo tanks, piping and accessories shall be insulated so that, in the event of a failure of all cargo refrigeration systems, the entire cargo remains for at least 52 hours in a condition not causing the safety valves to open.

9.3.1.27.2 The security devices and the connecting lines from the refrigeration system shall be connected to the cargo tanks above the liquid phase of the cargo when the tanks are filled to their maximum permissible degree of filling. They shall remain within the gaseous phase, even if the vessel has a list up to 12 degrees.

9.3.1.27.3 When several refrigerated cargoes with a potentially dangerous chemical reaction are carried simultaneously, particular care shall be given to the refrigeration systems so as to prevent any mixing of the cargoes. For the carriage of such cargoes, separate refrigeration systems, each including the full stand-by unit referred to in 9.3.1.27.1, shall be provided for each cargo. When, however, refrigeration is ensured by an indirect or combined system and no leak in the heat exchangers can under any foreseeable circumstances lead to the mixing of cargoes, no provision need be made for separate refrigeration units for the different cargoes.

9.3.1.27.4 When several refrigerated cargoes are not soluble in each other under conditions of carriage such that their vapour pressures are added together in the event of mixing, particular care shall be given to the refrigeration systems to prevent any mixing of the cargoes.

9.3.1.27.5 When the refrigeration systems require water for cooling, a sufficient quantity shall be supplied by a pump or pumps used exclusively for the purpose. This pump or pumps shall have at least two suction pipes, leading from two water intakes, one to port, the other to starboard. Provision shall be made for a stand-by pump with a satisfactory flow; this may be a pump used for other purposes provided that its use for supplying water for cooling does not impair any other essential service.

9.3.1.27.6 The refrigeration system may take one of the following forms:

(a) Direct system: the cargo vapours are compressed, condensed and returned to the cargo tanks. This system shall not be used for certain cargoes specified in Table C of Chapter 3.2. This requirement is indicated by remark 35 in column (20) of Table C of Chapter 3.2;

(b) Indirect system: the cargo or the cargo vapours are cooled or condensed by means of a coolant without being compressed;

(c) Combined system: the cargo vapours are compressed and condensed in a cargo/coolant heat-exchanger and returned to the cargo tanks. This system shall not be used for certain cargoes specified in Table C of Chapter 3.2. This requirement is indicated by remark 36 in column (20) of Table C of Chapter 3.2.

9.3.1.27.7 All primary and secondary coolant fluids shall be compatible with each other and with the cargo with which they may come into contact. Heat exchange may take place either at a distance from the cargo tank, or by using cooling coils attached to the inside or the outside of the cargo tank.

9.3.1.27.8 When the refrigeration system is installed in a separate service space, this service space shall meet the requirements of 9.3.1.17.6.

9.3.1.27.9 For all cargo systems, the heat transmission coefficient as used for the determination of the holding time (7.2.4.16.16 and 7.2.4.16.17) shall be determined by calculation. Upon completion of the vessel, the correctness of the calculation shall be checked by means of a

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heat balance test. The calculation and test shall be performed under supervision by the recognized classification society which classified the vessel.

The heat transmission coefficient shall be documented and kept on board. The heat transmission coefficient shall be verified at every renewal of the certificate of approval.

9.3.1.27.10 A certificate from a recognized classification society stating that 9.3.1.24.1 to 9.3.1.24.3, 9.3.1.27.1 and 9.3.1.27.4 above have been complied with shall be submitted together with the application for issue or renewal of the certificate of approval.

9.3.1.28 ***Water-spray system***

When water-spraying is required in column (9) of Table C of Chapter 3.2 a water-spray system shall be installed in the cargo area on deck for the purpose of reducing gases given off by the cargo by spraying water.

The system shall be fitted with a connection device for supply from the shore. The spray nozzles shall be so installed that released gases are precipitated safely. The system shall be capable of being put into operation from the wheelhouse and from the deck. The capacity of the water-spray system shall be such that when all the spray nozzles are in operation, the outflow is of 50 litres per square metre of cargo deck area and per hour.

9.3.1.29 and 9.3.1.30 (*Reserved*)

9.3.1.31 ***Engines***

9.3.1.31.1 Only internal combustion engines running on fuel with having a flashpoint above 55 ºC are allowed. This provision does not apply to internal combustion engines which are part of propulsion and auxiliary systems. These systems shall meet the requirements of Chapter 30 and Annex 8, Section 1 of the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) as amended.[2]

9.3.1.31.2 Ventilation inlets of the engine room and, when the engines do not take in air directly from the engine room, the air intakes of the engines shall be located not less than 2.00 m from the cargo area.

9.3.1.31.3 and 9.3.1.31.4 *(Deleted)*

9.3.1.31.5 The ventilation in the closed engine room shall be designed so that, at an ambient temperature of 20 °C, the average temperature in the engine room does not exceed 40 °C.

9.3.1.32 ***Oil fuel tanks***

9.3.1.32.1 When the vessel is fitted with hold spaces and double bottoms, double bottoms within the cargo area may be arranged as oil fuel tanks, provided their depth is not less than 0.6 m.

Oil fuel pipes and openings of such tanks are not permitted in the hold space.

9.3.1.32.2 The open ends of the air pipes of each oil fuel tanks shall extend to not less than 0.5 m above the open deck. These open ends and the open ends of overflow pipes leading to the deck shall be fitted with a protective device consisting of a gauze diaphragm or a perforated plate.

9.3.1.33 (*Reserved*)

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[2] *As available on the website of the Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI, https://www.cesni.eu/en/documents/es-trin/.*

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9.3.1.34 ***Exhaust pipes***

9.3.1.34.1 Exhausts shall be evacuated from the vessel into the open air either upwards through an exhaust pipe or through the shell plating. The exhaust outlet shall be located not less than 2 m from the cargo area. The exhaust pipes of engines shall be arranged so that the exhausts are led away from the vessel. The exhaust pipes shall not be located within the cargo area.

9.3.1.34.2 Exhaust pipes of engines shall be provided with a device preventing the escape of sparks, e.g. spark arresters.

9.3.1.35 ***Bilge pumping and ballasting arrangements***

9.3.1.35.1 Bilge and ballast pumps for spaces within the cargo area shall be installed within such area.

This provision does not apply to:

– double-hull spaces and double bottoms which do not have a common boundary wall with the cargo tanks;

– cofferdams and hold spaces where ballasting is carried out using the piping of the fire-fighting system in the cargo area and bilge-pumping is performed using eductors which are installed in the cargo area.

9.3.1.35.2 Where the double bottom is used as a liquid oil fuel tank, it shall not be connected to the bilge piping system.

9.3.1.35.3 Where the ballast pump is installed in the cargo area, the standpipe and its outboard connection for suction of ballast water shall be located within the cargo area.

9.3.1.35.4 It shall be possible for an under-deck pump-room to be stripped in an emergency using a system located in the cargo area and independent of any other system. This stripping system shall be located outside the pump-room.

9.3.1.36 to 9.3.1.39 (*Reserved*)

9.3.1.40 ***Fire-extinguishing arrangements***

9.3.1.40.1 A fire-extinguishing system shall be installed on the vessel.

This system shall comply with the following requirements:

– It shall be supplied by two independent fire or ballast pumps, one of which shall be ready for use at any time. These pumps and their means of propulsion and electrical equipment shall not be installed in the same space;

– It shall be provided with a water main fitted with at least three hydrants in the cargo area above deck. Three suitable and sufficiently long hoses with jet/spray nozzles having a diameter of not less than 12 mm shall be provided. Alternatively one or more of the hose assemblies may be substituted by directable jet/spray nozzles having a diameter of not less than 12 mm. It shall be possible to reach any point of the deck in the cargo area simultaneously with at least two jets of water which do not emanate from the same hydrant.

A spring-loaded non-return valve shall be fitted to ensure that no gases can escape through the fire-extinguishing system into the accommodation, wheelhouse or service spaces outside the cargo area;

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– The capacity of the system shall be at least sufficient for a jet of water to have a minimum reach of not less than the vessel's breadth from any location on board with two spray nozzles being used at the same time;

– The water supply system shall be capable of being put into operation from the wheelhouse and from the deck;

– Measures shall be taken to prevent the freezing of fire-mains and hydrants.

9.3.1.40.2 In addition the engine rooms, the cargo pump-room and all spaces containing special equipment (switchboards, compressors, etc.) for the refrigerant equipment if any, shall be provided with a permanently fixed fire-extinguishing system meeting the following requirements:

9.3.1.40.2.1 *Extinguishing agents*

For the protection of spaces in engine rooms, boiler rooms and pump rooms, only permanently fixed fire-extinguishing systems using the following extinguishing agents are permitted:

(a) CO_2 (carbon dioxide);

(b) HFC 227 ea (heptafluoropropane);

(c) IG-541 (52% nitrogen, 40% argon, 8% carbon dioxide);

(d) FK-5-1-12 (dodecafluoro 2–methylpentane–3–one);

(e) (*Reserved*)

(f) K_2CO_3 (potassium carbonate).

Other extinguishing agents are permitted only on the basis of recommendations by the Administrative Committee.

9.3.1.40.2.2 *Ventilation, air extraction*

(a) The combustion air required by the combustion engines which ensure propulsion should not come from spaces protected by permanently fixed fire-extinguishing systems. This requirement is not mandatory if the vessel has two independent main engine rooms with a gastight separation or if, in addition to the main engine room, there is a separate engine room installed with a bow thruster that can independently ensure propulsion in the event of a fire in the main engine room.

(b) All forced ventilation systems in the space to be protected shall be shut down automatically as soon as the fire-extinguishing system is activated.

(c) All openings in the space to be protected which permit air to enter or gas to escape shall be fitted with devices enabling them to be closed rapidly. It shall be clear whether they are open or closed.

(d) Air escaping from the pressure–relief valves of the pressurised air tanks installed in the engine rooms shall be evacuated to the open air.

(e) Overpressure or negative pressure caused by the diffusion of the extinguishing agent shall not destroy the constituent elements of the space to be protected. It shall be possible to ensure the safe equalisation of pressure.

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(f) Protected spaces shall have a facility for extracting the extinguishing agent and the combustion gases. Such facilities shall be capable of being operated from positions outside the protected rooms and which must not be made inaccessible by a fire within such spaces. If there are permanently installed extractors, it shall not be possible for these to be switched on while the fire is being extinguished.

9.3.1.40.2.3 *Fire alarm system*

The space to be protected shall be monitored by an appropriate fire alarm system. The alarm signal shall be audible in the wheelhouse, the accommodation and the space to be protected.

9.3.1.40.2.4 *Piping system*

(a) The extinguishing agent shall be routed to and distributed in the space to be protected by means of a permanent piping system. Piping installed in the space to be protected and their fittings shall be made of steel. This shall not apply to the connecting nozzles of tanks and compensators provided that the materials used have equivalent fire–retardant properties. Piping shall be protected against corrosion both internally and externally.

(b) The discharge nozzles shall be so arranged as to ensure the regular diffusion of the extinguishing agent. In particular, the extinguishing agent must also be effective beneath the floor.

9.3.1.40.2.5 *Triggering device*

(a) Automatically activated fire-extinguishing systems are not permitted.

(b) It shall be possible to activate the fire-extinguishing system from a suitable point located outside the space to be protected.

(c) Triggering devices shall be so installed that they can be activated in the event of a fire and so that the risk of their breakdown in the event of a fire or an explosion in the space to be protected is reduced as far as possible.

Systems which are not mechanically activated shall be supplied from two energy sources independent of each other. These energy sources shall be located outside the space to be protected. The control lines located in the space to be protected shall be so designed as to remain capable of operating in the event of a fire for a minimum of 30 minutes. The electrical installations are deemed to meet this requirement if they conform to the IEC 60331–21:1999 standard.

When the triggering devices are so placed as not to be visible, the component concealing them shall carry the “Fire-fighting system” symbol, each side being not less than 10 cm in length, with the following text in red letters on a white ground:

Fire-extinguishing system

(d) If the fire-extinguishing system is intended to protect several spaces, it shall comprise a separate and clearly–marked triggering device for each space.

(e) The instructions shall be posted alongside all triggering devices and shall be clearly visible and indelible. The instructions shall be in a language the master can read and understand and if this language is not English, French or German, they shall be in English, French or German. They shall include information concerning:

(i) the activation of the fire-extinguishing system;

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(ii) the need to ensure that all persons have left the space to be protected;

(iii) The correct behaviour of the crew in the event of activation and when accessing the space to be protected following activation or diffusion, in particular in respect of the possible presence of dangerous substances;

(iv) the correct behaviour of the crew in the event of the failure of the fire-extinguishing system to function properly.

(f) The instructions shall mention that prior to the activation of the fire-extinguishing system, combustion engines installed in the space and aspirating air from the space to be protected, shall be shut down.

9.3.1.40.2.6 *Alarm device*

(a) Permanently fixed fire-extinguishing systems shall be fitted with an audible and visual alarm device.

(b) The alarm device shall be set off automatically as soon as the fire-extinguishing system is first activated. The alarm device shall function for an appropriate period of time before the extinguishing agent is released; it shall not be possible to turn it off.

(c) Alarm signals shall be clearly visible in the spaces to be protected and their access points and be clearly audible under operating conditions corresponding to the highest possible sound level. It shall be possible to distinguish them clearly from all other sound and visual signals in the space to be protected.

(d) Sound alarms shall also be clearly audible in adjoining spaces, with the communicating doors shut, and under operating conditions corresponding to the highest possible sound level.

(e) If the alarm device is not intrinsically protected against short circuits, broken wires and drops in voltage, it shall be possible to monitor its operation.

(f) A sign with the following text in red letters on a white ground shall be clearly posted at the entrance to any space the extinguishing agent may reach:

Warning, fire-extinguishing system!
Leave this space immediately when the … (description) alarm is activated!

9.3.1.40.2.7 *Pressurised tanks, fittings and piping*

(a) Pressurised tanks, fittings and piping shall conform to the requirements of the competent authority or, if there are no such requirements, to those of a recognized classification society.

(b) Pressurised tanks shall be installed in accordance with the manufacturer’s instructions.

(c) Pressurised tanks, fittings and piping shall not be installed in the accommodation.

(d) The temperature of cabinets and storage spaces for pressurised tanks shall not exceed 50 °C.

(e) Cabinets or storage spaces on deck shall be securely stowed and shall have vents so placed that in the event of a pressurised tank not being gastight, the escaping gas cannot penetrate into the vessel. Direct connections with other spaces are not permitted.

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9.3.1.40.2.8 *Quantity of extinguishing agent*

If the quantity of extinguishing agent is intended for more than one space, the quantity of extinguishing agent available does not need to be greater than the quantity required for the largest of the spaces thus protected.

9.3.1.40.2.9 *Installation, maintenance, monitoring and documents*

(a) The mounting or modification of the system shall only be performed by a company specialised in fire-extinguishing systems. The instructions (product data sheet, safety data sheet) provided by the manufacturer of the extinguishing agent or the system shall be followed.

(b) The system shall be inspected by an expert:

(i) before being brought into service;

(ii) each time it is put back into service after activation;

(iii) after every modification or repair;

(iv) regularly, not less than every two years.

(c) During the inspection, the expert is required to check that the system conforms to the requirements of 9.3.1.40.2.

(d) The inspection shall include, as a minimum:

(i) an external inspection of the entire system;

(ii) an inspection to ensure that the piping is leakproof;

(iii) an inspection to ensure that the control and activation systems are in good working order;

(iv) an inspection of the pressure and contents of tanks;

(v) an inspection to ensure that the means of closing the space to be protected are leakproof;

(vi) an inspection of the fire alarm system;

(vii) an inspection of the alarm device.

(e) The person performing the inspection shall establish, sign and date a certificate of inspection.

(f) The number of permanently fixed fire-extinguishing systems shall be mentioned in the vessel certificate.

9.3.1.40.2.10 *Fire-extinguishing system operating with CO_2*

In addition to the requirements contained in 9.3.1.40.2.1 to 9.3.1.40.2.9, fire-extinguishing systems using CO_2 as an extinguishing agent shall conform to the following provisions:

(a) Tanks of CO_2 shall be placed in a gastight space or cabinet separated from other spaces. The doors of such storage spaces and cabinets shall open outwards; they shall be capable of being locked and shall carry on the outside the symbol “Warning:

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general danger", not less than 5 cm high and "CO_2" in the same colours and the same size;

(b) Storage cabinets or spaces for CO_2 tanks located below deck shall only be accessible from the outside. These spaces shall have an artificial ventilation system with extractor hoods and shall be completely independent of the other ventilation systems on board;

(c) The level of filling of CO_2 tanks shall not exceed 0.75 kg/l. The volume of depressurised CO_2 shall be taken to be 0.56 m^3/kg;

(d) The concentration of CO_2 in the space to be protected shall be not less than 40% of the gross volume of the space. This quantity shall be released within 120 seconds. It shall be possible to monitor whether diffusion is proceeding correctly;

(e) The opening of the tank valves and the control of the diffusing valve shall correspond to two different operations;

(f) The appropriate period of time mentioned in 9.3.1.40.2.6 (b) shall be not less than 20 seconds. A reliable installation shall ensure the timing of the diffusion of CO_2.

9.3.1.40.2.11 *Fire-extinguishing system operating with HFC-227 ea (heptafluoropropane)*

In addition to the requirements of 9.3.1.40.2.1 to 9.3.1.40.2.9, fire-extinguishing systems using HFC-227 ea as an extinguishing agent shall conform to the following provisions:

(a) Where there are several spaces with different gross volumes, each space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing HFC-227 ea placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Every tank shall be fitted with a device permitting control of the gas pressure;

(d) The level of filling of tanks shall not exceed 1.15 kg/l. The specific volume of depressurised HFC-227 ea shall be taken to be 0.1374 m^3/kg;

(e) The concentration of HFC-227 ea in the space to be protected shall be not less than 8% of the gross volume of the space. This quantity shall be released within 10 seconds;

(f) Tanks of HFC-227 ea shall be fitted with a pressure monitoring device which triggers an audible and visual alarm in the wheelhouse in the event of an unscheduled loss of propellant gas. Where there is no wheelhouse, the alarm shall be triggered outside the space to be protected;

(g) After discharge, the concentration in the space to be protected shall not exceed 10.5% (volume);

(h) The fire-extinguishing system shall not comprise aluminium parts.

9.3.1.40.2.12 *Fire-extinguishing system operating with IG-541*

In addition to the requirements of 9.3.1.40.2.1 to 9.3.1.40.2.9, fire-extinguishing systems using IG-541 as an extinguishing agent shall conform to the following provisions:

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(a) Where there are several spaces with different gross volumes, every space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing IG-541 placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Each tank shall be fitted with a device for checking the contents;

(d) The filling pressure of the tanks shall not exceed 200 bar at a temperature of +15 °C;

(e) The concentration of IG-541 in the space to be protected shall be not less than 44% and not more than 50% of the gross volume of the space. This quantity shall be released within 120 seconds.

9.3.1.40.2.13 *Fire-extinguishing system operating with FK-5-1-12*

In addition to the requirements of 9.3.1.40.2.1 to 9.3.1.40.2.9, fire-extinguishing systems using FK-5-1-12 as an extinguishing agent shall comply with the following provisions:

(a) Where there are several spaces with different gross volumes, every space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing FK-5-1-12 placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Every tank shall be fitted with a device permitting control of the gas pressure;

(d) The level of filling of tanks shall not exceed 1.00 kg/l. The specific volume of depressurized FK-5-1-12 shall be taken to be 0.0719 m^3/kg;

(e) The volume of FK-5-1-12 in the space to be protected shall be not less than 5.5% of the gross volume of the space. This quantity shall be released within 10 seconds;

(f) Tanks of FK-5-1-12 shall be fitted with a pressure monitoring device which triggers an audible and visual alarm in the wheelhouse in the event of an unscheduled loss of extinguishing agent. Where there is no wheelhouse, the alarm shall be triggered outside the space to be protected;

(g) After discharge, the concentration in the space to be protected shall not exceed 10.0%.

9.3.1.40.2.14 *(Reserved)*

9.3.1.40.2.15 *Fire-fighting systems using K_2CO_3 as the extinguishing agent*

In addition to the requirements laid down in 9.3.1.40.2.1 to 9.3.1.40.2.3, 9.3.1.40.2.5, 9.3.1.40.2.6 and 9.3.1.40.2.9, fire-fighting systems using K_2CO_3 as the extinguishing agent shall comply with the following provisions:

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(a) The fire-fighting system shall have a type-approval pursuant to Directive 2014/90/EU[3] or to MSC/Circ. 1270;[4]

(b) Each room shall be provided with its own firefighting system;

(c) The extinguishing agent must be stored in specially provided unpressurised tanks in the room to be protected. These tanks shall be fitted in such a way that the extinguishing agent is dispensed evenly in the room. In particular the extinguishing agent shall also work underneath the deck plates;

(d) Each tank is separately connected with the triggering device;

(e) The quantity of dry aerosol-forming extinguishing agent relative to the room to be protected shall be at least 120 g per m^3 of the net volume of this room. This net volume is calculated according to Directive 2014/90/EU[3] or to MSC/Circ. 1270[4]. It shall be possible to supply the extinguishing agent within 120 s.

9.3.1.40.2.16 *Fixed fire-extinguishing system for physical protection*

In order to ensure physical protection in the engine rooms, boiler rooms and pump rooms, permanently fixed fire-extinguishing systems are accepted solely on the basis of recommendations by the Administrative Committee.

9.3.1.40.3 The two hand fire–extinguishers referred to in 8.1.4 shall be located in the cargo area.

9.3.1.40.4 The fire-extinguishing agent and the quantity contained in the permanently fixed fire-extinguishing system shall be suitable and sufficient for fighting fires.

9.3.1.41 *Fire and naked light*

9.3.1.41.1 The outlets of funnels shall be located not less than 2.00 m from the cargo area. Arrangements shall be provided to prevent the escape of sparks and the entry of water.

9.3.1.41.2 Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels.

The installation in the engine room or in another separate space of heating appliances fuelled with liquid fuel having a flash–point above 55 °C is, however, permitted.

Cooking and refrigerating appliances are permitted only in the accommodation.

9.3.1.41.3 Only electrical lamps are permitted.

9.3.1.42 to 9.3.1.49 (*Reserved*)

9.3.1.50 *(Deleted)*

9.3.1.51 *Surface temperatures of installations and equipment*

(a) Surface temperatures of electrical and non-electrical installations and equipment shall not exceed 200 °C.

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[3] *Official Journal of the European Union, L 257 of 28 August 2014, p.146.*

[4] *International Maritime Organization Circular MSC/Circ. 1270 and corrigenda — Revised Guidelines for the approval of fixed aerosol fire-extinguishing systems equivalent to fixed gas extinguishing systems, as referred to in SOLAS 1974, for machinery spaces — adopted on 4 June 2008.*

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(b) Surface temperatures of the outer parts of engines and of their air inlets and exhaust ducts shall not exceed 200 °C;

(c) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which the temperature classes T4, T5 or T6 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 135 °C (T4), 100 °C (T5) or 85 °C (T6) respectively;

(d) (a) and (b) do not apply if the following requirements are met (see also 7.2.3.51.4):

(i) Accommodation, wheelhouse and service spaces where surface temperatures higher than those mentioned in (a) and (b) occur are equipped with a ventilation system according to 9.3.1.12.4 (b); or

(ii) Installations and equipment which generate surface temperatures higher than those set out in (a) or (b), respectively, must be capable of being shut down. Such installations and equipment shall be marked in red.

9.3.1.52 ***Type and location of electrical installations and equipment***

9.3.1.52.1 Electrical installations and equipment shall be of at least the ‘limited explosion risk’ type.

This provision does not apply to:

(a) Lighting installations in the accommodation and the wheelhouse, except for switches near to the entrances;

(b) Mobile phones, fixed telephone installations, stationary and portable computers and loading instruments in the accommodation or the wheelhouse;

(c) Electrical installations and equipment which, during a stay in the immediate vicinity of or within a shoreside assigned zone:

(i) Are extinguished; or

(ii) Are placed in premises equipped with a ventilation system according to 9.3.1.12.4;

(d) To radiotelephone installations and inland AIS (automatic identification systems) stations in the accommodation and the wheelhouse, if no part of an aerial for radiotelephone installations or AIS stations is situated above or within 2.00 m of the cargo area.

9.3.1.52.2 In the cofferdams, double-hull spaces, double bottoms and hold spaces, only hermetically sealed echo sounding devices are allowed, the cables of which are led through thick-walled steel tubes with gastight connections up to the main deck.

9.3.1.52.3 The fixed electrical installations and equipment which do not meet the requirements set out in 9.3.1.51 (a), 9.3.1.51 (b) and 9.3.1.52.1 above and their switches shall be marked in red. The disconnection of such equipment shall be controlled from a centralized location on board.

9.3.1.52.4 Every insulated distribution network shall be fitted with an automatic device with a visual and audible alarm for checking the insulation level.

9.3.1.52.5 Only distribution systems without return connection to the hull are permitted. This provision does not apply to:

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– Active cathodic corrosion protection;

– Certain limited sections of the installations situated outside the cargo area (e.g., connections of starters of diesel engines);

– The device for checking the insulation level referred to in 9.3.1.52.4.

9.3.1.52.6 An electric generator which is permanently driven by an engine and which does not meet the requirements of 9.3.1.52.1 above, shall be fitted with a multipolar switch capable of shutting down the generator. A notice board with the operating instructions shall be displayed near the switch.

9.3.1.52.7 Failure of the power supply for the safety and control equipment shall be immediately indicated by visual and audible signals in the wheelhouse and on the deck. The alarm must be relayed to the accommodation automatically if it has not been switched off.

9.3.1.52.8 Electrical switches, sockets and cables on deck shall be protected against mechanical damage.

9.3.1.52.9 Sockets for the connection of signal lights and gangway lighting shall be solidly fitted to the vessel close to the signal mast or the gangway. The sockets used in this area shall be designed so as to prevent connection or disconnection except when they are not live.

9.3.1.52.10 Accumulators shall be located outside the cargo area.

9.3.1.53 ***Type and location of electrical and non-electrical installations and equipment intended to be used in explosion hazardous areas***

9.3.1.53.1 On board vessels covered by the classification of zones as defined in 1.2.1, electrical and non-electrical installations and equipment used in explosion hazardous areas shall meet at least the requirements for use in the area concerned.

They shall be selected on the basis of the explosion groups/subgroups and temperature classes to which the substances to be carried belong (see columns (15) and (16) of Table C of Chapter 3.2).

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which temperature classes T4, T5 or T6 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 135 °C (T4), 100 °C (T5) or 85 °C (T6).

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which temperature classes T1 or T2 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 200 °C.

9.3.1.53.2 Except in the case of optical fibres, electrical cables shall be armoured or placed in a metallic sheath or in protective tubes.

Electrical cables for the active cathodic protection of the shell plating shall be led through thick-walled steel tubes with gastight connections up to the main deck.

9.3.1.53.3 Movable electric cables are prohibited in the explosion danger area, except for electric cables for intrinsically safe electric circuits or for connecting:

(a) Signal lights and lighting for gangways, provided the connection point (for example, the socket) is permanently fitted to the vessel close to the signal mast or gangway;

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(b) The power network on a vessel to a land-based power network; provided

– The electric cables and the power supply unit conform with a valid standard (for example, EN 15869-03: 2010);

– The power supply unit and connectors are located outside of the explosion danger area.

Connecting and disconnecting sockets/connectors shall only be possible when they are not live.

9.3.1.53.4 Electrical cables of intrinsically safe circuits shall be separated from other cables not intended for use in such circuits and shall be marked (they shall not be installed together in the same string of cables and they shall not be fixed by the same cable clamps).

9.3.1.53.5 For movable electrical cables permitted under 9.3.1.53.3, only sheathed cables of type H07RN-F in accordance with standard IEC 60245-4:2011[5] or electrical cables of at least equivalent design having conductors with a cross-section of not less than 1.50 mm^2 shall be used.

9.3.1.54 ***Earthing***

9.3.1.54.1 The metal parts of electrical installations and equipment in the cargo area which are not live, as well as the protective metal tubes or metal sheaths of cables, in normal service shall be earthed, unless they are so arranged that they are automatically earthed by bonding to the metal structure of the vessel.

9.3.1.54.2 The provisions of 9.3.1.54.1 also apply to installations with a voltage of less than 50 Volts.

9.3.1.54.3 Independent cargo tanks, metal intermediate bulk containers and tank-containers shall be earthed.

9.3.1.54.4 Receptacles for residual products shall be capable of being earthed.

9.3.1.55 (*Reserved*)

9.3.1.56 *(Deleted)*

9.3.1.57 to 9.3.1.59 (*Reserved*)

9.3.1.60 ***Special equipment***

A shower and an eye and face bath shall be provided on the vessel at a location which is directly accessible from the cargo area. The water shall meet the quality of drinking water on board.

NOTE: *Additional decontamination substances for the purpose of avoiding corrosion of eyes and skin are allowed.*

A connection of this special equipment with the area outside the cargo zone is accepted.

A spring-loaded non-return valve shall be fitted to ensure that no gases can escape through the shower and the eye and face bath system outside the cargo area.

9.3.1.61 (*Reserved*)

[5] *Identical to EN 50525-2-21: 2011.*

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9.3.1.62 ***Valve for degassing to reception facilities***

A permanently installed or portable spring-loaded low-pressure valve used during degassing operations to reception facilities, shall be fitted at the piping used to extract air. If the vessel's substance list, according to 1.16.1.2.5, contains substances for which explosion protection is required according to column (17) of Table C of Chapter 3.2, this valve shall be fitted with a flame arrester capable of withstanding a deflagration. When the vessel is not degassing to a reception facility, the valve shall be closed with a blind flange. The low-pressure valve shall be so installed that under other normal working conditions the vacuum valve is not activated.

NOTE*: Degassing operations are part of normal working conditions.*

9.3.1.63 to 9.3.1.70 (*Reserved*)

9.3.1.71 ***Admittance on board***

The notice boards displaying the prohibition of admittance in accordance with 8.3.3 shall be clearly legible from either side of the vessel.

9.3.1.72 and 9.3.1.73 (*Reserved*)

9.3.1.74 ***Prohibition of smoking, fire or naked light***

9.3.1.74.1 The notice boards displaying the prohibition of smoking in accordance with 8.3.4 shall be clearly legible from either side of the vessel.

9.3.1.74.2 Notice boards indicating the circumstances under which the prohibition is applicable shall be fitted near the entrances to the spaces where smoking or the use of fire or naked light is not always prohibited.

9.3.1.74.3 Ashtrays shall be provided close to each exit of the accommodation and the wheelhouse.

9.3.1.75 to 9.3.1.91 (*Reserved*)

9.3.1.92 ***Emergency exit***

Spaces the entrances or exits of which are likely to become partly or completely immersed in the damaged condition shall have an emergency exit which is situated not less than 0.10 m above the damage waterline. This does not apply to forepeak and afterpeak.

9.3.1.93 to 9.3.1.99 (*Reserved*)

9.3.2 Rules for construction of type C tank vessels

The rules for construction of 9.3.2.0 to 9.3.2.99 apply to type C tank vessels.

9.3.2.0 ***Materials of construction***

9.3.2.0.1 (a) The vessel's hull and the cargo tanks shall be constructed of shipbuilding steel or other at least equivalent metal.

The independent cargo tanks may also be constructed of other materials, provided these have at least equivalent mechanical properties and resistance against the effects of temperature and fire.

(b) Every part of the vessel including any installation and equipment which may come into contact with the cargo shall consist of materials which can neither be dangerously

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affected by the cargo nor cause decomposition of the cargo or react with it so as to form harmful or hazardous products. In case it has not been possible to examine this during classification and inspection of the vessel a relevant reservation shall be entered in the vessel substance list according to 1.16.1.2.5.

(c) Venting piping shall be protected against corrosion.

9.3.2.0.2 Except where explicitly permitted in 9.3.2.0.3 below or in the certificate of approval, the use of wood, aluminium alloys, plastic materials or rubber within the cargo area is prohibited.

9.3.2.0.3 The use of wood, aluminium alloys, plastic materials or rubber in the cargo area is permitted as shown in the following table:

The use of wood, aluminium alloys, plastic materials or rubber is permitted only for:				**(X indicates permitted)**
	Wood	**Aluminium alloys**	**Plastic material**	**Rubber**
Gangways	X	X	X	X
External ladders and passageways (gangways) *)		X	X	X
Cleaning equipment, e.g. brooms	X		X	X
Movable equipment e.g. fire extinguishers, portable gas detectors, rescue winches		X	X	X
Fenders	X		X	X
Mooring cables, fender ropes			X	
Chocking of cargo tanks which are independent of the vessel's hull and chocking of installations and equipment	X		X	
Masts and similar round timber	X	X	X	
Engine parts		X	X	
Protective covers of engines and pumps			X	
Parts of the electrical installation		X	X	
Parts of the loading and unloading installation, e.g., gaskets		X	X	X
Boxes, cabinets or other receptacles placed on the deck for storage of disposal and recovery equipment for capstans, extinguishers, fire hoses, waste, etc.		X	X	
Supports and stops of any kind	X		X	
Ventilators, including hose assemblies for ventilation		X	X	
Parts of the water spray system, the shower and the eye and face bath		X	X	
Insulation of cargo tanks and of piping for loading and unloading, gas discharge pipes and heating pipes			X	X
Coating of cargo tanks and of piping for loading and unloading		X	X	X
All kinds of gaskets (e.g. for dome or hatch covers)			X	X
Cables for electrical equipment			X	X
Mat under hose assemblies for loading and unloading piping system			X	X

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The use of wood, aluminium alloys, plastic materials or rubber is permitted only for:				**(X indicates permitted)**
	Wood	**Aluminium alloys**	**Plastic material**	**Rubber**
Fire hoses, air hoses, hoses for cleaning the deck, etc.			X	X
Sampling equipment and bottles			X	
Photo-optical copies of the certificate of approval according to 8.1.2.6 or 8.1.2.7, and of the vessel's certificate, the measurement certificate and the Rhine navigation membership certificate		X	X	
Drip trays			X	
(*) Take account of 9.3.1.0.5, 9.3.2.0.5 or 9.3.3.0.5, as appropriate				
Aluminium gauging rods are permitted, provided that they are fitted with brass feet or protected in another way to avoid sparking.				

All permanently fitted materials in the accommodation or wheelhouse, with the exception of furniture, shall not readily ignite. They shall not evolve fumes or toxic gases in dangerous quantities, if involved in a fire.

9.3.2.0.4 The paint used in the cargo area shall not be liable to produce sparks in case of impact.

9.3.2.0.5 The use of plastic material for a vessel's boats is permitted only if the material does not readily ignite. Except where explicitly permitted in 9.3.2.0.3 or in the certificate of approval, the use of wood, aluminium alloys, plastic materials or rubber is prohibited.

The use of aluminium alloys or plastic material for passageways (gangways) in the cargo area is permitted only if the material does not readily ignite or conduct electricity.

9.3.2.1 Vessel record

NOTE: *For the purpose of this paragraph, the term "owner" has the same meaning as in 1.16.0.*

The vessel record shall be retained by the owner who shall be able to provide this documentation at the request of the competent authority and the recognized classification society.

The vessel record shall be maintained and updated throughout the life of the vessel and shall be retained for 6 months after the vessel is taken out of service.

Should a change of owner occur during the life of the vessel the vessel record shall be transferred to the new owner.

Copies of the vessel record or all necessary documents shall be made available on request to the competent authority for the issuance of the certificate of approval and for the recognized classification society or inspection body for first inspection, periodic inspection, special inspection or exceptional checks.

9.3.2.2 to 9.3.2.7 (*Reserved*)

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9.3.2.8 ***Classification***

9.3.2.8.1 The tank vessel shall be built under the survey of a recognised classification society and be classed in its highest class.

The vessel's highest class shall be continued. This shall be confirmed by an appropriate certificate issued by the recognized classification society (certificate of class).

The design pressure and the test pressure of cargo tanks shall be entered in the certificate.

If a vessel has cargo tanks with different valve opening pressures, the design and test pressures of each tank shall be entered in the certificate.

The recognized classification society shall draw up a vessel substance list mentioning all the dangerous goods accepted for carriage by the tank vessel (see also 1.16.1.2.5).

9.3.2.8.2 and 9.3.2.8.3 *(Deleted)*

9.3.2.8.4 The conformity of the documents required in 8.1.2.3 (r) to (v) with the circumstances on board shall be inspected by a recognized classification society, an inspection body or by a person authorized for that purpose by the competent authority whenever the certificate of approval is renewed and, in addition, once during the third year of validity of the certificate of approval. A signed certificate must be available on board.

9.3.2.9 (*Reserved*)

9.3.2.10 ***Protection against the penetration of dangerous gases and the spreading of dangerous liquids***

9.3.2.10.1 The vessel shall be designed so as to prevent dangerous gases and liquids from penetrating into the accommodation, wheelhouse and service spaces. None of the windows in these spaces shall be capable of being opened unless its intended use is as an emergency exit and it is marked as such.

9.3.2.10.2 Liquid-tight protective coamings shall be fitted on deck at the height of the external bulkheads of the cargo tanks, at a maximum distance of 0.60 m from the outer cofferdam bulkheads or the hold end bulkheads. The protective coamings shall either extend over the entire width of the vessel or be fixed between the longitudinal spill coamings so as to prevent liquids from entering the forepeak and afterpeak. The height of the protective coamings and the spill coamings shall be at least 0.075 m. The protective coaming may correspond to the protection wall prescribed in 9.3.2.10.3 if the protection wall extends across the entire width of the vessel.

9.3.2.10.3 If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the use of installations and equipment that are not of at least the 'limited explosion risk' type is not permitted during loading and unloading operations in parts of the deck outside the cargo area, unless those parts are protected against the penetration of gases and liquids by a gas- and liquid-tight protection wall. The wall must either extend over the full width of the vessel or surround the areas to be protected in a U-shaped form. The wall must cover the whole width of the area to be protected and at least 1.00 m in the direction opposite to the cargo area (see Classification of zones diagram). The height of the wall shall be at least 1.00 m above the adjacent cargo deck area in the cargo area. The outer wall and side walls of the accommodation can be considered as a protection wall if they do not include openings and if the dimensions are complied with.

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A protection wall is not required where the distance between the areas to be protected and the high velocity vent valve, the shore connections of the piping for loading and unloading, the compressor on deck and the opening of the closest pressure tanks is at least 12.00 m.

9.3.2.10.4 On deck, the lower edges of door-openings in the sidewalls of superstructures and the sills of hatches and ventilation openings of premises located under the deck shall have a height of not less than 0.50 m above the deck.

This requirement does not apply to access openings to double-hull spaces and double bottoms.

9.3.1.10.5 The bulwarks, foot-rails, etc., shall be provided with sufficiently large openings which are located directly above the deck.

9.3.2.11 ***Hold spaces and cargo tanks***

9.3.2.11.1 (a) The maximum permissible capacity of a cargo tank shall be determined in accordance with the following table:

$L \times B \times H$ (m^3)	Maximum permissible capacity of a cargo tank (m^3)
up to 600	$L \times B \times H \times 0.3$
600 to 3 750	$180 + (L \times B \times H - 600) \times 0.0635$
> 3 750	380

Alternative constructions in accordance with 9.3.4 are permitted.

In the table above $L \times B \times H$ is the product of the main dimensions of the tank vessel in metres (according to the measurement certificate), where:

L = overall length of the hull in m;

B = extreme breadth of the hull in m;

H = shortest vertical distance in m between the top of the keel and the lowest point of the deck at the side of the vessel (moulded depth) within the cargo area.

(b) The relative density of the substances to be carried shall be taken into consideration in the design of the cargo tanks. The maximum relative density shall be indicated in the certificate of approval;

(c) When the vessel is provided with pressure cargo tanks, these tanks shall be designed for a working pressure of 400 kPa (4 bar);

(d) For vessels with a length of not more than 50.00 m, the length of a cargo tank shall not exceed 10.00 m; and

For vessels with a length of more than 50.00 m, the length of a cargo tank shall not exceed 0.20 L;

This provision does not apply to vessels with independent built–in cylindrical tanks having a length to diameter ratio ≤ 7.

9.3.2.11.2 (a) In the cargo area (except cofferdams) the vessel shall be designed as a flush–deck double-hull vessel, with double-hull spaces and double bottoms, but without a trunk;

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Cargo tanks independent of the vessel's hull and refrigerated cargo tanks may only be installed in a hold space which is bounded by double-hull spaces and double bottoms in accordance with 9.3.2.11.8 below. The cargo tanks shall not extend beyond the deck;

(b) The cargo tanks independent of the vessel's hull shall be fixed so that they cannot float. Refrigerated cargo tank fastenings shall meet the requirements of a recognised classification society;

(c) The capacity of a suction well shall be limited to not more than 0.10 m^3;

(d) Side–struts linking or supporting the load-bearing components of the sides of the vessel with the load-bearing components of the longitudinal walls of cargo tanks and side–struts linking the load-bearing components of the vessel's bottom with the tank-bottom are prohibited;

(e) A local recess in the cargo deck, contained on all sides, with a depth greater than 0.10 m, designed to house the cargo pump, is permitted if it fulfils the following conditions:

– The recess shall not be greater than 1.00 m in depth;

– The recess shall be located not less than 6.00 m from entrances and openings to accommodation and service spaces outside the cargo area;

– The recess shall be located at a minimum distance from the side plating equal to one quarter of the vessel's breadth;

– All pipes linking the recess to the cargo tanks shall be fitted with shut-off devices fitted directly on the bulkhead;

– All the controls required for the equipment located in the recess shall be activated from the deck;

– It shall be possible to drain the recess using a system installed on deck in the cargo area and independent of any other system;

– The recess shall be provided with a level alarm device which activates the draining system and triggers a visual and audible alarm in the wheelhouse and on the deck when liquid accumulates at the bottom;

– When the recess is located above the cofferdam, the engine room bulkhead shall have an insulation of Class "A-60" as defined in SOLAS 74, Chapter II-2, Regulation 3;

– When the cargo area is fitted with a water-spray system, electrical equipment located in the recess shall be protected against infiltration of water;

– Pipes connecting the recess to the hull shall not pass through the cargo tanks;

(f) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2 and the recess is deeper than 0.50 m, then it shall be provided with a permanent gas detection system which automatically indicates the presence of flammable gases by means of direct-measuring sensors and actuates a visual and audible alarm when the gas concentration has reached 20% of the LEL of the cargo or 20% of the LEL of n-Hexane, whichever is the more critical value. The sensors of this system shall be placed at suitable positions at the bottom of the recess.

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Measurement shall be continuous.

Visual and audible alarms shall be installed in the wheelhouse and on deck and, when the alarm is actuated, the vessel loading and unloading system shall be shut down. Failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by means of visual and audible alarms.

The alarm shall be automatically relayed to the accommodation if it has not been switched off.

9.3.2.11.3 (a) The cargo tanks shall be separated by cofferdams of at least 0.60 m in width from the accommodation, engine rooms and service spaces outside the cargo area below deck or, if there are no such accommodation, engine rooms and service spaces, from the vessel's ends. Where the cargo tanks are installed in a hold space, a space of not less than 0.50 m shall be provided between such tanks and the end bulkheads of the hold space. In this case an end bulkhead of Class "A-60" as defined in SOLAS 74, Chapter II-2, Regulation 3, shall be deemed equivalent to a cofferdam. For pressure cargo tanks, the 0.50 m distance may be reduced to 0.20 m;

(b) Hold spaces, cofferdams and cargo tanks shall be capable of being inspected;

(c) All spaces in the cargo area shall be capable of being ventilated. It has to be possible to check their gas-free condition.

9.3.2.11.4 The bulkheads bounding the cargo tanks, cofferdams and hold spaces shall be watertight. The cargo tanks and the bulkheads bounding the cargo area shall have no openings or penetrations below deck.

The bulkhead between the engine room and the cofferdam or service space in the cargo area or between the engine room and a hold space may be fitted with penetrations provided that they conform to the provisions of 9.3.2.17.5.

The bulkhead between the cargo tank and the cargo pump-room below deck may be fitted with penetrations provided that they conform to the provisions of 9.3.2.17.6. The bulkheads between the cargo tanks may be fitted with penetrations provided that the loading or unloading piping are fitted with shut-off devices in the cargo tank from which they come. These shut-off devices shall be operable from the deck.

9.3.2.11.5 Double-hull spaces and double bottoms in the cargo area shall be arranged for being filled with ballast water only. Double bottoms may, however, be used as oil fuel tanks, provided they comply with the provisions of 9.3.2.32.

9.3.2.11.6 (a) A cofferdam, the centre part of a cofferdam or another space below deck in the cargo area may be arranged as a service space, provided the bulkheads bounding the service space extend vertically to the bottom. This service space shall only be accessible from the deck;

(b) The service space shall be watertight with the exception of its access hatches and ventilation inlets;

(c) No piping for loading and unloading shall be fitted within the service space referred to under (a) above;

Piping for loading and unloading may be fitted in the cargo pump-rooms below deck only when they conform to the provisions of 9.3.2.17.6.

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9.3.2.11.7 For double-hull construction with the cargo tanks integrated in the vessel's structure, the distance between the side wall of the vessel and the longitudinal bulkhead of the cargo tanks shall be not less than 1.00 m. A distance of 0.80 m may however be permitted, provided that, compared with the scantling requirements specified in the rules for construction of a recognised classification society, the following reinforcements have been made:

(a) 25% increase in the thickness of the deck stringer plate;

(b) 15% increase in the side plating thickness;

(c) Arrangement of a longitudinal framing system at the vessel's side, where depth of the longitudinals shall be not less than 0.15 m and the longitudinals shall have a face plate with the cross-sectional area of at least 7.0 cm^2;

(d) The stringer or longitudinal framing systems shall be supported by web frames, and like bottom girders fitted with lightening holes, at a maximum spacing of 1.80 m. These distances may be increased if the longitudinals are strengthened accordingly.

When a vessel is built according to the transverse framing system, a longitudinal stringer system shall be arranged instead of (c) above. The distance between the longitudinal stringers shall not exceed 0.80 m and their depth shall be not less than 0.15 m, provided they are completely welded to the frames. The cross-sectional area of the facebar or faceplate shall be not less than 7.0 cm^2 as in (c) above. Where cut-outs are arranged in the stringer at the connection with the frames, the web depth of the stringer shall be increased with the depth of cut-outs.

The mean depth of the double bottoms shall be not less than 0.70 m. It shall, however, never be less than 0.60 m.

The depth below the suction wells may be reduced to 0.50 m.

Alternative constructions in accordance with 9.3.4 are permitted.

9.3.2.11.8 When a vessel is built with cargo tanks located in a hold space or refrigerated cargo tanks, the distance between the double walls of the hold space shall be not less than 0.80 m and the depth of the double bottom shall be not less than 0.60 m.

9.3.2.11.9 Where service spaces are located in the cargo area under deck, they shall be arranged so as to be easily accessible and to permit persons wearing protective clothing and breathing apparatus to safely operate the service equipment contained therein. They shall be designed so as to allow injured or unconscious personnel to be removed from such spaces without difficulties, if necessary by means of fixed equipment.

9.3.2.11.10 Cofferdams, double-hull spaces, double bottoms, cargo tanks, hold spaces and other accessible spaces within the cargo area shall be arranged so that they may be completely inspected and cleaned in an appropriate manner. The dimensions of openings except for those of double-hull spaces and double bottoms which do not have a wall adjoining the cargo tanks shall be sufficient to allow a person wearing breathing apparatus to enter or leave the space without difficulties. These openings shall have a minimum cross-sectional area of 0.36 m^2 and a minimum side length of 0.50 m. They shall be designed so as to allow an injured or unconscious person to be removed from the bottom of such a space without difficulties, if necessary by means of fixed equipment. In these spaces the distance between the reinforcements shall not be less than 0.50 m. In double bottoms this distance may be reduced to 0.45 m.

Cargo tanks may have circular openings with a diameter of not less than 0.68 m.

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9.3.2.12 ***Ventilation***

9.3.2.12.1 Each hold space shall have two openings the dimensions and location of which shall be such as to permit effective ventilation of any part of the hold space. If there are no such openings, it shall be possible to fill the hold spaces with inert gas or dry air.

9.3.2.12.2 Double-hull spaces and double bottoms within the cargo area which are not arranged for being filled with ballast water, hold spaces and cofferdams shall be provided with ventilation systems.

9.3.2.12.3 (a) A service space located within the cargo area below deck shall be provided with a ventilation system. The capacity of the fans shall be sufficient to ensure 20 complete changes of air per hour based on the volume of the service space.

The ventilation exhaust ducts shall extend down to 50 mm above the bottom of the service space. The air shall be supplied through a duct at the top of the service space.

(b) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the air inlets shall be located not less than 2.00 m above the deck, at a distance of not less than 2.00 m from tank openings and 6.00 m from the outlets of safety valves.

The extension pipes which may be necessary may be of the hinged type.

9.3.2.12.4 (a) Ventilation shall be provided for the accommodation, wheelhouse and service spaces.

(b) The ventilation system in such spaces shall meet the following requirements:

(i) The air intakes shall be located as far away as possible, and not less than 6.00 m from the protected area and not less than 2.00 m above the deck;

(ii) Pressure of at least 0.1 kPa (0.001 bar) may be maintained in the premises;

(iii) A breakdown alarm is integrated;

(iv) The ventilation system, including the breakdown alarm, shall be at least of the ‘limited explosion risk’ type;

(v) A gas detection system conforming to conditions 1. to 4. below is connected to the ventilation system:

1. It is appropriate at least for use in zone 1, explosion group IIC and temperature class T6;
2. It is equipped with sensors;
   – On the suction inlets of the ventilation systems; and
   – Directly below the top edge of the sill of the entrance doors;
3. Its t90 response time is lower than or equal to 4 s;
4. Measurement shall be continuous;

(vi) In the service spaces, the ventilation system is linked to the emergency lighting, which shall be at least of the ‘limited explosion risk’ type;

This emergency lighting is not necessary if the lighting installations in the service spaces are of at least the ‘limited explosion risk’ type;

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(vii) The suction of the ventilation system and installations and equipment that do not meet the requirements set out in 9.3.2.51 (a) and (b) and 9.3.2.52.1 must be shut down when a concentration of 20% of LEL of n-Hexane is reached;

The switching-off shall be indicated in the accommodation and wheelhouse by visual and audible signals;

(viii) In the event of failure of the ventilation system or the gas detection installations in the accommodation, installations and equipment in the accommodation that do not meet the requirements set out in 9.3.2.51 (a) and (b) and 9.3.2.52.1 must be stopped;

The failure shall be indicated in the accommodation, the wheelhouse and on the deck by visual and audible signals;

(ix) In the event of failure of the ventilation system or the gas detection installations in the wheelhouse or service spaces, installations and equipment in those spaces that do not meet the requirements set out in 9.3.2.51 (a) and (b) and 9.3.2.52.1 must be shut down;

The failure shall be indicated in the wheelhouse and on the deck by visual and audible signals. The alarm must be relayed to the accommodation automatically if it has not been switched off;

(x) Any switching-off shall take place immediately and automatically and, if necessary, shall activate the emergency lighting;

The automatic switch-off device is set so that no automatic switching-off may occur while the vessel is under way;

(c) If there is no ventilation system or the ventilation system of a space does not comply with all the requirements set out in (b) above, any installations or equipment present in that space that may, if switched on, give rise to surface temperatures higher than those mentioned in 9.3.2.51 (a) and (b) or that do not meet the requirements set out in 9.3.2.52.1 must be capable of being switched off.

9.3.2.12.5 *(Deleted)*

9.3.2.12.6 Notice boards shall be fitted at the ventilation inlets indicating the conditions under which they shall be closed. All ventilation inlets of accommodation, wheelhouse and service spaces leading to the open air outside the cargo area shall be fitted with devices permanently fixed according to 9.3.2.40.2.2 (c), enabling them to be closed rapidly. It shall be clear whether they are open or closed.

Such ventilation inlets shall be located not less than 2.00 m from the cargo area.

Ventilation inlets of service spaces in the cargo area may be located within that area.

9.3.2.12.7 *(Deleted)*

9.3.2.13 ***Stability (general)***

9.3.2.13.1 Proof of sufficient stability shall be furnished including for stability in damaged condition.

9.3.2.13.2 The basic values for the stability calculation - the vessel's lightweight and location of the centre of gravity - shall be determined either by means of an inclining experiment or by detailed mass and moment calculation. In the latter case the lightweight of the vessel shall be

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checked by means of a lightweight test with a tolerance limit of ± 5% between the mass determined by calculation and the displacement determined by the draught readings.

9.3.2.13.3 Proof of sufficient intact stability shall be furnished for all stages of loading and unloading and for the final loading condition for all the relative densities of the substances transported contained in the vessel substance list according to 1.16.1.2.5.

For every loading operation, taking account of the actual fillings and floating position of cargo tanks, ballast tanks and compartments, drinking water and sewage tanks and tanks containing products for the operation of the vessel, the vessel shall comply with the intact and damage stability requirements.

Intermediate stages during operations shall also be taken into consideration.

The proof of sufficient stability shall be shown for every operating, loading and ballast condition in the stability booklet, to be approved by the recognized classification society, which classes the vessel. If it is unpractical to pre-calculate the operating, loading and ballast conditions, a loading instrument approved by the recognised classification society which classes the vessel shall be installed and used which contains the contents of the stability booklet.

NOTE: *A stability booklet shall be worded in a form comprehensible for the responsible master and containing the following details:*

General description of the vessel:

– *General arrangement and capacity plans indicating the assigned use of compartments and spaces (cargo tanks, stores, accommodation, etc.);*

– *A sketch indicating the position of the draught marks referring to the vessel's perpendiculars;*

– *A scheme for ballast/bilge pumping and overflow prevention systems;*

– *Hydrostatic curves or tables corresponding to the design trim, and, if significant trim angles are foreseen during the normal operation of the vessel, curves or tables corresponding to such range of trim are to be introduced;*

– *Cross curves or tables of stability calculated on a free trimming basis, for the ranges of displacement and trim anticipated in normal operating conditions, with an indication of the volumes which have been considered buoyant;*

– *Tank sounding tables or curves showing capacities, centres of gravity, and free surface data for all cargo tanks, ballast tanks and compartments, drinking water and sewage water tanks and tanks containing products for the operation of the vessel;*

– *Lightship data (weight and centre of gravity) resulting from an inclining test or deadweight measurement in combination with a detailed mass balance or other acceptable measures. Where the above-mentioned information is derived from a sister vessel, the reference to this sister vessel shall be clearly indicated, and a copy of the approved inclining test report relevant to this sister vessel shall be included;*

– *A copy of the approved test report shall be included in the stability booklet;*

– *Operating loading conditions with all relevant details, such as:*

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– *Lightship data, tank fillings, stores, crew and other relevant items on board (mass and centre of gravity for each item, free surface moments for liquid loads);*

– *Draughts amidships and at perpendiculars;*

– *Metacentric height corrected for free surfaces effect;*

– *Righting lever values and curve;*

– *Longitudinal bending moments and shear forces at read–out points;*

– *Information about openings (location, type of tightness, means of closure); and*

– *Information for the master;*

– *Calculation of the influence of ballast water on stability with information on whether fixed level gauges for ballast tanks and compartments have to be installed or whether the ballast tanks or compartments shall be completely full or completely empty when underway.*

9.3.2.13.4 Floatability after damage shall be proved for the most unfavourable loading condition. For this purpose, calculated proof of sufficient stability shall be established for critical intermediate stages of flooding and for the final stage of flooding.

9.3.2.14 ***Stability (intact)***

9.3.2.14.1 The requirements for intact stability resulting from the damage stability calculation shall be fully complied with.

9.3.2.14.2 For vessels with cargo tanks of more than 0.70 B in width, proof shall be furnished that the following stability requirements have been complied with:

(a) In the positive area of the righting lever curve up to immersion of the first non-watertight opening there shall be a righting lever (GZ) of not less than 0.10 m;

(b) The surface of the positive area of the righting lever curve up to immersion of the first non-watertight opening and in any event up to an angle of heel $\leq 27°$ shall not be less than 0.024 m.rad;

(c) The metacentric height (GM) shall be not less than 0.10 m.

These conditions shall be met bearing in mind the influence of all free surfaces in tanks for all stages of loading and unloading.

9.3.2.14.3 The most stringent requirement of 9.3.2.14.1 and 9.3.2.14.2 is applicable to the vessel.

9.3.2.15 ***Stability (damaged condition)***

9.3.2.15.1 The following assumptions shall be taken into consideration for the damaged condition:

(a) The extent of side damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	0.79 m inboard from the vessel's side at right angles to the centreline at the level corresponding to the maximum draught, or when applicable, the distance allowed by section 9.3.4, reduced by 0.01 m;

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vertical extent: from the base line upwards without limit.

(b) The extent of bottom damage is as follows:

longitudinal extent: at least 0.10 L, but not less than 5.00 m;
transverse extent: 3.00 m;
vertical extent: from the base 0.59 m upwards, the sump excepted.

(c) Any bulkheads within the damaged area shall be assumed damaged, which means that the location of bulkheads shall be chosen so as to ensure that the vessel remains afloat after the flooding of two or more adjacent compartments in the longitudinal direction.

The following provisions are applicable:

– For bottom damage, adjacent athwartship compartments shall also be assumed as flooded;

– The lower edge of any non-watertight openings (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.10 m above the damage waterline;

– In general, permeability shall be assumed to be 95%. Where an average permeability of less than 95% is calculated for any compartment, this calculated value obtained may be used.

However, the following minimum values shall be used:

– engine rooms: 85%;

– accommodation: 95%;

– double bottoms, oil fuel tanks, ballast tanks, etc., depending on whether, according to their function, they have to be assumed as full or empty for the vessel floating at the maximum permissible draught: 0% or 95%.

For the main engine room only the one–compartment standard need be taken into account, i.e. the end bulkheads of the engine room shall be assumed as not damaged.

9.3.2.15.2 For the intermediate stage of flooding the following criteria have to be fulfilled:

GZ ≥ 0.03m
Range of positive GZ: 5°.

At the stage of equilibrium (final stage of flooding), the angle of heel shall not exceed 12°. Non-watertight openings shall not be flooded before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of the stability calculation.

The positive range of the righting lever curve beyond the stage of equilibrium shall have a righting lever of ≥ 0.05 m in association with an area under the curve of ≥ 0.0065 m.rad. The minimum values of stability shall be satisfied up to immersion of the first non-watertight opening and in any event up to an angle of heel ≤ 27°. If non-watertight openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purposes of stability calculation.

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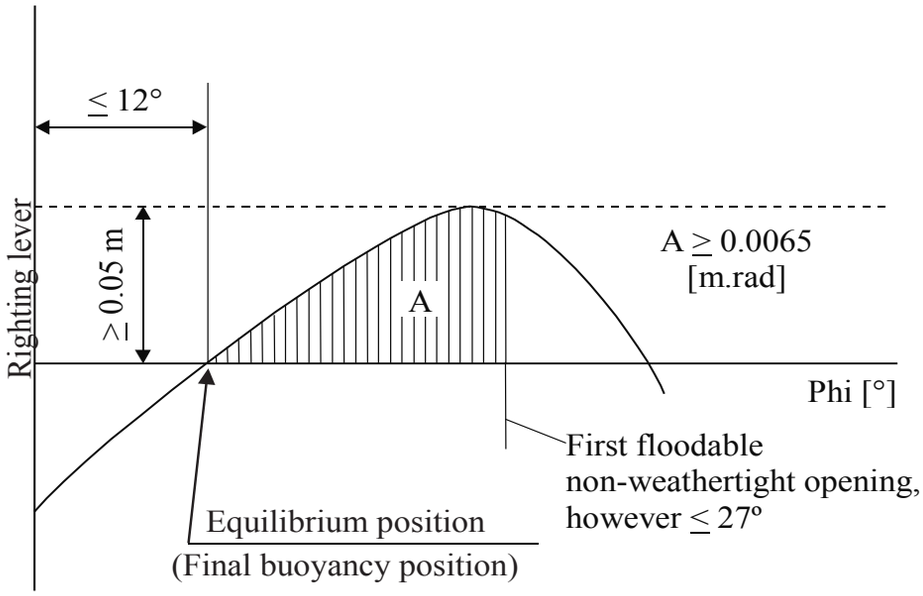

9.3.2.15.3 If openings through which undamaged compartments may additionally become flooded are capable of being closed watertight, the closing appliances shall be marked accordingly.

9.3.2.15.4 Where cross- or down-flooding openings are provided for reduction of unsymmetrical flooding, the time for equalisation shall not exceed 15 minutes, if during the intermediate stages of flooding sufficient stability has been proved.

9.3.2.16 ***Engine rooms***

9.3.2.16.1 Internal combustion engines for the vessel's propulsion as well as internal combustion engines for auxiliary machinery shall be located outside the cargo area. Entrances and other openings of engine rooms shall be at a distance of not less than 2.00 m from the cargo area.

9.3.2.16.2 The engine rooms shall be accessible from the deck; the entrances shall not face the cargo area. Where the doors are not located in a recess whose depth is at least equal to the door width, the hinges shall face the cargo area.

9.3.2.17 ***Accommodation and service spaces***

9.3.2.17.1 Accommodation spaces and the wheelhouse shall be located outside the cargo area forward of the fore vertical plane or abaft the aft vertical plane bounding the part of the cargo area below deck. Windows of the wheelhouse which are located not less than 1.00 m above the bottom of the wheelhouse may tilt forward.

9.3.2.17.2 Entrances to spaces and openings of superstructures shall not face the cargo area. Doors opening outward and not located in a recess the depth of which is at least equal to the width of the doors shall have their hinges face the cargo area.

9.3.2.17.3 Entrances from the deck and openings of spaces facing the weather shall be capable of being closed. The following instruction shall be displayed at the entrance of such spaces:

Do not open during loading, unloading and degassing
without the permission of the master.
Close immediately.

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9.3.2.17.4 Entrances and windows of superstructures and accommodation spaces which can be opened as well as other openings of these spaces shall be located not less than 2.00 m from the cargo area. No wheelhouse doors and windows shall be located within 2.00 m from the cargo area, except where there is no direct connection between the wheelhouse and the accommodation.

9.3.2.17.5 (a) Driving shafts of the bilge or ballast pumps in the cargo area may penetrate through the bulkhead between the service space and the engine room, provided the arrangement of the service space is in compliance with 9.3.2.11.6.

(b) The penetration of the shaft through the bulkhead shall be gastight and shall have been approved by a recognised classification society.

(c) The necessary operating instructions shall be displayed.

(d) Penetrations through the bulkhead between the engine room and the service space in the cargo area and the bulkhead between the engine room and the hold spaces may be provided for electrical cables, hydraulic and piping for measuring, control and alarm systems, provided that the penetration have been approved by a recognised classification society. The penetrations shall be gastight. Penetrations through a bulkhead of Class "A-60" as defined in SOLAS 74, Chapter II-2, Regulation 3, shall have an equivalent fire protection.

(e) Pipes may penetrate the bulkhead between the engine room and the service space in the cargo area provided that these are pipes between the mechanical equipment in the engine room and the service space which do not have any openings within the service space and which are provided with shut-off devices at the bulkhead in the engine room.

(f) Notwithstanding 9.3.2.11.4, pipes from the engine room may pass through the service space in the cargo area or a cofferdam or a hold space or a double-hull space to the outside provided that within the service space or cofferdam or hold space or double-hull space they are of the thick-walled type and have no flanges or openings.

(g) Where a driving shaft of auxiliary machinery penetrates through a wall located above the deck the penetration shall be gastight.

9.3.2.17.6 A service space located within the cargo area below deck shall not be used as a cargo pump-room for the loading and unloading system, except where:

– The cargo pump-room is separated from the engine room or from service spaces outside the cargo area by a cofferdam or a bulkhead with an insulation of Class "A-60" as defined in SOLAS 74, Chapter II-2, Regulation 3, or by a service space or a hold space;

– The "A-60" bulkhead required above does not include penetrations referred to in 9.3.2.17.5 (a);

– Ventilation exhaust outlets are located not less than 6.00 m from entrances and openings of the accommodation, wheelhouse and service spaces outside the cargo area;

– The access hatches and ventilation inlets can be closed from the outside;

– All piping for loading and unloading as well as that of stripping systems is provided with shut-off devices at the pump suction side in the cargo pump-room immediately at the bulkhead. The necessary operation of the control devices in the pump-room, starting of pumps and control of the liquid flow rate shall be effected from the deck;

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– The bilge of the cargo pump-room is equipped with a gauging device for measuring the filling level which activates a visual and audible alarm in the wheelhouse when liquid is accumulating in the cargo pump-room bilge;

– The cargo pump room is provided with a permanent oxygen detection system which automatically indicates the amount of oxygen and which actuates a visual and audible alarm when the oxygen concentration has reached 19.5% by volume. The sensors of this system shall be placed at suitable positions at the bottom and at a height of 2.00 m. Measurement shall be continuous and displayed near to the entrance. Audible and visual alarms shall be installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system shall be shut down;

– Failure of the oxygen measuring system shall activate a visual and audible alarm in the wheelhouse and on deck. The alarm must be relayed to the accommodation automatically if it has not been switched off;

– The ventilation system prescribed in 9.3.2.12.3 has a capacity sufficient to ensure not less than 30 changes of air per hour based on the total volume of the service space.

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the cargo pump room shall also be provided with a permanent gas detection system which automatically indicates the presence of flammable gases and actuates a visual and audible alarm when the gas concentration has reached 20% of the LEL of the cargo or 20% of the LEL of n-Hexane, whichever gives the more critical value.

The sensors of this gas detection system shall be placed at suitable positions at the bottom and directly below the deck. Measurement shall be continuous and displayed near to the entrance.

Audible and visual alarms shall be installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system shall be shut down.

Any failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by a visual and audible warning. The alarm must be relayed to the accommodation automatically if it has not been switched off.

9.3.2.17.7 The following instruction shall be displayed at the entrance of the cargo pump-room:

Before entering the cargo pump-room check whether
it is free from gases and contains sufficient oxygen.
Do not open doors and entrance openings without
the permission of the master.
Leave immediately in the event of alarm.

9.3.2.18 ***Inerting facility***

In cases in which inerting or blanketing of the cargo is prescribed, the vessel shall be equipped with an inerting system.

This system shall be capable of maintaining a permanent minimum pressure of 7 kPa (0.07 bar) in the spaces to be inerted. In addition, the inerting system shall not increase the pressure in the cargo tank to a pressure greater than that at which the pressure valve is regulated. The set pressure of the vacuum-relief valve shall be 3.5 kPa (0.035 bar).

A sufficient quantity of inert gas for loading or unloading shall be carried or produced on board if it is not possible to obtain it on shore. In addition, a sufficient quantity of inert gas to offset normal losses occurring during carriage shall be on board.

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The premises to be inerted shall be equipped with connections for introducing the inert gas and monitoring systems so as to ensure the correct atmosphere on a permanent basis.

When the pressure or the concentration of inert gas in the gaseous phase falls below a given value, this monitoring system shall activate an audible and visible alarm in the wheelhouse. When the wheelhouse is unoccupied, the alarm shall also be perceptible in a location occupied by a crew member.

9.3.2.19 (*Reserved*)

9.3.2.20 ***Arrangement of cofferdams***

9.3.2.20.1 Cofferdams or cofferdam compartments remaining once a service space has been arranged in accordance with 9.3.2.11.6 shall be accessible through an access hatch.

9.3.2.20.2 Cofferdams shall be capable of being filled with water and emptied by means of a pump. Filling shall be effected within 30 minutes. These requirements are not applicable when the bulkhead between the engine room and the cofferdam comprises fire-protection insulation "A-60" in accordance with SOLAS 74, Chapter II-2, Regulation 3, or has been fitted out as a service space. The cofferdams shall not be fitted with inlet valves.

9.3.2.20.3 No fixed pipe shall permit connection between a cofferdam and other piping of the vessel outside the cargo area.

9.3.2.20.4 If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2 then the ventilation openings of cofferdams shall be fitted with a flame arrester capable of withstanding a deflagration. The flame arresters shall be chosen according to the explosion groups/subgroups of the substances foreseen for inclusion in the list of substances on the vessel (see column (16) of Table C of Chapter 3.2).

9.3.2.21 ***Safety and control installations***

9.3.2.21.1 Cargo tanks shall be provided with the following equipment:

(a) a mark inside the tank indicating the liquid level of 95%;

(b) a level gauge;

(c) a level alarm device which is activated at the latest when a degree of filling of 90% is reached;

(d) a high level sensor for actuating the facility against overflowing at the latest when a degree of filling of 97.5% is reached;

(e) an instrument for measuring the pressure of the vapour phase inside the cargo tank;

(f) an instrument for measuring the temperature of the cargo, if in column (9) of Table C of Chapter 3.2, a cargo heating installation or a possibility of heating the cargo is required on board, or if a maximum temperature is indicated in column (20) of Table C of Chapter 3.2;

(g) a connection for a closed-type or partly closed-type sampling device, and/or at least one sampling opening as required in column (13) of Table C of Chapter 3.2;

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the flame arrester plate stack capable of withstanding

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steady burning of the sampling opening shall be selected according to the explosion groups/subgroups of the substances foreseen for inclusion in the list of substances on the vessel (see column (16) of Table C of Chapter 3.2).

9.3.2.21.2 When the degree of filling in per cent is determined, an error of not more than 0.5% is permitted. It shall be calculated on the basis of the total cargo tank capacity including the expansion trunk.

9.3.2.21.3 The level gauge shall allow readings from the control position of the shut-off devices of the particular cargo tank. The permissible maximum filling levels of 95% and 97%, as given in the list of substances, shall be marked on each level gauge.

Permanent reading of the overpressure and vacuum shall be possible from a location from which loading or unloading operations may be interrupted. The permissible maximum overpressure and vacuum shall be marked on each level gauge.

Readings shall be possible in all weather conditions.

9.3.2.21.4 The level alarm device shall give a visual and audible warning on board when actuated. The level alarm device shall be independent of the level gauge.

9.3.2.21.5 (a) The high level sensor referred to in 9.3.2.21.1 (d) above shall give a visual and audible alarm on board and at the same time actuate an electrical contact which in the form of a binary signal interrupts the electric current loop provided and fed by the shore facility, thus initiating measures at the shore facility against overflowing during loading operations.

The signal shall be transmitted to the shore facility via a watertight two–pin plug of a connector device in accordance with standard EN 60309-2:1999 + A1:2007 + A2:2012 for direct current of 40 to 50 volts, identification colour white, position of the nose 10 h.

The plug shall be permanently fitted to the vessel close to the shore connections of the loading and unloading piping.

The high level sensor shall also be capable of switching off the vessel's own discharging pump. The high level sensor shall be independent of the level alarm device, but it may be connected to the level gauge.

(b) During discharging by means of the on-board pump, it shall be possible for the shore facility to switch it off. For this purpose, an independent intrinsically safe power line, fed by the vessel, shall be switched off by the shore facility by means of an electrical contact.

It shall be possible for the binary signal of the shore facility to be transmitted via a watertight two–pole socket or a connector device in accordance with standard EN 60309-2:1999 + A1:2007 + A2:2012, for direct current of 40 to 50 volts, identification colour white, position of the nose 10 h.

This socket shall be permanently fitted to the vessel close to the shore connections of the unloading piping.

(c) Vessels which may be delivering products required for operation of vessels shall be equipped with a transhipment facility compatible with European standard EN 12827:1999 and a rapid closing device enabling refuelling to be interrupted. It shall be possible to actuate this rapid closing device by means of an electrical signal from the overflow prevention system. The electrical circuits actuating the rapid closing device shall be secured according to the quiescent current principle or other

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appropriate error detection measures. The state of operation of electrical circuits which cannot be controlled using the quiescent current principle shall be capable of being easily checked.

It shall be possible to actuate the rapid closing device independently of the electrical signal.

The rapid closing device shall actuate a visual and audible alarm on board.

9.3.2.21.6 The visual and audible signals given by the level alarm device shall be clearly distinguishable from those of the high level sensor.

The visual alarm shall be visible at each control position on deck of the cargo tank stop valves. It shall be possible to easily check the functioning of the sensors and electric circuits or these shall be “intrinsically safe apparatus”.

9.3.2.21.7 When the pressure or temperature exceeds a set value, instruments for measuring the vacuum or overpressure of the gaseous phase in the cargo tank or the temperature of the cargo shall activate a visual and audible alarm in the wheelhouse and on deck. The alarm must be relayed to the accommodation automatically if it has not been switched off.

When the pressure exceeds the set value during loading and unloading, the instrument for measuring the pressure shall, by means of the plug referred to in 9.3.2.21.5 above, immediately initiate an electrical contact which shall put into effect measures to interrupt the loading or unloading operation. When the vessel’s own discharge pump is used, it shall be switched off automatically.

The instrument for measuring the overpressure or vacuum shall activate the alarm at latest when:

(a) An overpressure equal to 1.15 times the opening pressure of the pressure relief valves/high velocity vent valves is reached; or

(b) The lower threshold of the design pressure of the vacuum valves, but not exceeding a vacuum of 5 kPa (0.05 bar), is reached.

The maximum permissible temperature is indicated in column (20) of Table C of Chapter 3.2. The sensors for the alarms mentioned in this paragraph may be connected to the alarm device of the sensor.

When it is prescribed in column (20) of Table C of Chapter 3.2, the instrument for measuring the overpressure of the gaseous phase in the cargo tank shall actuate a visible and audible alarm in the wheelhouse when the overpressure exceeds 40 kPa (0.4 bar) during the voyage. The alarm must be relayed to the accommodation automatically if it has not been switched off. It shall be possible to read the gauges in direct proximity to the control for the water spray system.

9.3.2.21.8 Where the control elements of the shut-off devices of the cargo tanks are located in a control room, it shall be possible to stop the loading pumps and read the level gauges in the control room, and the visual and audible warning given by the level alarm device, the high level sensor referred to in 9.3.2.21.1 (d) and the instruments for measuring the pressure and temperature of the cargo shall be noticeable in the control room and on deck.

Satisfactory monitoring of the cargo area shall be ensured from the control room.

9.3.2.21.9 The vessel shall be so equipped that loading or unloading operations can be interrupted by means of switches, i.e. the quick closing valve located on the flexible vessel–to–shore

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connecting line must be capable of being closed. The switches shall be placed at two points on the vessel (fore and aft).

This provision applies only when prescribed in column (20) of Table C of Chapter 3.2.

The interruption system shall be designed according to the quiescent current principle.

9.3.2.21.10 When refrigerated substances are carried the opening pressure of the safety system shall be determined by the design of the cargo tanks. In the event of the transport of substances that must be carried in a refrigerated state the opening pressure of the safety system shall be not less than 25 kPa (0.25 bar) greater than the maximum pressure calculated according to 9.3.2.27.

9.3.2.22 ***Cargo tank openings***

9.3.2.22.1 (a) Cargo tank openings shall be located on deck in the cargo area.

(b) Cargo tank openings with a cross-section of more than 0.10 m^2 and openings of safety devices for preventing overpressures shall be located not less than 0.50 m above deck.

9.3.2.22.2 Cargo tank openings shall be fitted with gastight closures capable of withstanding the test pressure in accordance with 9.3.2.23.2

9.3.2.22.3 Closures which are normally used during loading or unloading operations shall not cause sparking when operated.

9.3.2.22.4 (a) Each cargo tank or group of cargo tanks connected to a common venting piping shall be fitted with:

– A connection for the safe return ashore of gases expelled during loading;

– A safe depressurization device for the cargo tanks, on which the position of the shut-off valve indicates clearly whether it is open or shut;

– Safety devices for preventing unacceptable overpressures or vacuums.

The opening pressure of the safety valves shall be permanently marked on the valves;

The setting of the pressure relief valves shall be such that during the transport operation they do not blow off until the maximum permissible working pressure of the cargo tanks is reached;

The gases shall be discharged upwards;

The outlets of the pressure relief valves shall be located not less than 1.00 m above the deck and at a distance of not less than 6.00 m from the openings of accommodation, the wheelhouse and the service spaces outside the cargo area. No equipment shall be present in a circle of 1.00 m radius around the outlet of the pressure relief valve outlets. This area shall be marked as a danger zone;

(b) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then at the connection to each cargo tank, the venting piping and the vacuum valve shall be equipped with a flame arrester capable of withstanding a detonation;

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(c) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, or for which there is a T in column (3b) of Table C of Chapter 3.2, then the pressure relief valve shall be designed as a high velocity vent valve;

(d) If a shut-off device is to be mounted between the venting piping and the cargo tank, it shall be placed between the cargo tank and the flame arrester, and each cargo tank shall be equipped with pressure relief valves;

(e) The autonomous protection system mentioned in (c) shall be chosen according to the explosion groups/subgroups of the substances listed in the list of substances on the vessel (see column (16) of Table C of Chapter 3.2). The outlets of the high-velocity vent valves shall be located not less than 2.00 m above the deck and at a distance of not less than 6.00 m from the openings of the accommodations, the wheelhouse and the service spaces outside the cargo area. This height may be reduced to 1.00 m when there is no equipment and no work is being carried out within a radius of 1.00 m around the pressure relief valve outlet. This area shall be marked as a danger zone;

If the high velocity vent valve, the vacuum valve, the flame arresters and the venting piping are required to be heatable, the devices concerned shall be suitable for the relevant temperature.

9.3.2.22.5 ***Venting piping***

(a) When two or more cargo tanks are connected to common venting piping, it is sufficient that the equipment according to 9.3.2.22.4 (safety valves to prevent unacceptable overpressures and vacuums, high velocity vent valve, vacuum valve protected against deflagrations, safe pressure relief device for cargo tanks protected against deflagrations) is installed on the joint venting piping (see also 7.2.4.16.7);

(b) When each cargo tank is connected to its own venting piping, each cargo tank or the associated venting piping shall be equipped according to 9.3.2.22.4.

9.3.2.23 *Pressure tests*

9.3.2.23.1 The cargo tanks, residual cargo tanks, cofferdams, piping for loading and unloading shall be subjected to initial tests before being put into service and thereafter at prescribed intervals.

Where a heating system is provided inside the cargo tanks, the heating coils shall be subjected to initial tests before being put into service and thereafter at prescribed intervals.

9.3.2.23.2 The test pressure for the cargo tanks and residual cargo tanks shall be not less than 1.3 times the construction pressure. The test pressure for the cofferdams and open cargo tanks shall be not less than 10 kPa (0.10 bar) gauge pressure.

9.3.2.23.3 The test pressure for piping for loading and unloading shall be not less than 1,000 kPa (10 bar) gauge pressure.

9.3.2.23.4 The maximum intervals for the periodic tests shall be 11 years.

9.3.2.23.5 The procedure for pressure tests shall comply with the provisions established by the competent authority or a recognised classification society.

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9.3.2.24 ***Regulation of cargo pressure and temperature***

9.3.2.24.1 Unless the entire cargo system is designed to resist the full effective vapour pressure of the cargo at the upper limits of the ambient design temperatures, the pressure of the tanks shall be kept below the permissible maximum set pressure of the safety valves, by one or more of the following means:

(a) a system for the regulation of cargo tank pressure using mechanical refrigeration;

(b) a system ensuring safety in the event of the heating or increase in pressure of the cargo. The insulation or the design pressure of the cargo tank, or the combination of these two elements, shall be such as to leave an adequate margin for the operating period and the temperatures expected; in each case the system shall be deemed acceptable by a recognised classification society and shall ensure safety for a minimum time of three times the operation period;

(c) other systems deemed acceptable by a recognised classification society.

9.3.2.24.2 The systems prescribed in 9.3.2.24.1 shall be constructed, installed and tested to the satisfaction of the recognised classification society. The materials used in their construction shall be compatible with the cargoes to be carried. For normal service, the upper ambient design temperature limits shall be:

air: +30° C;
water: +20° C.

9.3.2.24.3 The cargo storage system shall be capable of resisting the full vapour pressure of the cargo at the upper limits of the ambient design temperatures, whatever the system adopted to deal with the boil-off gas. This requirement is indicated by remark 37 in column (20) of Table C of Chapter 3.2.

9.3.2.25 ***Pumps and piping***

9.3.2.25.1 Pumps, compressors and accessory loading and unloading piping shall be placed in the cargo area. Cargo pumps shall be capable of being shut down from the cargo area and, in addition, from a position outside the cargo area. Cargo pumps situated on deck shall be located not less than 6.00 m from entrances to, or openings of, the accommodation and service spaces outside the cargo area.

9.3.2.25.2 (a) Piping for loading and unloading shall be independent of any other piping of the vessel. No cargo piping shall be located below deck, except those inside the cargo tanks and inside the cargo pump-room.

(b) The piping for loading and unloading shall be arranged so that, after loading or unloading operations, the liquid remaining in these pipes may be safely removed and may flow either into the vessel’s tanks or the tanks ashore.

(c) Piping for loading and unloading shall be clearly distinguishable from other piping, e.g. by means of colour marking.

(d) The piping for loading and unloading located on deck, with the exception of the shore connections, shall be located not less than a quarter of the vessel's breadth from the outer shell.

(e) The shore connections shall be located not less than 6.00 m from the entrances to, or openings of, the accommodation and service spaces outside the cargo area.

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(f) Each shore connection of the venting piping and shore connections of the piping for loading and unloading, through which the loading or unloading operation is carried out, shall be fitted with a shut-off device. However, each shore connection shall be fitted with a blind flange when it is not in operation.

(g) (*Deleted*)

(h) The flanges and stuffing boxes shall be provided with a spray protection device.

(i) Piping for loading and unloading, and venting piping, shall not have flexible connections fitted with sliding seals.

9.3.2.25.3 *(Deleted)*

9.3.2.25.4 (a) Every component of the piping for loading and unloading shall be electrically connected to the hull.

(b) The piping for loading shall extend down to the bottom of the cargo tanks.

9.3.2.25.5 The stop valves or other shut-off devices of the piping for loading and unloading shall indicate whether they are open or shut.

9.3.2.25.6 The piping for loading and unloading shall have, at the test pressure, the required elasticity, leakproofness and resistance to pressure.

9.3.2.25.7 The piping for loading and unloading shall be fitted with pressure gauges at the outlet of the pumps. The permissible maximum overpressure or vacuum value shall be indicated on each measuring device. Readings shall be possible in all weather conditions.

9.3.2.25.8 (a) When piping for loading and unloading are used for supplying the cargo tanks with washing or ballast water, the suctions of these pipes shall be located within the cargo area but outside the cargo tanks.

Pumps for tank washing systems with associated connections may be located outside the cargo area, provided the discharge side of the system is arranged in such a way that the suction is not possible through that part.

A spring-loaded non-return valve shall be provided to prevent any gases from being expelled from the cargo area through the tank washing system.

(b) A non-return valve shall be fitted at the junction between the water suction pipe and the cargo loading pipe.

9.3.2.25.9 The permissible loading and unloading flows shall be calculated.

Calculations concern the permissible maximum loading and unloading flow for each cargo tank or each group of cargo tanks, taking into account the design of the ventilation system. These calculations shall take into consideration the fact that in the event of an unforeseen cut–off of the vapour return piping of the shore facility, the safety devices of the cargo tanks will prevent pressure in the cargo tanks from exceeding the following values:

over–pressure: 1.15 times the opening pressure of the pressure relief valve/high velocity vent valve;

vacuum pressure: not more than the design pressure, but not exceeding a vacuum of 5 kPa (0.05 bar).

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The main factors to be considered are the following:

1. Dimensions of the ventilation system of the cargo tanks;

2. Gas formation during loading: multiply the largest loading flow by a factor of not less than 1.25;

3. Density of the vapour mixture of the cargo based on 50% volume vapour and 50% volume air;

4. Loss of pressure through ventilation pipes, valves and fittings. Account will be taken of a 30% clogging of the mesh of the flame-arrester;

5. Chocking pressure of the safety valves.

Instructions concerning the permissible maximum loading and unloading flows for each cargo tank or for each group of cargo tanks shall be carried on board.

9.3.2.25.10 Compressed air generated outside the cargo area can be used in the cargo area subject to the installation of a spring-loaded non-return valve to ensure that no gases can escape from the cargo area through the compressed air system into accommodation, wheelhouse or service spaces outside the cargo area.

9.3.2.25.11 If the vessel is carrying several dangerous substances liable to react dangerously with each other, a separate pump with its own piping for loading and unloading shall be installed for each substance. The piping shall not pass through a cargo tank containing dangerous substances with which the substance in question is liable to react.

9.3.2.26 ***Residual cargo tanks and receptacles for residual products***

9.3.2.26.1 When vessels are provided with tanks for residual products or receptacles for residual products, they shall be located in the cargo area and comply with the provisions of 9.3.2.26.2 and 9.3.2.26.3. Receptacles for residual products shall be located only in the cargo area on deck and not less than a quarter of the vessel's breadth from the outer shell.

9.3.2.26.2 Tanks for residual products shall be equipped with:

– A level gauge;

– Connections, with stop valves, for pipes and hose assemblies;

– A pressure relief/vacuum valve;

The pressure relief valve shall be sized so that, during the transport operation, it does not open when in normal operation. This condition is met when the opening pressure of the valve meets the conditions required in column (10) of Table C of Chapter 3.2 for the substances to be carried.

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the vacuum valve shall be designed so as to be capable of withstanding a deflagration. The deflagration safety may also be ensured by a flame arrester.

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, or for which there is a T in column (3b) of Table C of Chapter 3.2, then the pressure relief valve shall be designed as a high velocity vent valve.

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The pressure relief valve shall be sized so that, during the transport operation, it does not open when in normal operation. This condition is met when the opening pressure of the valve meets the conditions required in column (10) of Table C of Chapter 3.2 for the substance to be carried.

The high velocity vent valve and the deflagration safe vacuum valve shall be chosen according to the explosion groups/subgroups of the substances listed in the list of substances on the vessel (see column (16) of Table C of Chapter 3.2).

The maximum permissible capacity is 30 m^3.

9.3.2.26.3 The receptacles for residual products shall be equipped with:

– A possibility of indicating the degree of filling;

– Connections, with stop valves, for pipes and hose assemblies;

A connection enabling gases released during filling to be evacuated safely.

9.3.2.26.4 *(Deleted)*

9.3.2.27 *Refrigeration system*

9.3.2.27.1 The refrigeration system referred to in 9.3.2.24.1 (a) shall be composed of one or more units capable of keeping the pressure and temperature of the cargo at the upper limits of the ambient design temperatures at the prescribed level. Unless another means of regulating cargo pressure and temperature deemed satisfactory by a recognised classification society is provided, provision shall be made for one or more stand-by units with an output at least equal to that of the largest prescribed unit. A stand-by unit shall include a compressor, its engine, its control system and all necessary accessories to enable it to operate independently of the units normally used. Provision shall be made for a stand-by heat-exchanger unless the system's normal heat-exchanger has a surplus capacity equal to at least 25% of the largest prescribed capacity. It is not necessary to make provision for separate piping.

Cargo tanks, piping and accessories shall be insulated so that, in the event of a failure of all cargo refrigeration systems, the entire cargo remains for at least 52 hours in a condition not causing the safety valves to open.

9.3.2.27.2 The security devices and the connecting lines from the refrigeration system shall be connected to the cargo tanks above the liquid phase of the cargo when the tanks are filled to their maximum permissible degree of filling. They shall remain within the gaseous phase, even if the vessel has a list up to 12 degrees.

9.3.2.27.3 When several refrigerated cargoes with a potentially dangerous chemical reaction are carried simultaneously, particular care shall be given to the refrigeration systems so as to prevent any mixing of the cargoes. For the carriage of such cargoes, separate refrigeration systems, each including the full stand-by unit referred to in 9.3.2.27.1, shall be provided for each cargo. When, however, refrigeration is ensured by an indirect or combined system and no leak in the heat exchangers can under any foreseeable circumstances lead to the mixing of cargoes, no provision need be made for separate refrigeration units for the different cargoes.

9.3.2.27.4 When several refrigerated cargoes are not soluble in each other under conditions of carriage such that their vapour pressures are added together in the event of mixing, particular care shall be given to the refrigeration systems to prevent any mixing of the cargoes.

9.3.2.27.5 When the refrigeration systems require water for cooling, a sufficient quantity shall be supplied by a pump or pumps used exclusively for the purpose. This pump or pumps shall have at least two suction pipes, leading from two water intakes, one to port, the other to

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starboard. Provision shall be made for a stand-by pump with a satisfactory flow; this may be a pump used for other purposes provided that its use for supplying water for cooling does not impair any other essential service.

9.3.2.27.6 The refrigeration system may take one of the following forms:

(a) Direct system: the cargo vapours are compressed, condensed and returned to the cargo tanks. This system shall not be used for certain cargoes specified in Table C of Chapter 3.2. This requirement is indicated by remark 35 in column (20) of Table C of Chapter 3.2;

(b) Indirect system: the cargo or the cargo vapours are cooled or condensed by means of a coolant without being compressed;

(c) Combined system: the cargo vapours are compressed and condensed in a cargo/coolant heat-exchanger and returned to the cargo tanks. This system shall not be used for certain cargoes specified in Table C of Chapter 3.2. This requirement is indicated by remark 36 in column (20) of Table C of Chapter 3.2.

9.3.2.27.7 All primary and secondary coolant fluids shall be compatible with each other and with the cargo with which they may come into contact. Heat exchange may take place either at a distance from the cargo tank, or by using cooling coils attached to the inside or the outside of the cargo tank.

9.3.2.27.8 When the refrigeration system is installed in a separate service space, this service space shall meet the requirements of 9.3.2.17.6.

9.3.2.27.9 For all cargo systems, the heat transmission coefficient as used for the determination of the holding time (7.2.4.16.16 and 7.2.4.16.17) shall be determined by calculation. Upon completion of the vessel, the correctness of the calculation shall be checked by means of a heat balance test. The calculation and test shall be performed under supervision by the recognized classification society which classified the vessel.

The heat transmission coefficient shall be documented and kept on board. The heat transmission coefficient shall be verified at every renewal of the certificate of approval.

9.3.2.27.10 A certificate from a recognised classification society stating that 9.3.2.24.1 to 9.3.2.24.3, 9.3.2.27.1 and 9.3.2.27.4 above have been complied with shall be submitted together with the application for issue or renewal of the certificate of approval.

9.3.2.28 ***Water-spray system***

When water-spraying is required in column (9) of Table C of Chapter 3.2, a water-spray system shall be installed in the cargo area on deck to enable gas emissions from loading to be precipitated or to cool the tops of cargo tanks by spraying water over the whole surface so as to avoid safely the activation of the pressure relief valves/high velocity vent valves at 50 kPa (0.5 bar).

The gas precipitation system shall be fitted with a connection device for supply from a shore installation.

The spray nozzles shall be so installed that the entire cargo deck area is covered and the gases released are precipitated safely.

The system shall be capable of being put into operation from the wheelhouse and from the deck. Its capacity shall be such that when all the spray nozzles are in operation, the outflow is not less than 50 litres per square metre of deck area and per hour.

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9.3.2.29 and 9.3.2.30 (*Reserved*)

9.3.2.31 ***Engines***

9.3.2.31.1 Only internal combustion engines running on fuel with having a flashpoint above 55 ºC are allowed. This provision does not apply to internal combustion engines which are part of propulsion and auxiliary systems. These systems shall meet the requirements of Chapter 30 and Annex 8, Section 1 of the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) as amended.[2]

9.3.2.31.2. Ventilation inlets of the engine room, and when the engines do not take in air directly from the engine room, air intakes of the engines shall be located not less than 2.00 m from the cargo area.

9.3.2.31.3 and 9.3.2.31.4 *(Deleted)*

9.3.2.31.5 The ventilation in the closed engine room shall be designed so that, at an ambient temperature of 20 °C, the average temperature in the engine room does not exceed 40º C.

9.3.2.32 ***Oil fuel tanks***

9.3.2.32.1 Where the vessel is provided with hold spaces, the double bottoms within these spaces may be arranged as oil fuel tanks, provided their depth is not less than 0.6 m.

Oil fuel pipes and openings of such tanks are not permitted in the hold space.

9.3.2.32.2 The open ends of the air pipes of each oil fuel tanks shall extend to not less than 0.5 m above the open deck. These open ends and the open ends of overflow pipes leading to the deck shall be fitted with a protective device consisting of a gauze diaphragm or a perforated plate.

9.3.2.33 (*Reserved*)

9.3.2.34 ***Exhaust pipes***

9.3.2.34.1 Exhausts shall be evacuated from the vessel into the open air either upwards through an exhaust pipe or through the shell plating. The exhaust outlet shall be located not less than 2.00 m from the cargo area. The exhaust pipes of engines shall be arranged so that the exhausts are led away from the vessel. The exhaust pipes shall not be located within the cargo area.

9.3.2.34.2 Exhaust pipes shall be provided with a device preventing the escape of sparks, e.g. spark arresters.

9.3.2.35 ***Bilge pumping and ballasting arrangements***

9.3.2.35.1 Bilge and ballast pumps for spaces within the cargo area shall be installed within such area.

This provision does not apply to:

– double-hull spaces and double bottoms which do not have a common boundary wall with the cargo tanks;

– cofferdams, double-hull spaces, hold spaces and double bottoms where ballasting is carried out using the piping of the fire-fighting system in the cargo area and bilge-pumping is performed using eductors which are installed in the cargo area.

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[2] *As available on the website of the Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI, https://www.cesni.eu/en/documents/es-trin/.*

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9.3.2.35.2 Where the double bottom is used as a liquid oil fuel tank, it shall not be connected to the bilge piping system.

9.3.2.35.3 Where the ballast pump is installed in the cargo area, the standpipe and its outboard connection for suction of ballast water shall be located within the cargo area but outside the cargo tanks.

9.3.2.35.4 A cargo pump-room below deck shall be capable of being drained in an emergency by an installation located in the cargo area and independent from any other installation. This installation shall be provided outside the cargo pump-room.

9.3.2.36 to 9.3.2.39 (*Reserved*)

9.3.2.40 ***Fire-extinguishing arrangements***

9.3.2.40.1 A fire-extinguishing system shall be installed on the vessel. This system shall comply with the following requirements:

– It shall be supplied by two independent fire or ballast pumps, one of which shall be ready for use at any time. These pumps and their means of propulsion and electrical equipment shall not be installed in the same space;

– It shall be provided with a water main fitted with at least three hydrants in the cargo area above deck. Three suitable and sufficiently long hoses with jet/spray nozzles having a diameter of not less than 12 mm shall be provided. Alternatively one or more of the hose assemblies may be substituted by directable jet/spray nozzles having a diameter of not less than 12 mm. It shall be possible to reach any point of the deck in the cargo area simultaneously with at least two jets of water which do not emanate from the same hydrant.

  A spring-loaded non-return valve shall be fitted to ensure that no gases can escape through the fire-extinguishing system into the accommodation, wheelhouse or service spaces outside the cargo area;

– The capacity of the system shall be at least sufficient for a jet of water to have a minimum reach of not less than the vessel's breadth from any location on board with two spray nozzles being used at the same time;

– The water supply system shall be capable of being put into operation from the wheelhouse and from the deck;

– Measures shall be taken to prevent the freezing of fire-mains and hydrants.

9.3.2.40.2 In addition, the engine rooms, the pump-room and all spaces containing essential equipment (switchboards, compressors, etc.) for the refrigeration equipment, if any, shall be provided with a permanently fixed fire-extinguishing system meeting the following requirements:

9.3.2.40.2.1 *Extinguishing agents*

For the protection of spaces in engine rooms, boiler rooms and pump rooms, only permanently fixed fire-extinguishing systems using the following extinguishing agents are permitted:

(a) CO_2 (carbon dioxide);

(b) HFC 227 ea (heptafluoropropane);

(c) IG-541 (52% nitrogen, 40% argon, 8% carbon dioxide);

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(d) FK-5-1-12 (dodecafluoro 2-methylpentane-3-one);

(e) (*Reserved*)

(f) K_2CO_3 (potassium carbonate).

Other extinguishing agents are permitted only on the basis of recommendations by the Administrative Committee.

9.3.2.40.2.2 *Ventilation, air extraction*

(a) The combustion air required by the combustion engines which ensure propulsion should not come from spaces protected by permanently fixed fire-extinguishing systems. This requirement is not mandatory if the vessel has two independent main engine rooms with a gastight separation or if, in addition to the main engine room, there is a separate engine room installed with a bow thruster that can independently ensure propulsion in the event of a fire in the main engine room.

(b) All forced ventilation systems in the space to be protected shall be shut down automatically as soon as the fire-extinguishing system is activated.

(c) All openings in the space to be protected which permit air to enter or gas to escape shall be fitted with devices enabling them to be closed rapidly. It shall be clear whether they are open or closed.

(d) Air escaping from the pressure–relief valves of the pressurised air tanks installed in the engine rooms shall be evacuated to the open air.

(e) Overpressure or negative pressure caused by the diffusion of the extinguishing agent shall not destroy the constituent elements of the space to be protected. It shall be possible to ensure the safe equalisation of pressure.

(f) Protected spaces shall have a facility for extracting the extinguishing agent and the combustion gases. Such facilities shall be capable of being operated from positions outside the protected rooms and which must not be made inaccessible by a fire within such spaces. If there are permanently installed extractors, it shall not be possible for these to be switched on while the fire is being extinguished.

9.3.2.40.2.3 *Fire alarm system*

The space to be protected shall be monitored by an appropriate fire alarm system. The alarm signal shall be audible in the wheelhouse, the accommodation and the space to be protected.

9.3.2.40.2.4 *Piping system*

(a) The extinguishing agent shall be routed to and distributed in the space to be protected by means of a permanent piping system. Piping installed in the space to be protected and their fittings shall be made of steel. This shall not apply to the connecting nozzles of tanks and compensators provided that the materials used have equivalent fire-retardant properties. Piping shall be protected against corrosion both internally and externally.

(b) The discharge nozzles shall be so arranged as to ensure the regular diffusion of the extinguishing agent. In particular, the extinguishing agent must also be effective beneath the floor.

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9.3.2.40.2.5 *Triggering device*

(a) Automatically activated fire-extinguishing systems are not permitted.

(b) It shall be possible to activate the fire-extinguishing system from a suitable point located outside the space to be protected.

(c) Triggering devices shall be so installed that they can be activated in the event of a fire and so that the risk of their breakdown in the event of a fire or an explosion in the space to be protected is reduced as far as possible.

Systems which are not mechanically activated shall be supplied from two energy sources independent of each other. These energy sources shall be located outside the space to be protected. The control lines located in the space to be protected shall be so designed as to remain capable of operating in the event of a fire for a minimum of 30 minutes. The electrical installations are deemed to meet this requirement if they conform to the IEC 60331–21:1999 standard.

When the triggering devices are so placed as not to be visible, the component concealing them shall carry the "Fire-fighting system" symbol, each side being not less than 10 cm in length, with the following text in red letters on a white ground:

Fire-extinguishing system

(d) If the fire-extinguishing system is intended to protect several spaces, it shall comprise a separate and clearly–marked triggering device for each space.

(e) The instructions shall be posted alongside all triggering devices and shall be clearly visible and indelible. The instructions shall be in a language the master can read and understand and if this language is not English, French or German, they shall be in English, French or German. They shall include information concerning:

(i) the activation of the fire-extinguishing system;

(ii) the need to ensure that all persons have left the space to be protected;

(iii) The correct behaviour of the crew in the event of activation and when accessing the space to be protected following activation or diffusion, in particular in respect of the possible presence of dangerous substances;

(iv) the correct behaviour of the crew in the event of the failure of the fire-extinguishing system to function properly.

(f) The instructions shall mention that prior to the activation of the fire-extinguishing system, combustion engines installed in the space and aspirating air from the space to be protected, shall be shut down.

9.3.2.40.2.6 *Alarm device*

(a) Permanently fixed fire-extinguishing systems shall be fitted with an audible and visual alarm device.

(b) The alarm device shall be set off automatically as soon as the fire-extinguishing system is first activated. The alarm device shall function for an appropriate period of time before the extinguishing agent is released; it shall not be possible to turn it off.

(c) Alarm signals shall be clearly visible in the spaces to be protected and their access points and be clearly audible under operating conditions corresponding to the highest

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possible sound level. It shall be possible to distinguish them clearly from all other sound and visual signals in the space to be protected.

(d) Sound alarms shall also be clearly audible in adjoining spaces, with the communicating doors shut, and under operating conditions corresponding to the highest possible sound level.

(e) If the alarm device is not intrinsically protected against short circuits, broken wires and drops in voltage, it shall be possible to monitor its operation.

(f) A sign with the following text in red letters on a white ground shall be clearly posted at the entrance to any space the extinguishing agent may reach:

Warning, fire-extinguishing system!
Leave this space immediately when the … (description) alarm is activated!

9.3.2.40.2.7 *Pressurised tanks, fittings and piping*

(a) Pressurised tanks, fittings and piping shall conform to the requirements of the competent authority or, if there are no such requirements, to those of a recognized classification society.

(b) Pressurised tanks shall be installed in accordance with the manufacturer's instructions.

(c) Pressurised tanks, fittings and piping shall not be installed in the accommodation.

(d) The temperature of cabinets and storage spaces for pressurised tanks shall not exceed 50 °C.

(e) Cabinets or storage spaces on deck shall be securely stowed and shall have vents so placed that in the event of a pressurised tank not being gastight, the escaping gas cannot penetrate into the vessel. Direct connections with other spaces are not permitted.

9.3.2.40.2.8 *Quantity of extinguishing agent*

If the quantity of extinguishing agent is intended for more than one space, the quantity of extinguishing agent available does not need to be greater than the quantity required for the largest of the spaces thus protected.

9.3.2.40.2.9 *Installation, maintenance, monitoring and documents*

(a) The mounting or modification of the system shall only be performed by a company specialised in fire-extinguishing systems. The instructions (product data sheet, safety data sheet) provided by the manufacturer of the extinguishing agent or the system shall be followed.

(b) The system shall be inspected by an expert:

(i) before being brought into service;

(ii) each time it is put back into service after activation;

(iii) after every modification or repair;

(iv) regularly, not less than every two years.

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(c) During the inspection, the expert is required to check that the system conforms to the requirements of 9.3.2.40.2.

(d) The inspection shall include, as a minimum:

(i) an external inspection of the entire system;

(ii) an inspection to ensure that the piping is leakproof;

(iii) an inspection to ensure that the control and activation systems are in good working order;

(iv) an inspection of the pressure and contents of tanks;

(v) an inspection to ensure that the means of closing the space to be protected are leakproof;

(vi) an inspection of the fire alarm system;

(vii) an inspection of the alarm device.

(e) The person performing the inspection shall establish, sign and date a certificate of inspection.

(f) The number of permanently fixed fire-extinguishing systems shall be mentioned in the vessel certificate.

9.3.2.40.2.10 *Fire-extinguishing system operating with CO_2*

In addition to the requirements contained in 9.3.2.40.2.1 to 9.3.2.40.2.9, fire-extinguishing systems using CO_2 as an extinguishing agent shall conform to the following provisions:

(a) Tanks of CO_2 shall be placed in a gastight space or cabinet separated from other spaces. The doors of such storage spaces and cabinets shall open outwards; they shall be capable of being locked and shall carry on the outside the symbol “Warning: danger”, not less than 5 cm high and “CO_2” in the same colours and the same size;

(b) Storage cabinets or spaces for CO_2 tanks located below deck shall only be accessible from the outside. These spaces shall have an artificial ventilation system with extractor hoods and shall be completely independent of the other ventilation systems on board;

(c) The level of filling of CO_2 tanks shall not exceed 0.75 kg/l. The volume of depressurised CO_2 shall be taken to be 0.56 m^3/kg;

(d) The concentration of CO_2 in the space to be protected shall be not less than 40% of the gross volume of the space. This quantity shall be released within 120 seconds. It shall be possible to monitor whether diffusion is proceeding correctly;

(e) The opening of the tank valves and the control of the diffusing valve shall correspond to two different operations;

(f) The appropriate period of time mentioned in 9.3.2.40.2.6 (b) shall be not less than 20 seconds. A reliable installation shall ensure the timing of the diffusion of CO_2.

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9.3.2.40.2.11 *Fire-extinguishing system operating with HFC-227 ea (heptafluoropropane)*

In addition to the requirements of 9.3.2.40.2.1 to 9.3.2.40.2.9, fire-extinguishing systems using HFC-227 ea as an extinguishing agent shall conform to the following provisions:

(a) Where there are several spaces with different gross volumes, each space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing HFC-227 ea placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Every tank shall be fitted with a device permitting control of the gas pressure;

(d) The level of filling of tanks shall not exceed 1.15 kg/l. The specific volume of depressurised HFC-227 ea shall be taken to be 0.1374 m^3/kg;

(e) The concentration of HFC-227 ea in the space to be protected shall be not less than 8% of the gross volume of the space. This quantity shall be released within 10 seconds;

(f) Tanks of HFC-227 ea shall be fitted with a pressure monitoring device which triggers an audible and visual alarm in the wheelhouse in the event of an unscheduled loss of propellant gas. Where there is no wheelhouse, the alarm shall be triggered outside the space to be protected;

(g) After discharge, the concentration in the space to be protected shall not exceed 10.5% (volume);

(h) The fire-extinguishing system shall not comprise aluminium parts.

9.3.2.40.2.12 *Fire-extinguishing system operating with IG-541*

In addition to the requirements of 9.3.2.40.2.1 to 9.3.2.40.2.9, fire-extinguishing systems using IG-541 as an extinguishing agent shall conform to the following provisions:

(a) Where there are several spaces with different gross volumes, every space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing IG-541 placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Each tank shall be fitted with a device for checking the contents;

(d) The filling pressure of the tanks shall not exceed 200 bar at a temperature of +15 °C;

(e) The concentration of IG-541 in the space to be protected shall be not less than 44% and not more than 50% of the gross volume of the space. This quantity shall be released within 120 seconds.

9.3.2.40.2.13 *Fire-extinguishing system operating with FK-5-1-12*

In addition to the requirements of 9.3.2.40.2.1 to 9.3.2.40.2.9, fire-extinguishing systems using FK-5-1-12 as an extinguishing agent shall comply with the following provisions:

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(a) Where there are several spaces with different gross volumes, every space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing FK-5-1-12 placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Every tank shall be fitted with a device permitting control of the gas pressure;

(d) The level of filling of tanks shall not exceed 1.00 kg/l. The specific volume of depressurized FK-5-1-12 shall be taken to be 0.0719 m^3/kg;

(e) The volume of FK-5-1-12 in the space to be protected shall be not less than 5.5% of the gross volume of the space. This quantity shall be released within 10 seconds;

(f) Tanks of FK-5-1-12 shall be fitted with a pressure monitoring device which triggers an audible and visual alarm in the wheelhouse in the event of an unscheduled loss of extinguishing agent. Where there is no wheelhouse, the alarm shall be triggered outside the space to be protected;

(g) After discharge, the concentration in the space to be protected shall not exceed 10.0%.

9.3.2.40.2.14 *(Reserved)*

9.3.2.40.2.15 *Fire-fighting systems using K_2CO_3 as the extinguishing agent*

In addition to the requirements laid down in 9.3.2.40.2.1 to 9.3.2.40.2.3, 9.3.2.40.2.5, 9.3.2.40.2.6 and 9.3.2.40.2.9, fire-fighting systems using K_2CO_3 as the extinguishing agent shall comply with the following provisions:

(a) The fire-fighting system shall have a type-approval pursuant to Directive 2014/90/EU[3] or to MSC/Circ. 1270;[4]

(b) Each room shall be provided with its own firefighting system;

(c) The extinguishing agent must be stored in specially provided unpressurised tanks in the room to be protected. These tanks shall be fitted in such a way that the extinguishing agent is dispensed evenly in the room. In particular the extinguishing agent shall also work underneath the deck plates;

(d) Each tank is separately connected with the triggering device;

(e) The quantity of dry aerosol-forming extinguishing agent relative to the room to be protected shall be at least 120 g per m^3 of the net volume of this room. This net volume is calculated according to Directive 2014/90/EU[3] or to MSC/Circ. 1270[4]. It shall be possible to supply the extinguishing agent within 120 s.

9.3.2.40.2.16 *Fixed fire-extinguishing system for physical protection*

In order to ensure physical protection in the engine rooms, boiler rooms and pump rooms, permanently fixed fire-extinguishing systems are accepted solely on the basis of recommendations by the Administrative Committee.

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[3] *Official Journal of the European Union, L 257 of 28 August 2014, p.146.*

[4] *International Maritime Organization Circular MSC/Circ. 1270 and corrigenda — Revised Guidelines for the approval of fixed aerosol fire-extinguishing systems equivalent to fixed gas extinguishing systems, as referred to in SOLAS 1974, for machinery spaces — adopted on 4 June 2008.*

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9.3.2.40.3 The two hand fire–extinguishers referred to in 8.1.4 shall be located in the cargo area.

9.3.2.40.4 The fire-extinguishing agent and the quantity contained in the permanently fixed fire-extinguishing system shall be suitable and sufficient for fighting fires.

9.3.2.41 ***Fire and naked light***

9.3.2.41.1 The outlets of funnels shall be located not less than 2.00 m from the cargo area. Arrangements shall be provided to prevent the escape of sparks and the entry of water.

9.3.2.41.2 Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels.

The installation in the engine room or in another separate space of heating appliances fuelled with liquid fuel having a flash–point above 55 °C is, however, permitted.

Cooking and refrigerating appliances are permitted only in the accommodation.

9.3.2.41.3 Only electrical lamps are permitted.

9.3.2.42 ***Cargo heating system***

9.3.2.42.1 Boilers which are used for heating the cargo shall be fuelled with a liquid fuel having a flashpoint of more than 55 °C. They shall be placed either in the engine room or in another separate space below deck and outside the cargo area, which is accessible from the deck or from the engine room.

9.3.2.42.2 The cargo heating system shall be designed so that the cargo cannot penetrate into the boiler in the case of a leak in the heating coils. A cargo heating system with artificial draught shall be ignited electrically.

9.3.2.42.3 The ventilation system of the engine room shall be designed taking into account the air required for the boiler.

9.3.2.42.4 Where the cargo heating system is used during loading, unloading or degassing with a concentration given off by the cargo of 10% of the LEL or above, the service space which contains this system shall fully comply with the requirements of 9.3.2.52.3. This requirement does not apply to the inlets of the ventilation system. These inlets shall be located at a minimum distance of 2 m from the cargo area and 6 m from the openings of cargo tanks or residual cargo tanks, loading pumps situated on deck, openings of high velocity vent valves, pressure relief devices and shore connections of loading and unloading piping and must be located not less than 2 m above the deck.

The requirements of 9.3.2.52.3 are not applicable to the unloading of substances having a flash point of 60 °C or more when the temperature of the product is at least 15 K lower at the flash point.

9.3.2.43 to 9.3.2.49 (*Reserved*)

9.3.2.50 *(Deleted)*

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9.3.2.51 ***Surface temperatures of installations and equipment***

(a) Surface temperatures of electrical and non-electrical installations and equipment shall not exceed 200 °C.

(b) Surface temperatures of the outer parts of engines and of their air inlets and exhaust ducts shall not exceed 200 °C;

(c) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which the temperature classes T4, T5 or T6 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 135 °C (T4), 100 °C (T5) or 85 °C (T6) respectively;

(d) (a) and (b) do not apply if the following requirements are met (see also 7.2.3.51.4):

(i) Accommodation, wheelhouse and service spaces where surface temperatures higher than those mentioned in (a) and (b) occur are equipped with a ventilation system according to 9.3.2.12.4 (b); or

(ii) Installations and equipment which generate surface temperatures higher than those set out in (a) or (b), respectively, must be capable of being shut down. Such installations and equipment shall be marked in red.

9.3.2.52 ***Type and location of electrical installations and equipment***

9.3.2.52.1 Electrical installations and equipment shall be of at least the ‘limited explosion risk’ type.

This provision does not apply to:

(a) Lighting installations in the accommodation and the wheelhouse, except for switches near to the entrances;

(b) Mobile phones, fixed telephone installations, stationary and portable computers and loading instruments in the accommodation or the wheelhouse;

(c) Electrical installations and equipment which, during a stay in the immediate vicinity of or within a shoreside assigned zone:

(i) Are extinguished; or

(ii) Are placed in premises equipped with a ventilation system according to 9.3.2.12.4;

(d) To radiotelephone installations and inland AIS (automatic identification systems) stations in the accommodation and the wheelhouse, if no part of an aerial for radiotelephone installations or AIS stations is situated above or within 2.00 m of the cargo area.

9.3.2.52.2 In the cofferdams, double-hull spaces, double bottoms and hold spaces, only hermetically sealed echo sounding devices are allowed, the cables of which are led through thick-walled steel tubes with gastight connections up to the main deck.

9.3.2.52.3 The fixed electrical installations and equipment which do not meet the requirements set out in 9.3.2.51 (a), 9.3.2.51 (b) and 9.3.2.52.1 above and their switches shall be marked in red. The disconnection of such equipment shall be controlled from a centralized location on board.

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9.3.2.52.4 Every insulated distribution network shall be fitted with an automatic device with a visual and audible alarm for checking the insulation level.

9.3.2.52.5 Only distribution systems without return connection to the hull are permitted. This provision does not apply to:

– Active cathodic corrosion protection;

– Certain limited sections of the installations situated outside the cargo area (e.g., connections of starters of diesel engines);

– The device for checking the insulation level referred to in 9.3.2.52.4.

9.3.2.52.6 An electric generator which is permanently driven by an engine and which does not meet the requirements of 9.3.2.52.1 above, shall be fitted with a multipolar switch capable of shutting down the generator. A notice board with the operating instructions shall be displayed near the switch.

9.3.2.52.7 Failure of the power supply for the safety and control equipment shall be immediately indicated by visual and audible signals in the wheelhouse and on the deck. The alarm must be relayed to the accommodation automatically if it has not been switched off.

9.3.2.52.8 Electrical switches, sockets and cables on deck shall be protected against mechanical damage.

9.3.2.52.9 Sockets for the connection of signal lights and gangway lighting shall be solidly fitted to the vessel close to the signal mast or the gangway. The sockets used in this area shall be designed so as to prevent connection or disconnection except when they are not live.

9.3.2.52.10 Accumulators shall be located outside the cargo area.

9.3.2.53 ***Type and location of electrical and non-electrical installations and equipment intended to be used in explosion hazardous areas***

9.3.2.53.1 On board vessels covered by the classification of zones as defined in 1.2.1, electrical and non-electrical installations and equipment used in explosion hazardous areas shall meet at least the requirements for use in the area concerned.

They shall be selected on the basis of the explosion groups/subgroups and temperature classes to which the substances to be carried belong (see columns (15) and (16) of Table C of Chapter 3.2).

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which temperature classes T4, T5 or T6 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 135 °C (T4), 100 °C (T5) or 85 °C (T6).

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which temperature classes T1 or T2 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 200 °C.

9.3.2.53.2 Except in the case of optical fibres, electrical cables shall be armoured or placed in a metallic sheath or in protective tubes.

Electrical cables for the active cathodic protection of the shell plating shall be led through thick-walled steel tubes with gastight connections up to the main deck.

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9.3.2.53.3 Movable electric cables are prohibited in the explosion danger area, except for electric cables for intrinsically safe electric circuits or for connecting:

(a) Signal lights and lighting for gangways, provided the connection point (for example, the socket) is permanently fitted to the vessel close to the signal mast or gangway;

(b) The power network on a vessel to a land-based power network; provided

– The electric cables and the power supply unit conform with a valid standard (for example, EN 15869-03: 2010);

– The power supply unit and connectors are located outside of the explosion danger area.

Connecting and disconnecting sockets/connectors shall only be possible when they are not live.

9.3.2.53.4 Electrical cables of intrinsically safe circuits shall be separated from other cables not intended for use in such circuits and shall be marked (they shall not be installed together in the same string of cables and they shall not be fixed by the same cable clamps).

9.3.2.53.5 For movable electrical cables permitted under 9.3.2.53.3, only sheathed cables of type H07RN-F in accordance with standard IEC 60245-4:2011[5] or electrical cables of at least equivalent design having conductors with a cross-section of not less than 1.50 mm^2 shall be used.

9.3.2.54 ***Earthing***

9.3.2.54.1 The metal parts of electrical installations and equipment in the cargo area which are not live, as well as the protective metal tubes or metal sheaths of cables, in normal service shall be earthed, unless they are so arranged that they are automatically earthed by bonding to the metal structure of the vessel.

9.3.2.54.2 The provisions of 9.3.2.54.1 also apply to installations with a voltage of less than 50 Volts.

9.3.2.54.3 Independent cargo tanks, metal intermediate bulk containers and tank-containers shall be earthed.

9.3.2.54.4 Receptacles for residual products shall be capable of being earthed.

9.3.2.55 (*Reserved*)

9.3.2.56 *(Deleted)*

9.3.2.57 to 9.3.2.59 (*Reserved*)

[5] *Identical to EN 50525-2-21: 2011.*

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9.3.2.60 ***Special equipment***

A shower and an eye and face bath shall be provided on the vessel at a location which is directly accessible from the cargo area. The water shall meet the quality of drinking water on board.

NOTE: *Additional decontamination substances for the purpose of avoiding corrosion of eyes and skin are allowed.*

A connection of this special equipment with the area outside the cargo zone is accepted.

A spring-loaded non-return valve shall be fitted to ensure that no gases can escape through the shower and the eye and face bath system outside the cargo area.

9.3.2.61 (*Reserved*)

9.3.2.62 ***Valve for degassing to reception facilities***

A permanently installed or portable spring-loaded low-pressure valve used during degassing operations to reception facilities, shall be fitted at the piping used to extract air. If the vessel's substance list, according to 1.16.1.2.5, contains substances for which explosion protection is required according to column (17) of Table C of Chapter 3.2, this valve shall be fitted with a flame arrester capable of withstanding a deflagration. When the vessel is not degassing to a reception facility, the valve shall be closed with a blind flange. The low-pressure valve shall be so installed that under other normal working conditions the vacuum valve is not activated.

NOTE*: Degassing operations are part of normal working conditions.*

9.3.2.63 to 9.3.2.70 (*Reserved*)

9.3.2.71 ***Admittance on board***

The notice boards displaying the prohibition of admittance in accordance with 8.3.3 shall be clearly legible from either side of the vessel.

9.3.2.72 and 9.3.2.73 (*Reserved*)

9.3.2.74 ***Prohibition of smoking, fire or naked light***

9.3.2.74.1 The notice boards displaying the prohibition of smoking in accordance with 8.3.4 shall be clearly legible from either side of the vessel.

9.3.2.74.2 Notice boards indicating the circumstances under which the prohibition is applicable shall be fitted near the entrances to the spaces where smoking or the use of fire or naked light is not always prohibited.

9.3.2.74.3 Ashtrays shall be provided close to each exit of the accommodation and the wheelhouse.

9.3.2.75 to 9.3.2.91 (*Reserved*)

9.3.2.92 ***Emergency exit***

Spaces the entrances or exits of which are likely to become partly or completely immersed in the damaged condition shall have an emergency exit which is situated not less than 0.10 m above the damage waterline. This requirement does not apply to forepeak and afterpeak.

9.3.2.93 to 9.3.2.99 (*Reserved*)

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9.3.3 Rules for construction of type N tank vessels

The rules for construction of 9.3.3.0 to 9.3.3.99 apply to type N tank vessels.

9.3.3.0 *Materials of construction*

9.3.3.0.1 (a) The vessel's hull and the cargo tanks shall be constructed of shipbuilding steel or other at least equivalent metal.

The independent cargo tanks may also be constructed of other materials, provided these have at least equivalent mechanical properties and resistance against the effects of temperature and fire.

(b) Every part of the vessel including any installation and equipment which may come into contact with the cargo shall consist of materials which can neither be dangerously affected by the cargo nor cause decomposition of the cargo or react with it so as to form harmful or hazardous products. In case it has not been possible to examine this during classification and inspection of the vessel a relevant reservation shall be entered in the vessel substance list according to 1.16.1.2.5.

(c) Inside venting piping shall be protected against corrosion.

9.3.3.0.2 Except where explicitly permitted in 9.3.3.03 below or in the certificate of approval, the use of wood, aluminium alloys, plastic materials or rubber within the cargo area is prohibited.

9.3.3.0.3 The use of wood, aluminium alloys, plastic materials or rubber in the cargo area is permitted as shown in the following table:

The use of wood, aluminium alloys, plastic materials or rubber is permitted only for:				**(X indicates permitted)**
	Wood	**Aluminium alloys**	**Plastic material**	**Rubber**
Gangways	X	X	X	X
External ladders and passageways (gangways) *)		X	X	X
Cleaning equipment, e.g. brooms	X		X	X
Movable equipment e.g. fire extinguishers, portable gas detectors, rescue winches		X	X	X
Fenders	X		X	X
Mooring cables, fender ropes			X	
Chocking of cargo tanks which are independent of the vessel's hull and chocking of installations and equipment	X		X	
Masts and similar round timber	X	X	X	
Engine parts		X	X	
Protective covers of engines and pumps			X	
Parts of the electrical installation		X	X	
Parts of the loading and unloading installation, e.g., gaskets		X	X	X
Boxes, cabinets or other receptacles placed on the deck for storage of disposal and recovery equipment for capstans, extinguishers, fire hoses, waste, etc.		X	X	
Supports and stops of any kind	X		X	

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The use of wood, aluminium alloys, plastic materials or rubber is permitted only for:				**(X indicates permitted)**
	Wood	**Aluminium alloys**	**Plastic material**	**Rubber**
Ventilators, including hose assemblies for ventilation		X	X	
Parts of the water spray system, the shower and the eye and face bath		X	X	
Insulation of cargo tanks and of piping for loading and unloading, gas discharge pipes and heating pipes			X	X
Coating of cargo tanks and of piping for loading and unloading		X	X	X
All kinds of gaskets (e.g. for dome or hatch covers)			X	X
Cables for electrical equipment			X	X
Mat under hose assemblies for loading and unloading piping system			X	X
Fire hoses, air hoses, hoses for cleaning the deck, etc.			X	X
Sampling equipment and bottles			X	
Photo-optical copies of the certificate of approval according to 8.1.2.6 or 8.1.2.7, and of the vessel's certificate, the measurement certificate and the Rhine navigation membership certificate		X	X	
Drip trays			X	
(*) Take account of 9.3.1.0.5, 9.3.2.0.5 or 9.3.3.0.5, as appropriate				
Aluminium gauging rods are permitted, provided that they are fitted with brass feet or protected in another way to avoid sparking.				

All permanently fitted materials in the accommodation or wheelhouse, with the exception of furniture, shall not readily ignite. They shall not evolve fumes or toxic gases in dangerous quantities, if involved in a fire.

9.3.3.0.4 The paint used in the cargo area shall not be liable to produce sparks in case of impact.

9.3.3.0.5 The use of plastic material for a vessel's boats is permitted only if the material does not readily ignite. Except where explicitly permitted in 9.3.3.0.3 or in the certificate of approval, the use of wood, aluminium alloys, plastic materials or rubber is prohibited.

The use of aluminium alloys or plastic material for passageways (gangways) in the cargo area is permitted only if the material does not readily ignite or conduct electricity.

9.3.3.1 Vessel record

NOTE: *For the purpose of this paragraph, the term "owner" has the same meaning as in 1.16.0.*

The vessel record shall be retained by the owner who shall be able to provide this documentation at the request of the competent authority and the recognized classification society.

The vessel record shall be maintained and updated throughout the life of the vessel and shall be retained for 6 months after the vessel is taken out of service.

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Should a change of owner occur during the life of the vessel the vessel record shall be transferred to the new owner.

Copies of the vessel record or all necessary documents shall be made available on request to the competent authority for the issuance of the certificate of approval and for the recognized classification society or inspection body for first inspection, periodic inspection, special inspection or exceptional checks.

9.3.3.2 to 9.3.3.7 (*Reserved*)

9.3.3.8 *Classification*

9.3.3.8.1 The tank vessel shall be built under the survey of a recognised classification society and be classed in its highest class.

The vessel's highest class shall be continued. This shall be confirmed by an appropriate certificate issued by the recognized classification society (certificate of class).

The design pressure and the test pressure of cargo tanks shall be entered in the certificate.

If a vessel has cargo tanks with different valve opening pressures, the design and test pressures of each tank shall be entered in the certificate.

The recognized classification society shall draw up a vessel substance list mentioning all the dangerous goods accepted for carriage by the tank vessel (see also 1.16.1.2.5).

9.3.3.8.2 and 9.3.3.8.3 *(Deleted)*

9.3.3.8.4 The conformity of the documents required in 8.1.2.3 (r) to (v) with the circumstances on board shall be inspected by a recognized classification society, an inspection body or by a person authorized for that purpose by the competent authority whenever the certificate of approval is renewed and, in addition, once during the third year of validity of the certificate of approval. A signed certificate must be available on board.

9.3.3.9 (*Reserved*)

9.3.3.10 *Protection against the penetration of dangerous gases and the spreading of dangerous liquids*

9.3.3.10.1 The vessel shall be designed so as to prevent dangerous gases and liquids from penetrating into the accommodation, wheelhouse and service spaces. None of the windows in these spaces shall be capable of being opened unless its intended use is as an emergency exit and it is marked as such.

9.3.3.10.2 Liquid-tight protective coamings shall be fitted on deck at the height of the external bulkheads of the cargo tanks, at a maximum distance of 0.60 m from the outer cofferdam bulkheads or the hold end bulkheads. The protective coamings shall either extend over the entire width of the vessel or be fixed between the longitudinal spill coamings so as to prevent liquids from entering the forepeak and afterpeak. The height of the protective coamings and the spill coamings shall be at least 0.075 m. The protective coaming may correspond to the protection wall prescribed in 9.3.3.10.3 if the protection wall extends across the entire width of the vessel.

9.3.3.10.3 If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the use of installations and equipment that are not of at least the 'limited explosion risk' type is not permitted during loading and unloading operations in parts of the deck outside the cargo area, unless those parts are protected against the penetration of gases and liquids by a

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gas- and liquid-tight protection wall. The wall must either extend over the full width of the vessel or surround the areas to be protected in a U-shaped form. The wall must cover the whole width of the area to be protected and at least 1.00 m in the direction opposite to the cargo area (see Classification of zones diagram). The height of the wall shall be at least 1.00 m above the adjacent cargo deck area in the cargo area. The outer wall and side walls of the accommodation can be considered as a protection wall if they do not include openings and if the dimensions are complied with.

A protection wall is not required where the distance between the areas to be protected and the high velocity vent valve, the shore connections of the piping for loading and unloading, the compressor on deck and the opening of the closest pressure tanks is at least 12.00 m.

9.3.3.10.4 On deck, the lower edges of door-openings in the sidewalls of superstructures and the sills of hatches and ventilation openings of premises located under the deck shall have a height of not less than 0.50 m above the deck.

This requirement does not apply to access openings to double-hull spaces and double bottoms.

9.3.3.10.5 The bulwarks, foot-rails, etc. shall be provided with sufficiently large openings which are located directly above the deck.

9.3.3.10.6 Open Type N vessels are only required to meet the requirements of 9.3.3.10.1 if the vessel remains in the immediate vicinity of or within a shoreside assigned zone.

9.3.3.11 ***Hold spaces and cargo tanks***

9.3.3.11.1 (a) The maximum permissible capacity of a cargo tank shall be determined in accordance with the following table:

$L \times B \times H$ (m^3)	Maximum permissible capacity of a cargo tank (m^3)
up to 600	$L \times B \times H \times 0.3$
600 to 3 750	$180 + (L \times B \times H - 600) \times 0.0635$
> 3 750	380

Alternative constructions in accordance with 9.3.4 are permitted.
In the table above $L \times B \times H$ is the product of the main dimensions of the tank vessel in metres (according to the measurement certificate), where:

L = overall length of the hull in m;
B = extreme breadth of the hull in m;
H = shortest vertical distance between the top of the keel and the lowest point of the deck at the side of the vessel (moulded depth) within the cargo area in m;

where:

For trunk vessels, H shall be replaced by H', where H' shall be obtained from the following formula:

$$H' = H + \left(ht \times \frac{bt}{B} \times \frac{lt}{L} \right)$$

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where:

ht = trunk height (distance between trunk deck and main deck measured on trunk side at L/2) in m;
bt = trunk breadth in m;
lt = trunk length in m.

(b) The relative density of the substances to be carried shall be taken into consideration in the design of the cargo tanks. The maximum relative density shall be indicated in the certificate of approval.

(c) When the vessel is provided with pressure tanks, these tanks shall be designed for a working pressure of 400 kPa (4 bar).

(d) For vessels with a length of not more than 50.00 m, the length of a cargo tank shall not exceed 10.00 m; and

For vessels with a length of more than 50.00 m, the length of a cargo tank shall not exceed 0.20 L.

This provision does not apply to vessels with independent built–in cylindrical tanks having a length to diameter ratio ≤ 7.

9.3.3.11.2 (a) The cargo tanks independent of the vessel's hull shall be fixed so that they cannot float.

Refrigerated cargo tank fastenings shall meet the requirements of a recognised classification society.

(b) The capacity of a suction well shall be limited to not more than 0.10 m^3.

(c) (*Reserved*)

(d) Side-struts linking or supporting the load-bearing components of the sides of the vessel with the load-bearing components of the longitudinal walls of cargo tanks and side-struts linking the load-bearing components of the vessel's bottom with the tank-bottom are prohibited.

9.3.3.11.3 (a) The cargo tanks shall be separated by cofferdams of at least 0.60 m in width from the accommodation, engine rooms and service spaces outside the cargo area below deck or, if there are no such accommodation, engine room and service spaces, from the vessel's ends. Where the cargo tanks are installed in a hold space, a space of not less than 0.50 m shall be provided between such tanks and the end bulkheads of the hold space. In this case an end bulkhead of Class "A-60" as defined in SOLAS 74, Chapter II-2, Regulation 3, shall be deemed equivalent to a cofferdam. For pressure cargo tanks, the 0.50 m distance may be reduced to 0.20 m.

(b) Hold spaces, cofferdams and cargo tanks shall be capable of being inspected.

(c) All spaces in the cargo area shall be capable of being ventilated. It has to be possible to check their gas-free condition.

9.3.3.11.4 The bulkheads bounding the cargo tanks, cofferdams and hold spaces shall be watertight. The cargo tanks and the bulkheads bounding the cargo area shall have no openings or penetrations below deck.

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The bulkhead between the engine room and the cofferdam or service space in the cargo area or between the engine room and a hold space may be fitted with penetrations provided that they conform to the provisions of 9.3.3.17.5.

The bulkhead between the cargo tank and the cargo pump-room below deck may be fitted with penetrations provided that they conform to the provisions of 9.3.3.17.6. The bulkheads between the cargo tanks may be fitted with penetrations provided that the loading and unloading piping are fitted with shut-off devices in the cargo tank from which they come. These pipes shall be fitted at least 0.60m above the bottom. The shut-off devices shall be capable of being activated from the deck.

9.3.3.11.5 Double-hull spaces and double bottoms in the cargo area shall be arranged for being filled with ballast water only. Double bottoms may, however, be used as oil fuel tanks, provided they comply with the provisions of 9.3.3.32.

9.3.3.11.6 (a) A cofferdam, the centre part of a cofferdam or another space below deck in the cargo area may be arranged as a service space, provided the bulkheads bounding the service space extend vertically to the bottom. This service space shall only be accessible from the deck.

(b) The service space shall be watertight with the exception of its access hatches and ventilation inlets.

(c) No piping for loading and unloading shall be fitted within the service space referred to under 9.3.3.11.4 above.

Piping for loading and unloading may be fitted in the cargo pump-rooms below deck only when they conform to the provisions of 9.3.3.17.6.

9.3.3.11.7 Where independent cargo tanks are used, or for double-hull construction where the cargo tanks are integrated in the vessel’s structure, the space between the wall of the vessel and wall of the cargo tanks shall be not less than 0.60 m.

The space between the bottom of the vessel and the bottom of the cargo tanks shall be not less than 0.50 m. The space may be reduced to 0.40 m under the pump sumps.

The vertical space between the suction well of a cargo tank and the bottom structures shall be not less than 0.10 m.

When a hull is constructed in the cargo area as a double hull with independent cargo tanks located in hold spaces, the above values are applicable to the double hull. If in this case the minimum values for inspections of independent tanks referred to in 9.3.3.11.9 are not feasible, it must be possible to remove the cargo tanks easily for inspection.

9.3.3.11.8 Where service spaces are located in the cargo area under deck, they shall be arranged so as to be easily accessible and to permit persons wearing protective clothing and breathing apparatus to safely operate the service equipment contained therein. They shall be designed so as to allow injured or unconscious personnel to be removed from such spaces without difficulties, if necessary by means of fixed equipment.

9.3.3.11.9 Cofferdams, double-hull spaces, double bottoms, cargo tanks, hold spaces and other accessible spaces within the cargo area shall be arranged so that they may be completely inspected and cleaned. The dimensions of openings except for those of double-hull spaces and double bottoms which do not have a wall adjoining the cargo tanks shall be sufficient to allow a person wearing breathing apparatus to enter or leave the space without difficulties. These openings shall have a minimum cross-section of 0.36 m^2 and a minimum side length of 0.50 m. They shall be designed so as to allow injured or unconscious personnel to be removed from the bottom of such a space without difficulties, if necessary by means of fixed

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equipment. In these spaces the free penetration width shall not be less than 0.50 m in the sector intended for the penetration. In double bottoms this distance may be reduced to 0.45 m.

Cargo tanks may have circular openings with a diameter of not less than 0.68 m.

9.3.3.11.10 9.3.3.11.6 (c) above does not apply to open type N.

9.3.3.12 ***Ventilation***

9.3.3.12.1 Each hold space shall have two openings the dimensions and location of which shall be such as to permit effective ventilation of any part of the hold space. If there are no such openings, it shall be possible to fill the hold spaces with inert gas or dry air.

9.3.3.12.2 Double-hull spaces and double bottoms within the cargo area which are not arranged for being filled with ballast water, hold spaces and cofferdams shall be provided with ventilation systems.

9.3.3.12.3 (a) A service space located within the cargo area below deck shall be provided with a ventilation system. The capacity of the fans shall be sufficient to ensure 20 complete changes of air per hour based on the volume of the service space.

The ventilation exhaust ducts shall extend down to 50 mm above the bottom of the service space. The air shall be supplied through a duct at the top of the service space.

(b) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the air inlets shall be located not less than 2.00 m above the deck, at a distance of not less than 2.00 m from tank openings and 6.00 m from the outlets of safety valves.

The extension pipes which may be necessary may be of the hinged type.

(c) On board open Type N vessels, other suitable installations without ventilator fans shall be sufficient.

9.3.3.12.4 (a) Ventilation shall be provided for the accommodation, wheelhouse and service spaces.

(b) The ventilation system in such spaces shall meet the following requirements:

(i) The air intakes shall be located as far away as possible, and not less than 6.00 m from the protected area and not less than 2.00 m above the deck;

(ii) Pressure of at least 0.1 kPa (0.001 bar) may be maintained in the premises;

(iii) A breakdown alarm is integrated;

(iv) The ventilation system, including the breakdown alarm, shall be at least of the ‘limited explosion risk’ type;

(v) A gas detection system conforming to conditions 1. to 4. below is connected to the ventilation system:

1. It is appropriate at least for use in zone 1, explosion group IIC and temperature class T6;

2. It is equipped with sensors;

– On the suction inlets of the ventilation systems; and

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– Directly below the top edge of the sill of the entrance doors;

3. Its t90 response time is lower than or equal to 4 s;

4. Measurement shall be continuous;

(vi) In the service spaces, the ventilation system is linked to the emergency lighting, which shall be at least of the 'limited explosion risk' type;

This emergency lighting is not necessary if the lighting installations in the service spaces are of at least the 'limited explosion risk' type;

(vii) The suction of the ventilation system and installations and equipment that do not meet the requirements set out in 9.3.3.51 (a) and (b) and 9.3.3.52.1 must be shut down when a concentration of 20% of LEL of n-Hexane is reached;

The switching-off shall be indicated in the accommodation and wheelhouse by visual and audible signals;

(viii) In the event of failure of the ventilation system or the gas detection installations in the accommodation, installations and equipment in the accommodation that do not meet the requirements set out in 9.3.3.51 (a) and (b) and 9.3.3.52.1 must be stopped;

The failure shall be indicated in the accommodation, the wheelhouse and on the deck by visual and audible signals;

(ix) In the event of failure of the ventilation system or the gas detection installations in the wheelhouse or service spaces, installations and equipment in those spaces that do not meet the requirements set out in 9.3.3.51 (a) and (b) and 9.3.3.52.1 must be shut down;

The failure shall be indicated in the wheelhouse and on the deck by visual and audible signals. The alarm must be relayed to the accommodation automatically if it has not been switched off;

(x) Any switching-off shall take place immediately and automatically and, if necessary, shall activate the emergency lighting;

The automatic switch-off device is set so that no automatic switching-off may occur while the vessel is under way;

(c) If there is no ventilation system or the ventilation system of a space does not comply with all the requirements set out in (b) above, any installations or equipment present in that space that may, if switched on, give rise to surface temperatures higher than those mentioned in 9.3.3.51 (a) and (b) or that do not meet the requirements set out in 9.3.3.52.1 must be capable of being switched off.

9.3.3.12.5 *(Deleted)*

9.3.3.12.6 Notice boards shall be fitted at the ventilation inlets indicating the conditions under which they shall be closed. All ventilation inlets of accommodation, wheelhouse and service spaces leading to the open air outside the cargo area shall be fitted with devices permanently fixed according to 9.3.3.40.2.2 (c), enabling them to be closed rapidly. It shall be clear whether they are open or closed.

Such ventilation inlets shall be located not less than 2.00 m from the cargo area.

Ventilation inlets of service spaces in the cargo area may be located within that area.

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9.3.3.12.7 Open Type N vessels are only required to meet the requirements of 9.3.3.12.4 (b) or (c) if the vessel remains in the immediate vicinity of or within a shoreside assigned zone.

9.3.3.12.8 9.3.3.12.6 and 9.3.3.12.7 above do not apply to open type N.

9.3.3.13 ***Stability (general*)**

9.3.3.13.1 Proof of sufficient stability shall be furnished. This proof is not required for single hull vessels with cargo tanks the width of which is not more than 0.70 B.

9.3.3.13.2 The basic values for the stability calculation – the vessel's lightweight and location of the centre of gravity – shall be determined either by means of an inclining experiment or by detailed mass and moment calculation. In the latter case the lightweight of the vessel shall be checked by means of a lightweight test with a tolerance limit of ± 5% between the mass determined by calculation and the displacement determined by the draught readings.

9.3.3.13.3 Proof of sufficient intact stability shall be furnished for all stages of loading and unloading and for the final loading condition for all the relative densities of the substances transported contained in the vessel substance list according to 1.16.1.2.5.

For every loading operation, taking account of the actual fillings and floating position of cargo tanks, ballast tanks and compartments, drinking water and sewage tanks and tanks containing products for the operation of the vessel, the vessel shall comply with the intact and damage stability requirements.

Intermediate stages during operations shall also be taken into consideration.

The proof of sufficient stability shall be shown for every operating, loading and ballast condition in the stability booklet, to be approved by the recognized classification society, which classes the vessel. If it is unpractical to pre-calculate the operating, loading and ballast conditions, a loading instrument approved by the recognised classification society which classes the vessel shall be installed and used which contains the contents of the stability booklet.

NOTE: *A stability booklet shall be worded in a form comprehensible for the responsible master and containing the following details:*

General description of the vessel:

– *General arrangement and capacity plans indicating the assigned use of compartments and spaces (cargo tanks, stores, accommodation, etc.);*

– *A sketch indicating the position of the draught marks referring to the vessel's perpendiculars;*

– *A scheme for ballast/bilge pumping and overflow prevention systems;*

– *Hydrostatic curves or tables corresponding to the design trim, and, if significant trim angles are foreseen during the normal operation of the vessel, curves or tables corresponding to such range of trim are to be introduced;*

– *Cross curves or tables of stability calculated on a free trimming basis, for the ranges of displacement and trim anticipated in normal operating conditions, with an indication of the volumes which have been considered buoyant;*

– *Tank sounding tables or curves showing capacities, centres of gravity, and free surface data for all cargo tanks, ballast tanks and compartments, drinking water and sewage water tanks and tanks containing products for the operation of the vessel;*

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– *Lightship data (weight and centre of gravity) resulting from an inclining test or deadweight measurement in combination with a detailed mass balance or other acceptable measures. Where the above–mentioned information is derived from a sister vessel, the reference to this sister vessel shall be clearly indicated, and a copy of the approved inclining test report relevant to this sister vessel shall be included;*

– *A copy of the approved test report shall be included in the stability booklet;*

– *Operating loading conditions with all relevant details, such as:*

  – *Lightship data, tank fillings, stores, crew and other relevant items on board (mass and centre of gravity for each item, free surface moments for liquid loads);*

  – *Draughts amidships and at perpendiculars;*

  – *Metacentric height corrected for free surfaces effect;*

  – *Righting lever values and curve;*

  – *Longitudinal bending moments and shear forces at read–out points;*

  – *Information about openings (location, type of tightness, means of closure); and*

  – *Information for the master;*

– *Calculation of the influence of ballast water on stability with information on whether fixed level gauges for ballast tanks and compartments have to be installed or whether the ballast tanks or compartments shall only be completely full or completely empty when underway.*

9.3.3.13.4 Floatability after damage shall be proved for the most unfavourable loading condition. For this purpose, calculated proof of sufficient stability shall be established for critical intermediate stages of flooding and for the final stage of flooding.

9.3.3.14 ***Stability (intact)***

9.3.3.14.1 For vessels with independent cargo tanks and for double-hull constructions with cargo tanks integrated in the frames of the vessel, the requirements for intact stability resulting from the damage stability calculation shall be fully complied with.

9.3.3.14.2 For vessels with cargo tanks of more than 0.70 B in width, proof shall be furnished that the following stability requirements have been complied with:

(a) In the positive area of the righting lever curve up to immersion of the first non-watertight opening there shall be a righting lever (GZ) of not less than 0.10 m;

(b) The surface of the positive area of the righting lever curve up to immersion of the first non-watertight opening and in any event up to an angle of heel $\leq 27°$ shall not be less than 0.024 m.rad;

(c) The metacentric height (GM) shall be not less than 0.10 m.

These conditions shall be met bearing in mind the influence of all free surfaces in tanks for all stages of loading and unloading.

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9.3.3.15 ***Stability (damaged condition)***

9.3.3.15.1 For vessels with independent cargo tanks and for double-hull vessels with cargo tanks integrated in the construction of the vessel, the following assumptions shall be taken into consideration for the damaged condition:

(a) The extent of side damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	0.59 m inboard from the vessel's side at right angles to the centreline at the level corresponding to the maximum draught, or when applicable, the distance allowed by section 9.3.4, reduced by 0.01 m;
vertical extent:	from the base line upwards without limit.

(b) The extent of bottom damage is as follows:

longitudinal extent:	at least 0.10 L, but not less than 5.00 m;
transverse extent:	3.00 m;
vertical extent:	from the base 0.49 m upwards, the sump excepted.

(c) Any bulkheads within the damaged area shall be assumed damaged, which means that the location of bulkheads shall be chosen so as to ensure that the vessel remains afloat after the flooding of two or more adjacent compartments in the longitudinal direction.

The following provisions are applicable:

– For bottom damage, adjacent athwartship compartments shall also be assumed as flooded;

– The lower edge of any non-watertight openings (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.10 m above the damage waterline;

– In general, permeability shall be assumed to be 95%. Where an average permeability of less than 95% is calculated for any compartment, this calculated value obtained may be used.

However, the following minimum values shall be used:

– engine rooms:	85%;
– accommodation:	95%;
– double bottoms, oil fuel tanks, ballast tanks, etc., depending on whether, according to their function, they have to be assumed as full or empty for the vessel floating at the maximum permissible draught:	0% or 95%.

For the main engine room only the one–compartment standard need be taken into account, i.e. the end bulkheads of the engine room shall be assumed as not damaged.

9.3.3.15.2 For the intermediate stage of flooding the following criteria have to be fulfilled:

$GZ \geq 0.03$m

Range of positive GZ: 5°.

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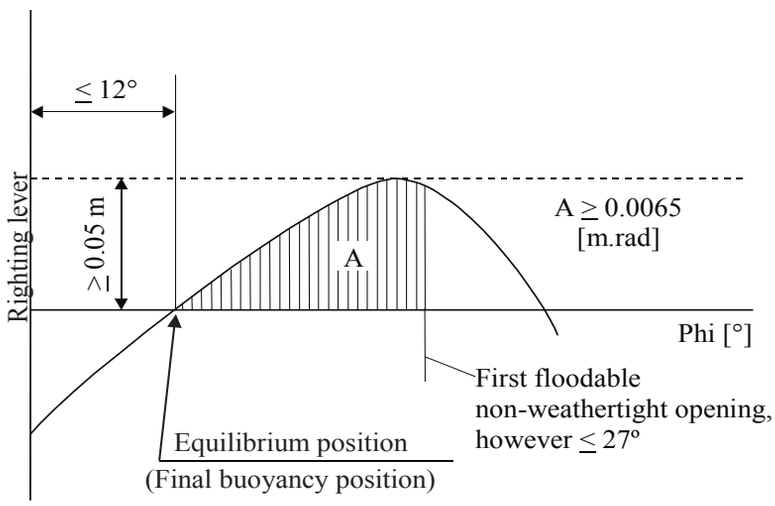
At the stage of equilibrium (final stage of flooding), the angle of heel shall not exceed 12°. Non-watertight openings shall not be flooded before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of the stability calculation.

The positive range of the righting lever curve beyond the stage of equilibrium shall have a righting lever of ≥ 0.05 m in association with an area under the curve of ≥ 0.0065 m.rad. The minimum values of stability shall be satisfied up to immersion of the first non-watertight opening and in any event up to an angle of heel ≤ 27°. If non-watertight openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purposes of stability calculation.



9.3.3.15.3 If openings through which undamaged compartments may additionally become flooded are capable of being closed watertight, the closing appliances shall be marked accordingly.

9.3.3.15.4 Where cross- or down-flooding openings are provided for reduction of unsymmetrical flooding, the time for equalization shall not exceed 15 minutes, if during the intermediate stages of flooding sufficient stability has been proved.

9.3.3.16 ***Engine rooms***

9.3.3.16.1 Internal combustion engines for the vessel's propulsion as well as internal combustion engines for auxiliary machinery shall be located outside the cargo area. Entrances and other openings of engine rooms shall be at a distance of not less than 2.00 m from the cargo area.

9.3.3.16.2 The engine rooms shall be accessible from the deck; the entrances shall not face the cargo area. Where the doors are not located in a recess whose depth is at least equal to the door width, the hinges shall face the cargo area.

9.3.3.16.3 The last sentence of 9.3.3.16.2 does not apply to oil separator or supply vessels.

9.3.3.17 ***Accommodation and service spaces***

9.3.3.17.1 Accommodation spaces and the wheelhouse shall be located outside the cargo area forward of the fore vertical plane or abaft the aft vertical plane bounding the part of the cargo area below deck. Windows of the wheelhouse which are located not less than 1.00 m above the bottom of the wheelhouse may tilt forward.

9.3.3.17.2 Entrances to spaces and openings of superstructures shall not face the cargo area. Doors opening outward and not located in a recess whose depth is at least equal to the width of the doors shall have their hinges face the cargo area.

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9.3.3.17.3 Entrances from the deck and openings of spaces facing the weather shall be capable of being closed. The following instruction shall be displayed at the entrance of such spaces:

Do not open during loading, unloading and degassing
without the permission of the master.
Close immediately.

9.3.3.17.4 Entrances and windows of superstructures and accommodation spaces which can be opened as well as other openings of these spaces shall be located not less than 2.00 m from the cargo area. No wheelhouse doors and windows shall be located within 2.00 m from the cargo area, except where there is no direct connection between the wheelhouse and the accommodation.

9.3.3.17.5 (a) Driving shafts of the bilge or ballast pumps may penetrate through the bulkhead between the service space and the engine room, provided the arrangement of the service space is in compliance with 9.3.3.11.6.

(b) The penetration of the shaft through the bulkhead shall be gastight and shall have been approved by a recognised classification society.

(c) The necessary operating instructions shall be displayed.

(d) Penetrations through the bulkhead between the engine room and the service space in the cargo area and the bulkhead between the engine room and the hold spaces may be provided for electrical cables, hydraulic lines and piping for measuring, control and alarm systems, provided that the penetrations have been approved by a recognised classification society. The penetrations shall be gastight. Penetrations through a bulkhead with an “A-60” fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3, shall have an equivalent fire protection.

(e) Pipes may penetrate the bulkhead between the engine room and the service space in the cargo area provided that these are pipes between the mechanical equipment in the engine room and the service space which do not have any openings within the service space and which are provided with shut-off devices at the bulkhead in the engine room.

(f) Notwithstanding 9.3.3.11.4, pipes from the engine room may pass through the service space in the cargo area or a cofferdam or a hold space or a double-hull space to the outside provided that within the service space or cofferdam or hold space or double-hull space they are of the thick-walled type and have no flanges or openings.

(g) Where a driving shaft of auxiliary machinery penetrates through a wall located above the deck the penetration shall be gastight.

9.3.3.17.6 A service space located within the cargo area below deck shall not be used as a cargo pump-room for the loading and unloading system, except where:

– The cargo pump-room is separated from the engine room or from service spaces outside the cargo area by a cofferdam or a bulkhead with an insulation of Class "A-60" as defined in SOLAS 74, Chapter II-2, Regulation 3, or by a service space or a hold space;

– The "A-60" bulkhead required above does not include penetrations referred to in 9.3.3.17.5 (a);

– Ventilation exhaust outlets are located not less than 6.00 m from entrances and openings of the accommodation, wheelhouse and service spaces outside the cargo area;

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– The access hatches and ventilation inlets can be closed from the outside;

– All piping for loading and unloading as well as that of stripping systems is provided with shut-off devices at the pump suction side in the cargo pump-room immediately at the bulkhead. The necessary operation of the control devices in the pump-room, starting of pumps and control of the liquid flow rate shall be effected from the deck;

– The bilge of the cargo pump-room is equipped with a gauging device for measuring the filling level which activates a visual and audible alarm in the wheelhouse when liquid is accumulating in the cargo pump-room bilge;

– The cargo pump room is provided with a permanent oxygen detection system which automatically indicates the amount of oxygen and which actuates a visual and audible alarm when the oxygen concentration has reached 19.5% by volume. The sensors of this system shall be placed at suitable positions at the bottom and at a height of 2.00 m. Measurement shall be continuous and displayed near to the entrance. Audible and visual alarms shall be installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system shall be shut down;

– Failure of the oxygen measuring system shall activate a visual and audible alarm in the wheelhouse and on deck. The alarm must be relayed to the accommodation automatically if it has not been switched off;

– The ventilation system prescribed in 9.3.3.12.3 has a capacity sufficient to ensure not less than 30 changes of air per hour based on the total volume of the service space.

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the cargo pump room shall also be provided with a permanent gas detection system which automatically indicates the presence of flammable gases and actuates a visual and audible alarm when the gas concentration has reached 20% of the LEL of the cargo or 20% of the LEL of n-Hexane, whichever gives the more critical value.

The sensors of this gas detection system shall be placed at suitable positions at the bottom and directly below the deck. Measurement shall be continuous and displayed near to the entrance.

Audible and visual alarms shall be installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system shall be shut down.

Any failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by a visual and audible warning. The alarm must be relayed to the accommodation automatically if it has not been switched off.

9.3.3.17.7 The following instruction shall be displayed at the entrance of the cargo pump-room:

Before entering the cargo pump-room check whether
it is free from gases and contains sufficient oxygen.
Do not open doors and entrance openings without
the permission of the master.
Leave immediately in the event of alarm.

9.3.3.17.8 9.3.3.17.5 (g), 9.3.3.17.6 except for the permanent oxygen measuring system and 9.3.3.17.7 do not apply to open type N.

9.3.3.17.2, last sentence, 9.3.3.17.3, last sentence and 9.3.3.17.4 do not apply to oil separator and supply vessels.

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9.3.3.18 ***Inerting facility***

In cases in which inerting or blanketing of the cargo is prescribed, the vessel shall be equipped with an inerting system.

This system shall be capable of maintaining a permanent minimum pressure of 7 kPa (0.07 bar) in the spaces to be inerted. In addition, the inerting system shall not increase the pressure in the cargo tank to a pressure greater than that at which the pressure valve is regulated. The set pressure of the vacuum-relief valve shall be 3.5 kPa (0.035 bar).

A sufficient quantity of inert gas for loading or unloading shall be carried or produced on board if it is not possible to obtain it on shore. In addition, a sufficient quantity of inert gas to offset normal losses occurring during carriage shall be on board.

The premises to be inerted shall be equipped with connections for introducing the inert gas and monitoring systems so as to ensure the correct atmosphere on a permanent basis.

When the pressure or the concentration of inert gas in the gaseous phase falls below a given value, this monitoring system shall activate an audible and visible alarm in the wheelhouse. When the wheelhouse is unoccupied, the alarm shall also be perceptible in a location occupied by a crew member.

9.3.3.19 (*Reserved*)

9.3.3.20 ***Arrangement of cofferdams***

9.3.3.20.1 Cofferdams or cofferdam compartments remaining once a service space has been arranged in accordance with 9.3.3.11.6 shall be accessible through an access hatch.

9.3.3.20.2 Cofferdams shall be capable of being filled with water and emptied by means of a pump. Filling shall be effected within 30 minutes. These requirements are not applicable when the bulkhead between the engine room and the cofferdam has an “A-16” fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3.

The cofferdams shall not be fitted with inlet valves.

9.3.3.20.3 No fixed pipe shall permit connection between a cofferdam and other piping of the vessel outside the cargo area.

9.3.3.20.4 If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2 then the ventilation openings of cofferdams shall be fitted with a flame arrester capable of withstanding a deflagration. The flame arresters shall be chosen according to the explosion groups/subgroups of the substances foreseen for inclusion in the list of substances on the vessel (see column (16) of Table C of Chapter 3.2).

9.3.3.20.5 9.3.3.20.2 above does not apply to oil separator and supply vessels.

9.3.3.21 ***Safety and control installations***

9.3.3.21.1 Cargo tanks shall be provided with the following equipment:

(a) a mark inside the tank indicating the liquid level of 97%;

(b) a level gauge;

(c) a level alarm device which is activated at the latest when a degree of filling of 90% is reached;

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(d) a high level sensor for actuating the facility against overflowing when a degree of filling of 97.5% is reached;

(e) an instrument for measuring the pressure of the vapour phase inside the cargo tank;

(f) an instrument for measuring the temperature of the cargo, if in column (9) of Table C of Chapter 3.2, a cargo heating installation or a possibility of heating the cargo is required on board, or if a maximum temperature is indicated in column (20) of Table C of Chapter 3.2;

(g) A connection for a closed-type or partly closed-type sampling device, and/or at least one sampling opening as required in column (13) of Table C of Chapter 3.2;

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the flame arrester plate stack capable of withstanding steady burning of the sampling opening shall be selected according to the explosion groups/subgroups of the substances foreseen for inclusion in the list of substances on the vessel (see column (16) of Table C of Chapter 3.2).

9.3.3.21.2 When the degree of filling in per cent is determined, an error of not more than 0.5% is permitted. It shall be calculated on the basis of the total cargo tank capacity including the expansion trunk.

9.3.3.21.3 The level gauge shall allow readings from the control position of the shut-off devices of the particular cargo tank. The permissible maximum filling levels of 95% and 97%, as given in the list of substances, shall be marked on each level gauge.

Permanent reading of the overpressure and vacuum shall be possible from a location from which loading or unloading operations may be interrupted. The permissible maximum overpressure and vacuum shall be marked on each level gauge.

Readings shall be possible in all weather conditions.

9.3.3.21.4 The level alarm device shall give a visual and audible warning on board when actuated. The level alarm device shall be independent of the level gauge.

9.3.3.21.5 (a) The high level sensor referred to in 9.3.3.21.1 (d) above shall give a visual and audible alarm on board and at the same time actuate an electrical contact which in the form of a binary signal interrupts the electric current loop provided and fed by the shore facility, thus initiating measures at the shore facility against overflowing during loading operations. The signal shall be transmitted to the shore facility via a watertight two–pin plug of a connector device in accordance with standard EN 60309-2:1999 + A1:2007 + A2:2012 for direct current of 40 to 50 volts, identification colour white, position of the nose 10 h.

The plug shall be permanently fitted to the vessel close to the shore connections of the loading and unloading piping.

The high level sensor shall also be capable of switching off the vessel's own discharging pump.

The high level sensor shall be independent of the level alarm device, but it may be connected to the level gauge.

(b) On board oil separator vessels the sensor referred to in 9.3.3.21.1 (d) shall activate a visual and audible alarm and switch off the pump used to evacuate bilge water.

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(c) Supply vessels and other vessels which may be delivering products required for operation shall be equipped with a transshipment facility compatible with European standard EN 12827:1999 and a rapid closing device enabling refuelling to be interrupted. It shall be possible to actuate this rapid closing device by means of an electrical signal from the overflow prevention system. The electrical circuits actuating the rapid closing device shall be secured according to the quiescent current principle or other appropriate error detection measures. The state of operation of electrical circuits which cannot be controlled using the quiescent current principle shall be capable of being easily checked.

It shall be possible to actuate the rapid closing device independently of the electrical signal.

The rapid closing device shall actuate a visual and an audible alarm on board.

(d) During discharging by means of the on-board pump, it shall be possible for the shore facility to switch it off. For this purpose, an independent intrinsically safe power line, fed by the vessel, shall be switched off by the shore facility by means of an electrical contact.

It shall be possible for the binary signal of the shore facility to be transmitted via a watertight two–pole socket or a connector device in accordance with standard EN 60309-2:1999 + A1:2007 + A2:2012, for direct current of 40 to 50 volts, identification colour white, position of the nose 10 h.

This socket shall be permanently fitted to the vessel close to the shore connections of the unloading piping.

9.3.3.21.6 The visual and audible signals given by the level alarm device shall be clearly distinguishable from those of the high level sensor.

The visual alarm shall be visible at each control position on deck of the cargo tank stop valves. It shall be possible to easily check the functioning of the sensors and electric circuits or these shall be intrinsically safe apparatus.

9.3.3.21.7 When the pressure or temperature exceeds a set value, instruments for measuring the vacuum or overpressure of the gaseous phase in the cargo tank or the temperature of the cargo shall activate a visual and audible alarm in the wheelhouse and on deck. The alarm must be relayed to the accommodation automatically if it has not been switched off.

When the pressure exceeds the set value during loading and unloading, the instrument for measuring the pressure shall, by means of the plug referred to in 9.3.3.21.5 above, immediately initiate an electrical contact which shall put into effect measures to interrupt the loading or unloading operation. When the vessel's own discharge pump is used, it shall be switched off automatically.

The instrument for measuring the overpressure or vacuum shall activate the alarm at latest when:

(a) An overpressure equal to 1.15 times the opening pressure of the pressure relief valves/high velocity vent valves is reached; or

(b) The lower threshold of the design pressure of the vacuum valves, but not exceeding a vacuum of 5 kPa (0.05 bar), is reached.

The maximum permissible temperature is indicated in column (20) of Table C of Chapter 3.2. The sensors for the alarms mentioned in this paragraph may be connected to the alarm device of the sensor.

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When it is prescribed in column (20) of Table C of Chapter 3.2, the instrument for measuring the overpressure of the gaseous phase in the cargo tank shall actuate a visible and audible alarm in the wheelhouse when the overpressure exceeds 40 kPa (0.4 bar) during the voyage. The alarm must be relayed to the accommodation automatically if it has not been switched off. It shall be possible to read the gauges in direct proximity to the control for the water spray system.

9.3.3.21.8 Where the control elements of the shut-off devices of the cargo tanks are located in a control room, it shall be possible to stop the loading pumps and read the level gauges in the control room, and the visual and audible warning given by the level alarm device, the high level sensor referred to in 9.3.3.21.1 (d) and the instruments for measuring the pressure and temperature of the cargo shall be noticeable in the control room and on deck.

Satisfactory monitoring of the cargo area shall be ensured from the control room.

9.3.3.21.9 9.3.3.21.1 (e), 9.3.3.21.7 as regards measuring the pressure, do not apply to open type N with flame-arrester and to open type N.

9.3.3.21.1 (b), (c) and (g), 9.3.3.21.3 and 9.3.3.21.4 do not apply to oil separator and supply vessels.

A flame arrester plate stack in sampling openings is not required on board open type N tank vessels.

9.3.3.21.1 (f) and 9.3.3.21.7 do not apply to supply vessels.

9.3.3.21.5 (a) does not apply to oil separator vessels.

9.3.3.21.10 When refrigerated substances are carried the opening pressure of the safety system shall be determined by the design of the cargo tanks. In the event of the transport of substances that must be carried in a refrigerated state the opening pressure of the safety system shall be not less than 25 kPa (0.25 bar) greater than the maximum pressure calculated according to 9.3.3.27.

9.3.3.22 ***Cargo tank openings***

9.3.3.22.1 (a) Cargo tank openings shall be located on deck in the cargo area.

(b) Cargo tank openings with a cross-section of more than 0.10 m^2 and openings of safety devices for preventing overpressures shall be located not less than 0.50 m above deck.

9.3.3.22.2 Cargo tank openings shall be fitted with gastight closures capable of withstanding the test pressure in accordance with 9.3.3.23.2.

9.3.3.22.3 Closures which are normally used during loading or unloading operations shall not cause sparking when operated.

9.3.3.22.4 Each cargo tank or group of cargo tanks connected to a common venting piping shall be fitted with:

Open Type N:

– Devices to prevent unacceptable overpressures or vacuums and constructed so as to prevent any accumulation of water and penetration of water into the cargo tank.

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Open Type N with flame arresters:

– Devices to prevent unacceptable overpressures or vacuums, equipped with flame arresters capable of withstanding steady burning and constructed so as to prevent any accumulation of water and penetration of water into the cargo tank.

Closed Type N:

(a) A connection for the safe return ashore of gases expelled during loading;

(b) A safe depressurization device for the cargo tanks, on which the position of the shut-off valve indicates clearly whether it is open or shut;

(c) Safety valves for preventing unacceptable overpressures or vacuums;

The opening pressure of the safety valves shall be marked indelibly on the valves;

(d) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then:

– At the connection to each cargo tank, the venting piping shall be equipped with a flame arrester capable of withstanding a detonation;

– The vacuum valve and the safe depressurization device for cargo tanks shall be deflagration safe. The deflagration safety may also be ensured by a flame arrester; and

– The pressure relief device shall be designed as a high velocity vent valve, with the gases discharged upwards;

The setting of the pressure relief valves shall be such that during the transport operation they do not blow off until the maximum permissible working pressure of the cargo tanks is reached;

The autonomous protection systems shall be chosen according to the explosion groups/subgroups of the substances listed in the list of substances on the vessel (see column (16) of Table C of Chapter 3.2);

If the high velocity vent valve, the vacuum valve, the flame arresters and the venting piping are required to be heatable for carriage, the safety devices concerned shall be suitable for the relevant temperature;

The opening pressure of the pressure relief valves, the vacuum valve and the high velocity vent valves shall be marked indelibly on the valves;

If a shut-off device is to be mounted between the venting piping and the cargo tank, it shall be placed between the cargo tank and the flame arrester, and each cargo tank shall be equipped with its own safety valves;

(e) The outlets of the pressure relief devices/high velocity vent valves shall be located not less than 2.00 m above the deck and at a distance of not less than 6.00 m from the openings of the accommodations, the wheelhouse and the service spaces outside the cargo area. This height may be reduced to 1.00 m when there is no equipment and no work is being carried out within a radius of 1.00 m around the pressure relief valve outlet. This area shall be marked as a danger zone.

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9.3.3.22.5 ***Venting piping***

(a) When two or more cargo tanks are connected to common venting piping, it is sufficient that the equipment according to 9.3.3.22.4 (safety valves to prevent unacceptable overpressures and vacuums, high velocity vent valve, vacuum valve protected against deflagrations, safe pressure relief device for cargo tanks protected against deflagrations) is installed on the joint venting piping (see also 7.2.4.16.7);

(b) When each cargo tank is connected to its own venting piping, each cargo tank or the associated venting piping shall be equipped according to 9.3.3.22.4.

9.3.3.22.6 9.3.3.22.2 and 9.3.3.22.5 do not apply to open type N with flame-arrester and to open type N.

9.3.3.22.3 does not apply to open type N.

9.3.3.23 ***Pressure tests***

9.3.3.23.1 The cargo tanks, residual cargo tanks, cofferdams, piping for loading and unloading, with the exception of discharge hoses shall be subjected to initial tests before being put into service and thereafter at prescribed intervals.

Where a heating system is provided inside the cargo tanks, the heating coils shall be subjected to initial tests before being put into service and thereafter at prescribed intervals.

9.3.3.23.2 The test pressure for the cargo tanks and residual cargo tanks shall be not less than 1.3 times the design pressure. The test pressure for the cofferdams and open cargo tanks shall be not less than 10 kPa (0.10 bar) gauge pressure.

9.3.3.23.3 The test pressure for piping for loading and unloading shall be not less than 1,000 kPa (10 bar) gauge pressure.

9.3.3.23.4 The maximum intervals for the periodic tests shall be 11 years.

9.3.3.23.5 The procedure for pressure tests shall comply with the provisions established by the competent authority or a recognised classification society.

9.3.3.24 ***Regulation of cargo pressure and temperature***

9.3.3.24.1 Unless the entire cargo system is designed to resist the full effective vapour pressure of the cargo at the upper limits of the ambient design temperatures, the pressure of the tanks shall be kept below the permissible maximum set pressure of the safety valves, by one or more of the following means:

(a) a system for the regulation of cargo tank pressure using mechanical refrigeration;

(b) a system ensuring safety in the event of the heating or increase in pressure of the cargo. The insulation or the design pressure of the cargo tank, or the combination of these two elements, shall be such as to leave an adequate margin for the operating period and the temperatures expected; in each case the system shall be deemed acceptable by a recognised classification society and shall ensure safety for a minimum time of three times the operation period;

(c) other systems deemed acceptable by a recognised classification society.

9.3.3.24.2 The systems prescribed in 9.3.3.24.1 shall be constructed, installed and tested to the satisfaction of the recognised classification society. The materials used in their construction shall be compatible with the cargoes to be carried. For normal service, the upper ambient design temperature limits shall be:

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air: +30° C;
water: +20° C.

9.3.3.24.3 The cargo storage system shall be capable of resisting the full vapour pressure of the cargo at the upper limits of the ambient design temperatures, whatever the system adopted to deal with the boil-off gas. This requirement is indicated by remark 37 in column (20) of Table C of Chapter 3.2.

9.3.3.25 ***Pumps and piping***

9.3.3.25.1 (a) Pumps and accessory loading and unloading piping shall be located in the cargo area;

(b) Cargo pumps shall be capable of being shut down from the cargo area and from a position outside the cargo area;

(c) Cargo pumps situated on deck shall be located not less than 6.00 m from entrances to, or openings of, the accommodation and service spaces outside the cargo area.

9.3.3.25.2 (a) Piping for loading and unloading shall be independent of any other piping of the vessel. No cargo piping shall be located below deck, except those inside the cargo tanks and inside the cargo pump-room;

(b) The piping for loading and unloading shall be arranged so that, after loading or unloading operations, the liquid remaining in these pipes may be safely removed and may flow either into the vessel's cargo tanks or the tanks ashore;

(c) Piping for loading and unloading shall be clearly distinguishable from other piping, e.g. by means of colour marking;

(d) (*Reserved*)

(e) The shore connections shall be located not less than 6.00 m from the entrances to, or openings of, the accommodation and service spaces outside the cargo area;

(f) Each shore connection of the venting piping and shore connections of the piping for loading and unloading, through which the loading or unloading operation is carried out, shall be fitted with a shut-off device. However, each shore connection shall be fitted with a blind flange when it is not in operation;

(g) (*Deleted*)

(h) Piping for loading and unloading, and venting piping, shall not have flexible connections fitted with sliding seals.

9.3.3.25.3 *(Deleted)*

9.3.3.25.4 (a) Every component of the piping for loading and unloading shall be electrically connected to the hull;

(b) The piping for loading shall extend down to the bottom of the cargo tanks.

9.3.3.25.5 The stop valves or other shut-off devices of the piping for loading and unloading shall indicate whether they are open or shut.

9.3.3.25.6 The piping for loading and unloading shall have, at the test pressure, the required elasticity, leakproofness and resistance to pressure.

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9.3.3.25.7 The piping for loading and unloading shall be fitted with pressure gauges at the outlet of the pumps. The permissible maximum overpressure or vacuum value shall be indicated on each measuring device. Readings shall be possible in all weather conditions.

9.3.3.25.8 (a) When piping for loading and unloading are used for supplying the cargo tanks with washing or ballast water, the suctions of these pipes shall be located within the cargo area but outside the cargo tanks;

Pumps for tank washing systems with associated connections may be located outside the cargo area, provided the discharge side of the system is arranged in such a way that suction is not possible through that part;

A spring-loaded non-return valve shall be provided to prevent any gases from being expelled from the cargo area through the tank washing system.

(b) A non-return valve shall be fitted at the junction between the water suction pipe and the cargo loading pipe.

9.3.3.25.9 The permissible loading and unloading flows shall be calculated.

Calculations concerning the permissible maximum loading and unloading flows for each cargo tank or each group of cargo tanks, taking into account the design of the ventilation system. These calculations shall take into consideration the fact that in the event of an unforeseen cut–off of the vapour return piping of the shore facility, the safety devices of the cargo tanks will prevent pressure in the cargo tanks from exceeding the following values:

over–pressure: 1.15 times the opening pressure of the pressure relief valve/high velocity vent valve;

vacuum pressure: not more than the design pressure, but not exceeding a vacuum of 5 kPa (0.05 bar).

The main factors to be considered are the following:

1. Dimensions of the ventilation system of the cargo tanks;

2. Gas formation during loading: multiply the largest loading flow by a factor of not less than 1.25;

3. Density of the vapour mixture of the cargo based on 50% volume vapour of 50% volume air;

4. Loss of pressure through ventilation pipes, valves and fittings. Account will be taken of a 30% clogging of the mesh of the flame-arresters;

5. Chocking pressure of the safety valves.

Instructions concerning the permissible maximum loading and unloading flows for each cargo tank or for each group of cargo tanks shall be carried on board.

9.3.3.25.10 Compressed air generated outside the cargo area can be used in the cargo area subject to the installation of a spring-loaded non-return valve to ensure that no gases can escape from the cargo area through the compressed air system into accommodation, wheelhouse or service spaces outside the cargo area.

9.3.3.25.11 If the vessel is carrying several dangerous substances liable to react dangerously with each other, a separate pump with its own piping for loading and unloading shall be installed for

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each substance. The piping shall not pass through a cargo tank containing dangerous substances with which the substance in question is liable to react.

9.3.3.25.12 9.3.3.25.1 (a) and (c), 9.3.3.25.2 (a), last sentence and (e) and 9.3.3.25.4 (a) do not apply to type N open unless the substance carried has corrosive properties (see column (5) of Table C of Chapter 3.2, hazard 8).

9.3.3.25.4 (b) does not apply to open type N.

9.3.3.25.2 (f), last sentence, 9.3.3.25.2 (g), 9.3.3.25.8 (a), last sentence and 9.3.3.25.10 do not apply to oil separator and supply vessels.

9.3.3.25.9 does not apply to oil separator vessels.

9.3.3.25.2 (h) does not apply to supply vessels.

9.3.3.26 ***Residual cargo tanks and receptacles for residual products***

9.3.3.26.1 When vessels are provided with tanks for residual products or receptacles for residual products, they shall be located in the cargo area and comply with the provisions of 9.3.3.26.2 and 9.3.3.26.3. Receptacles for residual products shall be located only in the cargo area on deck and not less than a quarter of the vessel's breadth from the outer shell.

9.3.3.26.2 Tanks for residual products shall be equipped with:

In the case of an open system:

– An ullage opening;

– Connections, with stop valves, for pipes and hose assemblies;

– A device for ensuring pressure equilibrium.

In the case of an open system with flame arrester:

– An ullage opening;

– Connections, with stop valves, for pipes and hose assemblies;

– A device for ensuring pressure equilibrium, fitted with a flame arrester capable of withstanding steady burning.

In the case of a closed system:

(a) A level indicator;

– Connections, with stop valves, for pipes and hose assemblies;

– A vacuum valve and a pressure relief valve;

The pressure relief valve shall be sized so that, during the transport operation, it does not open when in normal operation. This condition is met when the opening pressure of the valve meets the conditions required in column (10) of Table C of Chapter 3.2 for the substance to be carried;

(b) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the pressure relief valve shall be a high velocity vent

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valve and the vacuum valve shall be deflagration safe. The deflagration safety may also be ensured by a flame arrester;

The high velocity vent valve and the deflagration safe vacuum valve shall be chosen according to the explosion groups/subgroups of the substances listed in the list of substances on the vessel (see column (16) of Table C of Chapter 3.2).

The maximum permissible capacity is 30 m^3.

9.3.3.26.3 The receptacles for residual products shall be equipped with:

– A possibility of indicating the degree of filling;

– Connections, with stop valves, for pipes and hose assemblies;

A connection enabling gases released during filling to be evacuated safely.

9.3.2.26.4 *(Deleted)*

9.3.3.26.5 9.3.3.26.1, 9.3.3.26.2 (final sentence) and 9.3.3.26.3 do not apply to oil separator vessels.

9.3.3.27 ***Refrigeration system***

9.3.3.27.1 The refrigeration system referred to in 9.3.3.24.1 (a) shall be composed of one or more units capable of keeping the pressure and temperature of the cargo at the upper limits of the ambient design temperatures at the prescribed level. Unless another means of regulating cargo pressure and temperature deemed satisfactory by a recognised classification society is provided, provision shall be made for one or more stand-by units with an output at least equal to that of the largest prescribed unit. A stand-by unit shall include a compressor, its engine, its control system and all necessary accessories to enable it to operate independently of the units normally used. Provision shall be made for a stand-by heat-exchanger unless the system's normal heat-exchanger has a surplus capacity equal to at least 25% of the largest prescribed capacity. It is not necessary to make provision for separate piping.

Cargo tanks, piping and accessories shall be insulated so that, in the event of a failure of all cargo refrigeration systems, the entire cargo remains for at least 52 hours in a condition not causing the safety valves to open.

9.3.3.27.2 The security devices and the connecting lines from the refrigeration system shall be connected to the cargo tanks above the liquid phase of the cargo when the tanks are filled to their maximum permissible degree of filling. They shall remain within the gaseous phase, even if the vessel has a list up to 12 degrees.

9.3.3.27.3 When several refrigerated cargoes with a potentially dangerous chemical reaction are carried simultaneously, particular care shall be given to the refrigeration systems so as to prevent any mixing of the cargoes. For the carriage of such cargoes, separate refrigeration systems, each including the full stand-by unit referred to in 9.3.3.27.1, shall be provided for each cargo. When, however, refrigeration is ensured by an indirect or combined system and no leak in the heat exchangers can under any foreseeable circumstances lead to the mixing of cargoes, no provision need be made for separate refrigeration units for the different cargoes.

9.3.3.27.4 When several refrigerated cargoes are not soluble in each other under conditions of carriage such that their vapour pressures are added together in the event of mixing, particular care shall be given to the refrigeration systems to prevent any mixing of the cargoes.

9.3.3.27.5 When the refrigeration systems require water for cooling, a sufficient quantity shall be supplied by a pump or pumps used exclusively for the purpose. This pump or pumps shall have at least two suction pipes, leading from two water intakes, one to port, the other to

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starboard. Provision shall be made for a stand-by pump with a satisfactory flow; this may be a pump used for other purposes provided that its use for supplying water for cooling does not impair any other essential service.

9.3.3.27.6 The refrigeration system may take one of the following forms:

(a) Direct system: the cargo vapours are compressed, condensed and returned to the cargo tanks. This system shall not be used for certain cargoes specified in Table C of Chapter 3.2. This requirement is indicated by remark 35 in column (20) of Table C of Chapter 3.2;

(b) Indirect system: the cargo or the cargo vapours are cooled or condensed by means of a coolant without being compressed;

(c) Combined system: the cargo vapours are compressed and condensed in a cargo/coolant heat-exchanger and returned to the cargo tanks. This system shall not be used for certain cargoes specified in Table C of Chapter 3.2. This requirement is indicated by remark 36 in column (20) of Table C of Chapter 3.2.

9.3.3.27.7 All primary and secondary coolant fluids shall be compatible with each other and with the cargo with which they may come into contact. Heat exchange may take place either at a distance from the cargo tank, or by using cooling coils attached to the inside or the outside of the cargo tank.

9.3.3.27.8 When the refrigeration system is installed in a separate service space, this service space shall meet the requirements of 9.3.3.17.6.

9.3.3.27.9 For all cargo systems, the heat transmission coefficient as used for the determination of the holding time (7.2.4.16.16 and 7.2.4.16.17) shall be determined by calculation. Upon completion of the vessel, the correctness of the calculation shall be checked by means of a heat balance test. The calculation and test shall be performed under supervision by the recognized classification society which classified the vessel.

The heat transmission coefficient shall be documented and kept on board. The heat transmission coefficient shall be verified at every renewal of the certificate of approval.

9.3.3.27.10 A certificate from a recognised classification society stating that 9.3.3.24.1 to 9.3.3.24.3, 9.3.3.27.1 and 9.3.3.27.4 above have been complied with shall be submitted together with the application for issue or renewal of the certificate of approval.

9.3.3.28 ***Water-spray system***

When water-spraying is required in column (9) of Table C of Chapter 3.2, a water-spray system shall be installed in the cargo area on deck for the purpose of cooling the tops of cargo tanks by spraying water over the whole surface so as to avoid safely the activation of the pressure relief valves/high velocity vent valves at 10 kPa or as regulated.

The spray nozzles shall be so installed that the entire cargo deck area is covered and the gases released are precipitated safely.

The system shall be capable of being put into operation from the wheelhouse and from the deck. Its capacity shall be such that when all the spray nozzles are in operation, the outflow is not less than 50 litres per square metre of deck area and per hour.

9.3.3.29 and 9.3.3.30 (*Reserved*)

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9.3.3.31 ***Engines***

9.3.3.31.1 Only internal combustion engines running on fuel with having a flashpoint above 55 ºC are allowed. This provision does not apply to internal combustion engines which are part of propulsion and auxiliary systems. These systems shall meet the requirements of Chapter 30 and Annex 8, Section 1 of the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) as amended.[2]

9.3.3.31.2 Ventilation inlets of the engine room and, when the engines do not take in air directly from the engine room, air intakes of the engines shall be located not less than 2.00 m from the cargo area.

9.3.3.31.3 and 9.3.3.31.4 *(Deleted)*

9.3.3.31.5 The ventilation in the closed engine room shall be designed so that, at an ambient temperature of 20 °C, the average temperature in the engine room does not exceed 40 °C.

9.3.3.31.6 9.3.3.31.2 above does not apply to oil separator or supply vessels.

9.3.3.32 ***Oil fuel tanks***

9.3.3.32.1 Where the vessel is provided with hold spaces, the double bottoms within these spaces may be arranged as oil fuel tanks, provided their depth is not less than 0.6 m.

Oil fuel pipes and openings of such tanks are not permitted in the hold space.

9.3.3.32.2 The open ends of the air pipes of each oil fuel tanks shall extend to not less than 0.5 m above the open deck. These open ends and the open ends of overflow pipes leading to the deck shall be fitted with a protective device consisting of a gauze diaphragm or a perforated plate.

9.3.3.33 (*Reserved*)

9.3.3.34 ***Exhaust pipes***

9.3.3.34.1 Exhaust shall be evacuated from the vessel into the open air either upwards through an exhaust pipe or through the shell plating. The exhaust outlet shall be located not less than 2.00 m from the cargo area. The exhaust pipes of engines shall be arranged so that the exhausts are led away from the vessel. The exhaust pipes shall not be located within the cargo area.

9.3.3.34.2 Exhaust pipes shall be provided with a device preventing the escape of sparks, e.g. spark arresters.

9.3.3.34.3 The distance prescribed in 9.3.3.34.1 above does not apply to oil separator or supply vessels.

9.3.3.35 ***Bilge pumping and ballasting arrangements***

9.3.3.35.1 Bilge and ballast pumps for spaces within the cargo area shall be installed within such area.

This provision does not apply to:

– double-hull spaces and double bottoms which do not have a common boundary wall with the cargo tanks;

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[2] *As available on the website of the Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI, https://www.cesni.eu/en/documents/es-trin/.*

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– cofferdams, double-hull, double bottom and hold spaces where ballasting is carried out using the piping of the fire-fighting system in the cargo area and bilge-pumping is performed using eductors which are installed in the cargo area.

9.3.3.35.2 Where the double bottom is used as a liquid oil fuel tank, it shall not be connected to the bilge piping system.

9.3.3.35.3 Where the ballast pump is installed in the cargo area, the standpipe and its outboard connection for suction of ballast water shall be located within the cargo area but outside the cargo tanks.

9.3.3.35.4 A cargo pump-room below deck shall be capable of being drained in an emergency by an installation located in the cargo area and independent from any other installation. The installation shall be provided outside the cargo pump-room.

9.3.3.36 to 9.3.3.39 (*Reserved*)

9.3.3.40 ***Fire-extinguishing arrangements***

9.3.3.40.1 A fire-extinguishing system shall be installed on the vessel. This system shall comply with the following requirements:

– It shall be supplied by two independent fire or ballast pumps, one of which shall be ready for use at any time. These pumps and their means of propulsion and electrical equipment shall not be installed in the same space;

– It shall be provided with a water main fitted with at least three hydrants in the cargo area above deck. Three suitable and sufficiently long hoses with jet/spray nozzles having a diameter of not less than 12 mm shall be provided. Alternatively one or more of the hose assemblies may be substituted by directable jet/spray nozzles having a diameter of not less than 12 mm. It shall be possible to reach any point of the deck in the cargo area simultaneously with at least two jets of water which do not emanate from the same hydrant;

A spring-loaded non-return valve shall be fitted to ensure that no gases can escape through the fire-extinguishing system into the accommodation, wheelhouse or service spaces outside the cargo area;

– The capacity of the system shall be at least sufficient for a jet of water to have a minimum reach of not less than the vessel's breadth from any location on board with two spray nozzles being used at the same time;

– The water supply system shall be capable of being put into operation from the wheelhouse and from the deck;

– Measures shall be taken to prevent the freezing of fire-mains and hydrants.

9.3.3.40.2 In addition the engine room, the pump-room and all spaces containing essential equipment (switchboards, compressors, etc.) for the refrigeration equipment, if any, shall be provided with a fixed fire-extinguishing system meeting the following requirements:

9.3.3.40.2.1 *Extinguishing agents*

For the protection of spaces in engine rooms, boiler rooms and pump rooms, only permanently fixed fire-extinguishing systems using the following extinguishing agents are permitted:

(a) CO_2 (carbon dioxide);

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(b) HFC 227 ea (heptafluoropropane);

(c) IG-541 (52% nitrogen, 40% argon, 8% carbon dioxide);

(d) FK-5-1-12 (dodecafluoro 2–methylpentane–3–one);

(e) (*Reserved*)

(f) K_2CO_3 (potassium carbonate).

Other extinguishing agents are permitted only on the basis of recommendations by the Administrative Committee.

9.3.3.40.2.2 *Ventilation, air extraction*

(a) The combustion air required by the combustion engines which ensure propulsion should not come from spaces protected by permanently fixed fire-extinguishing systems. This requirement is not mandatory if the vessel has two independent main engine rooms with a gastight separation or if, in addition to the main engine room, there is a separate engine room installed with a bow thruster that can independently ensure propulsion in the event of a fire in the main engine room;

(b) All forced ventilation systems in the space to be protected shall be shut down automatically as soon as the fire-extinguishing system is activated;

(c) All openings in the space to be protected which permit air to enter or gas to escape shall be fitted with devices enabling them to be closed rapidly. It shall be clear whether they are open or closed;

(d) Air escaping from the pressure–relief valves of the pressurised air tanks installed in the engine rooms shall be evacuated to the open air;

(e) Overpressure or negative pressure caused by the diffusion of the extinguishing agent shall not destroy the constituent elements of the space to be protected. It shall be possible to ensure the safe equalisation of pressure;

(f) Protected spaces shall have a facility for extracting the extinguishing agent and the combustion gases. Such facilities shall be capable of being operated from positions outside the protected rooms and which must not be made inaccessible by a fire within such spaces. If there are permanently installed extractors, it shall not be possible for these to be switched on while the fire is being extinguished.

9.3.3.40.2.3 Fire alarm system

The space to be protected shall be monitored by an appropriate fire alarm system. The alarm signal shall be audible in the wheelhouse, the accommodation and the space to be protected.

9.3.3.40.2.4 *Piping system*

(a) The extinguishing agent shall be routed to and distributed in the space to be protected by means of a permanent piping system. Piping installed in the space to be protected and their fittings shall be made of steel. This shall not apply to the connecting nozzles of tanks and compensators provided that the materials used have equivalent fire–retardant properties. Piping shall be protected against corrosion both internally and externally;

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(b) The discharge nozzles shall be so arranged as to ensure the regular diffusion of the extinguishing agent. In particular, the extinguishing agent must also be effective beneath the floor.

9.3.3.40.2.5 *Triggering device*

(a) Automatically activated fire-extinguishing systems are not permitted;

(b) It shall be possible to activate the fire-extinguishing system from a suitable point located outside the space to be protected;

(c) Triggering devices shall be so installed that they can be activated in the event of a fire and so that the risk of their breakdown in the event of a fire or an explosion in the space to be protected is reduced as far as possible;

Systems which are not mechanically activated shall be supplied from two energy sources independent of each other. These energy sources shall be located outside the space to be protected. The control lines located in the space to be protected shall be so designed as to remain capable of operating in the event of a fire for a minimum of 30 minutes. The electrical installations are deemed to meet this requirement if they conform to the IEC 60331–21:1999 standard;

When the triggering devices are so placed as not to be visible, the component concealing them shall carry the "Fire-fighting system" symbol, each side being not less than 10 cm in length, with the following text in red letters on a white ground:

Fire-extinguishing system

(d) If the fire-extinguishing system is intended to protect several spaces, it shall comprise a separate and clearly–marked triggering device for each space;

(e) The instructions shall be posted alongside all triggering devices and shall be clearly visible and indelible. The instructions shall be in a language the master can read and understand and if this language is not English, French or German, they shall be in English, French or German. They shall include information concerning:

(i) the activation of the fire-extinguishing system;

(ii) the need to ensure that all persons have left the space to be protected;

(iii) the correct behaviour of the crew in the event of activation and when accessing the space to be protected following activation or diffusion, in particular in respect of the possible presence of dangerous substances;

(iv) the correct behaviour of the crew in the event of the failure of the fire-extinguishing system to function properly.

(f) The instructions shall mention that prior to the activation of the fire-extinguishing system, combustion engines installed in the space and aspirating air from the space to be protected, shall be shut down.

9.3.3.40.2.6 *Alarm device*

(a) Permanently fixed fire-extinguishing systems shall be fitted with an audible and visual alarm device;

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(b) The alarm device shall be set off automatically as soon as the fire-extinguishing system is first activated. The alarm device shall function for an appropriate period of time before the extinguishing agent is released; it shall not be possible to turn it off;

(c) Alarm signals shall be clearly visible in the spaces to be protected and their access points and be clearly audible under operating conditions corresponding to the highest possible sound level. It shall be possible to distinguish them clearly from all other sound and visual signals in the space to be protected;

(d) Sound alarms shall also be clearly audible in adjoining spaces, with the communicating doors shut, and under operating conditions corresponding to the highest possible sound level;

(e) If the alarm device is not intrinsically protected against short circuits, broken wires and drops in voltage, it shall be possible to monitor its operation;

(f) A sign with the following text in red letters on a white ground shall be clearly posted at the entrance to any space the extinguishing agent may reach:

Warning, fire-extinguishing system!
Leave this space immediately when the … (description)
alarm is activated!

9.3.3.40.2.7 *Pressurised tanks, fittings and piping*

(a) Pressurised tanks, fittings and piping shall conform to the requirements of the competent authority or, if there are no such requirements, to those of a recognized classification society;

(b) Pressurised tanks shall be installed in accordance with the manufacturer's instructions;

(c) Pressurised tanks, fittings and piping shall not be installed in the accommodation;

(d) The temperature of cabinets and storage spaces for pressurised tanks shall not exceed 50 °C;

(e) Cabinets or storage spaces on deck shall be securely stowed and shall have vents so placed that in the event of a pressurised tank not being gastight, the escaping gas cannot penetrate into the vessel. Direct connections with other spaces are not permitted.

9.3.3.40.2.8 *Quantity of extinguishing agent*

If the quantity of extinguishing agent is intended for more than one space, the quantity of extinguishing agent available does not need to be greater than the quantity required for the largest of the spaces thus protected.

9.3.3.40.2.9 *Installation, maintenance, monitoring and documents*

(a) The mounting or modification of the system shall only be performed by a company specialised in fire-extinguishing systems. The instructions (product data sheet, safety data sheet) provided by the manufacturer of the extinguishing agent or the system shall be followed;

(b) The system shall be inspected by an expert:

(i) before being brought into service;

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(ii) each time it is put back into service after activation;

(iii) after every modification or repair;

(iv) regularly, not less than every two years.

(c) During the inspection, the expert is required to check that the system conforms to the requirements of 9.3.3.40.2;

(d) The inspection shall include, as a minimum:

(i) an external inspection of the entire system;

(ii) an inspection to ensure that the piping is leakproof;

(iii) an inspection to ensure that the control and activation systems are in good working order;

(iv) an inspection of the pressure and contents of tanks;

(v) an inspection to ensure that the means of closing the space to be protected are leakproof;

(vi) an inspection of the fire alarm system;

(vii) an inspection of the alarm device.

(e) The person performing the inspection shall establish, sign and date a certificate of inspection;

(f) The number of permanently fixed fire-extinguishing systems shall be mentioned in the vessel certificate.

9.3.3.40.2.10 *Fire-extinguishing system operating with CO_2*

In addition to the requirements contained in 9.3.3.40.2.1 to 9.3.3.40.2.9, fire-extinguishing systems using CO_2 as an extinguishing agent shall conform to the following provisions:

(a) Tanks of CO_2 shall be placed in a gastight space or cabinet separated from other spaces. The doors of such storage spaces and cabinets shall open outwards; they shall be capable of being locked and shall carry on the outside the symbol “Warning: danger”, not less than 5 cm high and “CO_2” in the same colours and the same size;

(b) Storage cabinets or spaces for CO_2 tanks located below deck shall only be accessible from the outside. These spaces shall have an artificial ventilation system with extractor hoods and shall be completely independent of the other ventilation systems on board;

(c) The level of filling of CO_2 tanks shall not exceed 0.75 kg/l. The volume of depressurised CO_2 shall be taken to be 0.56 m^3/kg;

(d) The concentration of CO_2 in the space to be protected shall be not less than 40% of the gross volume of the space. This quantity shall be released within 120 seconds. It shall be possible to monitor whether diffusion is proceeding correctly;

(e) The opening of the tank valves and the control of the diffusing valve shall correspond to two different operations;

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(f) The appropriate period of time mentioned in 9.3.3.40.2.6 (b) shall be not less than 20 seconds. A reliable installation shall ensure the timing of the diffusion of CO_2.

9.3.3.40.2.11 *Fire-extinguishing system operating with HFC-227 ea (heptafluoropropane)*

In addition to the requirements of 9.3.3.40.2.1 to 9.3.3.40.2.9, fire-extinguishing systems using HFC-227 ea as an extinguishing agent shall conform to the following provisions:

(a) Where there are several spaces with different gross volumes, each space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing HFC-227 ea placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Every tank shall be fitted with a device permitting control of the gas pressure;

(d) The level of filling of tanks shall not exceed 1.15 kg/l. The specific volume of depressurised HFC-227 ea shall be taken to be 0.1374 m^3/kg;

(e) The concentration of HFC-227 ea in the space to be protected shall be not less than 8% of the gross volume of the space. This quantity shall be released within 10 seconds;

(f) Tanks of HFC-227 ea shall be fitted with a pressure monitoring device which triggers an audible and visual alarm in the wheelhouse in the event of an unscheduled loss of propellant gas. Where there is no wheelhouse, the alarm shall be triggered outside the space to be protected;

(g) After discharge, the concentration in the space to be protected shall not exceed 10.5% (volume);

(h) The fire-extinguishing system shall not comprise aluminium parts.

9.3.3.40.2.12 *Fire-extinguishing system operating with IG-541*

In addition to the requirements of 9.3.3.40.2.1 to 9.3.3.40.2.9, fire-extinguishing systems using IG-541 as an extinguishing agent shall conform to the following provisions:

(a) Where there are several spaces with different gross volumes, every space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing IG-541 placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Each tank shall be fitted with a device for checking the contents;

(d) The filling pressure of the tanks shall not exceed 200 bar at a temperature of +15 °C;

(e) The concentration of IG-541 in the space to be protected shall be not less than 44% and not more than 50% of the gross volume of the space. This quantity shall be released within 120 seconds.

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9.3.3.40.2.13 *Fire-extinguishing system operating with FK-5-1-12*

In addition to the requirements of 9.3.3.40.2.1 to 9.3.3.40.2.9, fire-extinguishing systems using FK-5-1-12 as an extinguishing agent shall comply with the following provisions:

(a) Where there are several spaces with different gross volumes, every space shall be equipped with its own fire-extinguishing system;

(b) Every tank containing FK-5-1-12 placed in the space to be protected shall be fitted with a device to prevent overpressure. This device shall ensure that the contents of the tank are safely diffused in the space to be protected if the tank is subjected to fire, when the fire-extinguishing system has not been brought into service;

(c) Every tank shall be fitted with a device permitting control of the gas pressure;

(d) The level of filling of tanks shall not exceed 1.00 kg/l. The specific volume of depressurized FK-5-1-12 shall be taken to be 0.0719 m^3/kg;

(e) The volume of FK-5-1-12 in the space to be protected shall be not less than 5.5% of the gross volume of the space. This quantity shall be released within 10 seconds;

(f) Tanks of FK-5-1-12 shall be fitted with a pressure monitoring device which triggers an audible and visual alarm in the wheelhouse in the event of an unscheduled loss of extinguishing agent. Where there is no wheelhouse, the alarm shall be triggered outside the space to be protected;

(g) After discharge, the concentration in the space to be protected shall not exceed 10.0%.

9.3.3.40.2.14 *(Reserved)*

9.3.3.40.2.15 *Fire-fighting systems using K_2CO_3 as the extinguishing agent*

In addition to the requirements laid down in 9.3.3.40.2.1 to 9.3.3.40.2.3, 9.3.3.40.2.5, 9.3.3.40.2.6 and 9.3.3.40.2.9, fire-fighting systems using K_2CO_3 as the extinguishing agent shall comply with the following provisions:

(a) The fire-fighting system shall have a type-approval pursuant to Directive 2014/90/EU[3] or to MSC/Circ. 1270;[4]

(b) Each room shall be provided with its own firefighting system;

(c) The extinguishing agent must be stored in specially provided unpressurised tanks in the room to be protected. These tanks shall be fitted in such a way that the extinguishing agent is dispensed evenly in the room. In particular the extinguishing agent shall also work underneath the deck plates;

(d) Each tank is separately connected with the triggering device;

(e) The quantity of dry aerosol-forming extinguishing agent relative to the room to be protected shall be at least 120 g per m^3 of the net volume of this room. This net

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[3] *Official Journal of the European Union, L 257 of 28 August 2014, p.146.*

[4] *International Maritime Organization Circular MSC/Circ. 1270 and corrigenda — Revised Guidelines for the approval of fixed aerosol fire-extinguishing systems equivalent to fixed gas extinguishing systems, as referred to in SOLAS 1974, for machinery spaces — adopted on 4 June 2008.*

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volume is calculated according to Directive 2014/90/EU[3] or to MSC/Circ. 1270.[4] It shall be possible to supply the extinguishing agent within 120 s.

9.3.3.40.2.16 *Fixed fire-extinguishing system for physical protection*

In order to ensure physical protection in the engine rooms, boiler rooms and pump rooms, permanently fixed fire-extinguishing systems are accepted solely on the basis of recommendations by the Administrative Committee.

9.3.3.40.3 The two hand fire–extinguishers referred to in 8.1.4 shall be located in the cargo area.

9.3.3.40.4 The fire-extinguishing agent and the quantity contained in the permanently fixed fire-extinguishing system shall be suitable and sufficient for fighting fires.

9.3.3.40.5 9.3.3.40.1 and 9.3.3.40.2 above do not apply to oil separator or supply vessels.

9.3.3.41 ***Fire and naked light***

9.3.3.41.1 The outlets of funnels shall be located not less than 2.00 m from the cargo area. Arrangements shall be provided to prevent the escape of sparks and the entry of water.

9.3.3.41.2 Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels.

The installation in the engine room or in another separate space of heating appliances fuelled with liquid fuel having a flashpoint above 55 °C is, however, permitted.

Cooking and refrigerating appliances are permitted only in the accommodation.

9.3.3.41.3 Only electrical lamps are permitted.

9.3.3.42 ***Cargo heating system***

9.3.3.42.1 Boilers which are used for heating the cargo shall be fuelled with a liquid fuel having a flashpoint of more than 55 °C. They shall be placed either in the engine room or in another separate space below deck and outside the cargo area, which is accessible from the deck or from the engine room.

9.3.3.42.2 The cargo heating system shall be designed so that the cargo cannot penetrate into the boiler in the case of a leak in the heating coils. A cargo heating system with artificial draught shall be ignited electrically.

9.3.3.42.3 The ventilation system of the engine room shall be designed taking into account the air required for the boiler.

9.3.3.42.4 Where the cargo heating system is used during loading, unloading or degassing with a concentration given off by the cargo of 10% of the LEL or above, the service space which contains this system shall fully comply with the requirements of 9.3.3.52.3. This requirement does not apply to the inlets of the ventilation system. These inlets shall be located at a minimum distance of 2 m from the cargo area and 6 m from the openings of cargo tanks or residual cargo tanks, loading pumps situated on deck, openings of high-velocity vent valves, pressure relief devices and shore connections of loading and unloading piping and must be located not less than 2 m above the deck.

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[3] *Official Journal of the European Union, L 257 of 28 August 2014, p.146.*

[4] *International Maritime Organization Circular MSC/Circ. 1270 and corrigenda — Revised Guidelines for the approval of fixed aerosol fire-extinguishing systems equivalent to fixed gas extinguishing systems, as referred to in SOLAS 1974, for machinery spaces — adopted on 4 June 2008.*

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The requirements of 9.3.3.52.3 are not applicable to the unloading of substances having a flashpoint of 60 °C or more when the temperature of the product is at least 15 K lower at the flashpoint.

9.3.3.43 to 9.3.3.49 (*Reserved*)

9.3.3.50 *(Deleted)*

9.3.3.51 ***Surface temperatures of installations and equipment***

(a) Surface temperatures of electrical and non-electrical installations and equipment shall not exceed 200 °C;

(b) Surface temperatures of the outer parts of engines and their air inlets and exhaust ducts shall not exceed 200 °C;

(c) If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which the temperature classes T4, T5 or T6 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 135 °C (T4), 100 °C (T5) or 85 °C (T6), respectively;

(d) (a) and (b) do not apply if the following requirements are met (see also 7.2.3.51.4):

(i) Accommodation, wheelhouse and service spaces where surface temperatures higher than those mentioned in (a) and (b) occur are equipped with a ventilation system according to 9.3.3.12.4 (b); or

(ii) Installations and equipment which generate surface temperatures higher than those set out in (a) or (b), respectively, must be capable of being shut down. Such installations and equipment shall be marked in red;

(e) Open Type N vessels are only required to meet the requirements of (a), (b) and (d) if the vessel remains in the immediate vicinity of or within a shoreside assigned zone.

9.3.3.52 ***Type and location of electrical installations and equipment***

9.3.3.52.1 Electrical installations and equipment shall be of at least the ‘limited explosion risk’ type.

This provision does not apply to:

(a) Lighting installations in the accommodation and the wheelhouse, except for switches near to the entrances;

(b) Mobile phones, fixed telephone installations, stationary and portable computers and loading instruments in the accommodation or the wheelhouse;

(c) Electrical installations and equipment which, during a stay in the immediate vicinity of or within a shoreside assigned zone:

(i) Are extinguished; or

(ii) Are placed in premises equipped with a ventilation system according to 9.3.3.12.4;

(d) To radiotelephone installations and inland AIS (automatic identification systems) stations in the accommodation and the wheelhouse, if no part of an aerial for radiotelephone installations or AIS stations is situated above or within 2.00 m of the cargo area.

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9.3.3.52.2 In the cofferdams, double-hull spaces, double bottoms and hold spaces, only hermetically sealed echo sounding devices are allowed, the cables of which are led through thick-walled steel tubes with gastight connections up to the main deck.

9.3.3.52.3 The fixed electrical installations and equipment which do not meet the requirements set out in 9.3.3.51 (a), 9.3.3.51 (b) and 9.3.3.52.1 above and their switches shall be marked in red. The disconnection of such equipment shall be controlled from a centralized location on board.

9.3.3.52.4 Every insulated distribution network shall be fitted with an automatic device with a visual and audible alarm for checking the insulation level.

9.3.3.52.5 Only distribution systems without return connection to the hull are permitted. This provision does not apply to:

– Active cathodic corrosion protection;

– Certain limited sections of the installations situated outside the cargo area (e.g., connections of starters of diesel engines);

– The device for checking the insulation level referred to in 9.3.3.52.4.

9.3.3.52.6 An electric generator which is permanently driven by an engine and which does not meet the requirements of 9.3.3.52.1 above, shall be fitted with a multipolar switch capable of shutting down the generator. A notice board with the operating instructions shall be displayed near the switch.

9.3.3.52.7 Failure of the power supply for the safety and control equipment shall be immediately indicated by visual and audible signals in the wheelhouse and on the deck. The alarm must be relayed to the accommodation automatically if it has not been switched off.

9.3.3.52.8 Electrical switches, sockets and cables on deck shall be protected against mechanical damage.

9.3.3.52.9 Sockets for the connection of signal lights and gangway lighting shall be solidly fitted to the vessel close to the signal mast or the gangway. The sockets used in this area shall be designed so as to prevent connection or disconnection except when they are not live.

9.3.3.52.10 Accumulators shall be located outside the cargo area.

9.3.3.52.11 Open Type N vessels are only required to meet the requirements of 9.3.3.52.1 and 9.3.3.52.3 if the vessel remains in the immediate vicinity of or within a shoreside assigned zone.

9.3.3.53 ***Type and location of electrical and non-electrical installations and equipment intended to be used in explosion hazardous areas***

9.3.3.53.1 On board vessels covered by the classification of zones as defined in 1.2.1, electrical and non-electrical installations and equipment used in explosion hazardous areas shall meet at least the requirements for use in the area concerned.

They shall be selected on the basis of the explosion groups/subgroups and temperature classes to which the substances to be carried belong (see columns (15) and (16) of Table C of Chapter 3.2).

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which temperature classes T4, T5 or T6 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 135 °C (T4), 100 °C (T5) or 85 °C (T6).

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If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances for which temperature classes T1 or T2 are indicated in column (15) of Table C of Chapter 3.2, then the corresponding surface temperatures within the assigned zones shall not exceed 200 °C.

9.3.3.53.2 Except in the case of optical fibres, electrical cables shall be armoured or placed in a metallic sheath or in protective tubes.

Electrical cables for the active cathodic protection of the shell plating shall be led through thick-walled steel tubes with gastight connections up to the main deck.

9.3.3.53.3 Movable electric cables are prohibited in the explosion danger area, except for electric cables for intrinsically safe electric circuits or for connecting:

(a) Signal lights and lighting for gangways, provided the connection point (for example, the socket) is permanently fitted to the vessel close to the signal mast or gangway;

(b) The power network on a vessel to a land-based power network; provided

– The electric cables and the power supply unit conform with a valid standard (for example, EN 15869-03: 2010);

– The power supply unit and connectors are located outside of the explosion danger area.

Connecting and disconnecting sockets/connectors shall only be possible when they are not live.

9.3.3.53.4 Electrical cables of intrinsically safe circuits shall be separated from other cables not intended for use in such circuits and shall be marked (they shall not be installed together in the same string of cables and they shall not be fixed by the same cable clamps).

9.3.3.53.5 For movable electrical cables permitted under 9.3.3.53.3, only sheathed cables of type H07RN-F in accordance with standard IEC 60245-4:2011[5] or electrical cables of at least equivalent design having conductors with a cross-section of not less than 1.50 mm^2 shall be used.

9.3.3.54 ***Earthing***

9.3.3.54.1 The metal parts of electrical installations and equipment in the cargo area which are not live, as well as the protective metal tubes or metal sheaths of cables, in normal service shall be earthed, unless they are so arranged that they are automatically earthed by bonding to the metal structure of the vessel.

9.3.3.54.2 The provisions of 9.3.3.54.1 also apply to installations with a voltage of less than 50 Volts.

9.3.3.54.3 Independent cargo tanks, metal intermediate bulk containers and tank-containers shall be earthed.

9.3.3.54.4 Receptacles for residual products shall be capable of being earthed.

9.3.3.55 (*Reserved*)

9.3.3.56 *(Deleted)*

9.3.3.57 to 9.3.3.59 (*Reserved*)

[5] *Identical to EN 50525-2-21: 2011.*

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9.3.3.60 ***Special equipment***

A shower and an eye and face bath shall be provided on the vessel at a location which is directly accessible from the cargo area. The water shall meet the quality of drinking water on board.

NOTE: *Additional decontamination substances for the purpose of avoiding corrosion of eyes and skin are allowed.*

A connection of this special equipment with the area outside the cargo zone is accepted.

A spring-loaded non-return valve shall be fitted to ensure that no gases can escape through the shower and the eye and face bath system outside the cargo area.

9.3.3.61 9.3.3.60 above does not apply to oil separator and supply vessels.

9.3.3.62 ***Valve for degassing to reception facilities***

A permanently installed or portable spring-loaded low-pressure valve used during degassing operations to reception facilities, shall be fitted at the piping used to extract air. If the vessel's substance list, according to 1.16.1.2.5, contains substances for which explosion protection is required according to column (17) of Table C of Chapter 3.2, this valve shall be fitted with a flame arrester capable of withstanding a deflagration. When the vessel is not degassing to a reception facility, the valve shall be closed with a blind flange. The low-pressure valve shall be so installed that under other normal working conditions the vacuum valve is not activated.

NOTE*: Degassing operations are part of normal working conditions.*

9.3.3.63 to 9.3.3.70 (*Reserved*)

9.3.3.71 ***Admittance on board***

The notice boards displaying the prohibition of admittance in accordance with 8.3.3 shall be clearly legible from either side of the vessel.

9.3.3.72 and 9.3.3.73 (*Reserved*)

9.3.3.74 ***Prohibition of smoking, fire or naked light***

9.3.3.74.1 The notice boards displaying the prohibition of smoking in accordance with 8.3.4 shall be clearly legible from either side of the vessel.

9.3.3.74.2 Notice boards indicating the circumstances under which the prohibition is applicable shall be fitted near the entrances to the spaces where smoking or the use of fire or naked light is not always prohibited.

9.3.3.74.3 Ashtrays shall be provided close to each exit in the accommodation and the wheelhouse.

9.3.3.75 to 9.3.3.91 (*Reserved*)

9.3.3.92 On board of tank vessels referred to in 9.3.3.11.7, spaces the entrances or exits of which are likely to become partly or completely immersed in the damaged condition shall have an emergency exit which is situated not less than 0.10 m above the damage waterline. This requirement does not apply to forepeak and afterpeak.

9.3.3.93 to 9.3.3.99 (*Reserved*)

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9.3.4 Alternative constructions

9.3.4.1 ***General***

9.3.4.1.1 The maximum permissible capacity and length of a cargo tank in accordance with 9.3.1.11.1, 9.3.2.11.1 and 9.3.3.11.1 may be exceeded and the minimum distances in accordance with 9.3.1.11.2 a) and 9.3.2.11.7 may be deviated from provided that the provisions of this section are complied with. The capacity of a cargo tank shall not exceed 1000 m^3.

9.3.4.1.2 Tank vessels whose cargo tanks exceed the maximum allowable capacity or where the distance between the side wall and the cargo tank is smaller than required, shall be protected through a more crashworthy side structure. This shall be proved by comparing the risk of a conventional construction (reference construction), complying with the ADN regulations with the risk of a crashworthy construction (alternative construction).

9.3.4.1.3 When the risk of the more crashworthy construction is equal to or lower than the risk of the conventional construction, equivalent or higher safety is proven. The equivalent or higher safety shall be proven in accordance with 9.3.4.3.

9.3.4.1.4 When a vessel is built in compliance with this section, a recognised classification society shall document the application of the calculation procedure in accordance with 9.3.4.3 and shall submit its conclusions to the competent authority for approval.

The competent authority may request additional calculations and proof.

9.3.4.1.5 The competent authority shall include this construction in the certificate of approval in accordance with 8.6.1.

9.3.4.2 ***Approach***

9.3.4.2.1 The probability of cargo tank rupture due to a collision and the area around the vessel affected by the cargo outflow as a result thereof are the governing parameters. The risk is described by the following formula:

$R = P \bullet C$

Wherein: R risk [m^2],

P probability of cargo tank rupture [ ],

C consequence (measure of damage) of cargo tank rupture [m^2].

9.3.4.2.2 The probability P of cargo tank rupture depends on the probability distribution of the available collision energy represented by vessels, which the victim is likely to encounter in a collision, and the capability of the struck vessel to absorb collision energy without cargo tank rupture. A decrease of this probability can be achieved by means of a more crashworthy side structure.

The consequence C of cargo spillage resulting from cargo tank rupture is expressed as an affected area around the struck vessel.

9.3.4.2.3 The procedure according to 9.3.4.3 shows how tank rupture probabilities shall be calculated as well as how the collision energy absorbing capacity of side structure and a consequence increase shall be determined.

9.3.4.3 ***Calculation procedure***

9.3.4.3.1 The calculation procedure shall follow 13 basic steps. Steps 2 through 10 shall be carried out for both the alternative design and the reference design. The following table shows the calculation of the weighted probability of cargo tank rupture:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
							F x G			I x J			L x M	
Identify collision locations and associated weighting factors, Collision scenario I	Loc1	Finite element analysis	Eloc1	Calculate probability with CPDF 50%	P50%	wf 50%	Pw50%							
				Calculate probability with CPDF 66%	P66%	wf 66%	Pw66%							
				Calculate probability with CPDF100%	P100%	wf 100%	Pw100%	+						
							sum	Ploc 1	wf loc 1	Pwloc 1				
	Loci	Finite element analysis	Eloci	Calculate probability with CPDF 50%	P50%	wf 50%	Pw50%							
				Calculate probability with CPDF 66%	P66%	wf 66%	Pw66%							
				Calculate probability with CPDF100%	P100%	wf 100%	Pw100%	+						
							sum	Ploci	wf loci	Pwloci				
	Locn	Finite element analysis	Elocn	Calculate probability with CPDF 50%	P50%	wf 50%	Pw50%							
				Calculate probability with CPDF 66%	P66%	wf 66%	Pw66%							
				Calculate probability with CPDF100%	P100%	wf 100%	Pw100%	+						
							sum	Plocn	wf locn	Pwlocn	+			
										sum	Pscenl	wfscenl	Pwscenl	
Identify collision locations and associated weighting factors, Collision scenario II	Loc1	Finite element analysis	Eloc1	Calculate probability with CPDF 30%	P30%	wf 30%	Pw30%							
				Calculate probability with CPDF 100%	P100%	wf 100%	Pw100%	+						
							sum	Ploc 1	wf loc 1	Pwloc 1				
	Locn	Finite element analysis	Elocn	Calculate probability with CPDF 30%	P30%	wf 30%	Pw30%							
				Calculate probability with CPDF 100%	P100%	wf 100%	Pw100%	+						
							sum	Plocn	wf locn	Pwlocn	+			
										sum	Pscenll	wfscenll	Pwscenll	+
													sum	Pw

CPDF: Cumulative probability density function

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9.3.4.3.1.1 *Step 1*

Besides the alternative design, which is used for cargo tanks exceeding the maximum allowable capacity or a reduced distance between the side wall and the cargo tank as well as a more crashworthy side structure, a reference design with at least the same dimensions (length, width, depth, displacement) shall be drawn up. This reference design shall fulfil the requirements specified in section 9.3.1 (Type G), 9.3.2 (Type C) or 9.3.3 (Type N) and shall comply with the minimum requirements of a recognised classification society.

9.3.4.3.1.2 *Step 2*

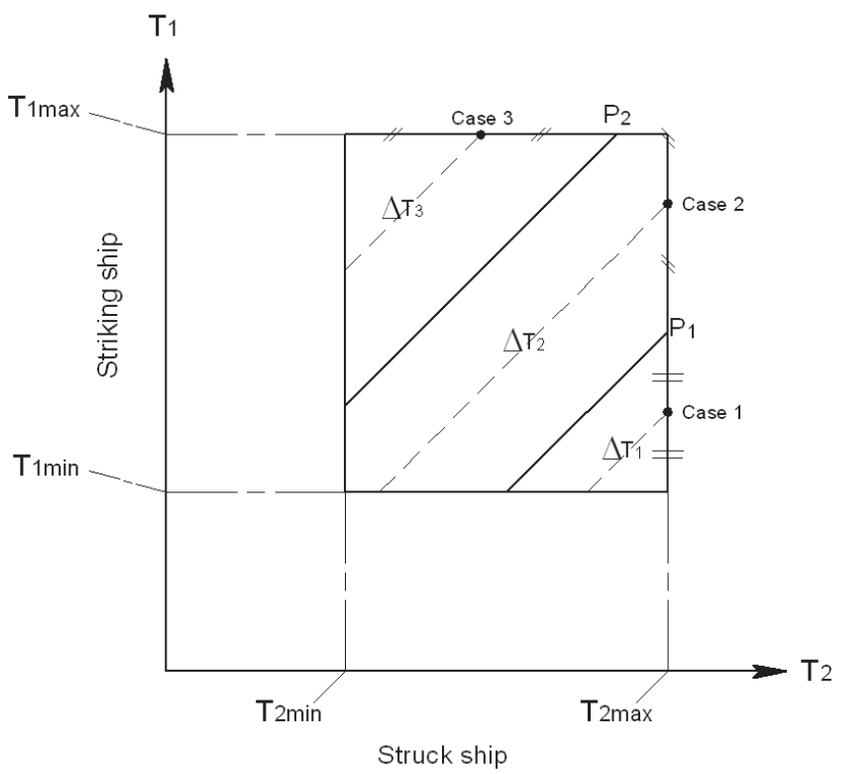
9.3.4.3.1.2.1 The relevant typical collision locations i=1 through n shall be determined. The table in 9.3.4.3.1 depicts the general case where there are 'n' typical collision locations.

The number of typical collision locations depends on the vessel design. The choice of the collision locations shall be accepted by the recognised classification society.

9.3.4.3.1.2.2 Vertical collision locations

9.3.4.3.1.2.2.1 Tank vessel type C and N

9.3.4.3.1.2.2.1.1 The determination of the collision locations in the vertical direction depends on the draught differences between striking and struck vessel, which is limited by the maximum and minimum draughts of both vessels and the construction of the struck vessel. This can be depicted graphically through a rectangular area which is enclosed by the values of the maximum and minimum draught of both striking and struck vessel (see following figure).



Definition of vertical striking locations

9.3.4.3.1.2.2.1.2 Each point in this area represents a possible draught combination. T_{1max} is the maximum draught and T_{1min} is the minimum draught of the striking vessel, while T_{2max} and T_{2min} are the corresponding minimum and maximum draughts of the struck vessel. Each draught combination has an equal probability of occurrence.

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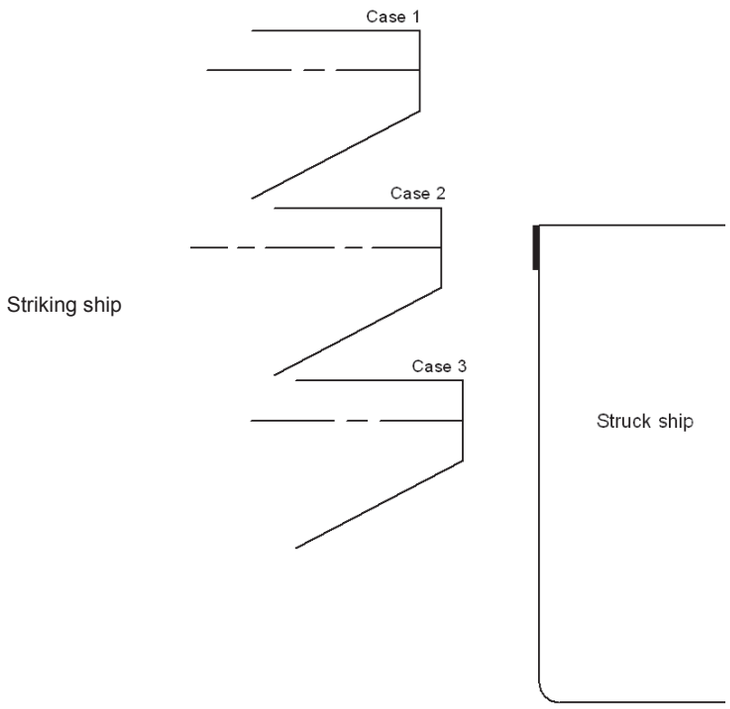
9.3.4.3.1.2.2.1.3 Points on each inclined line in the figure in 9.3.4.3.1.2.2.1.1 indicate the same draught difference. Each of these lines reflects a vertical collision location. In the example in the figure in 9.3.4.3.1.2.2.1.1 three vertical collision locations are defined, depicted by three areas. Point P_1 is the point where the lower edge of the vertical part of the push barge or V–bow strikes at deck level of the struck vessel. The triangular area for collision case 1 is bordered by point P_1. This corresponds to the vertical collision location "collision at deck level". The triangular upper left area of the rectangle corresponds to the vertical collision location "collision below deck". The draught difference ΔT_i, i=1,2,3 shall be used in the collision calculations (see following figure).



Example of vertical collision locations

9.3.4.3.1.2.2.1.4 For the calculation of the collision energies the maximum masses of both striking vessel and struck vessel must be used (highest point on each respective diagonal ΔT_i).

9.3.4.3.1.2.2.1.5 Depending on the vessel design, the recognised classification society may require additional collision locations.

9.3.4.3.1.2.2.2 *Tank vessel type G*

For a tank vessel type G a collision at half tank height shall be assumed. The recognised classification society may require additional collision locations at other heights. This shall be agreed with the recognised classification society.

9.3.4.3.1.2.3 Longitudinal collision location

9.3.4.3.1.2.3.1 Tank vessels type C and N

At least the following three typical collision locations shall be considered:

- at bulkhead,
- between webs and
- at web.

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9.3.4.3.1.2.3.2 Tank vessel type G

For a tank vessel type G at least the following three typical collision locations shall be considered:

- at cargo tank end,
- between webs and
- at web.

9.3.4.3.1.2.4 Number of collision locations

9.3.4.3.1.2.4.1 Tank vessel type C and N

The combination of vertical and longitudinal collision locations in the example mentioned in 9.3.4.3.1.2.2.1.3 and 9.3.4.3.1.2.3.1 results in 3 • 3 = 9 collision locations.

9.3.4.3.1.2.4.2 Tank vessel type G

The combination of vertical and longitudinal collision locations in the example mentioned in 9.3.4.3.1.2.2.2 and 9.3.4.3.1.2.3.2 results in 1 • 3 = 3 collision locations.

9.3.4.3.1.2.4.3 Additional examinations for tank vessels type G, C and N with independent cargo tanks

As proof that the tank seatings and the buoyancy restraints do not cause any premature tank rupture, additional calculations shall be carried out. The additional collision locations for this purpose shall be agreed with the recognised classification society.

9.3.4.3.1.3 Step 3

9.3.4.3.1.3.1 For each typical collision location a weighting factor which indicates the relative probability that such a typical collision location will be struck shall be determined. In the table in 9.3.4.3.1 these factors are named $wf_{loc(i)}$ (column J). The assumptions shall be agreed with the recognised classification society.

The weighting factor for each collision location is the product of the factor for the vertical collision location by the factor for the longitudinal collision location.

9.3.4.3.1.3.2 Vertical collision locations

9.3.4.3.1.3.2.1 Tank vessel type C and N

The weighting factors for the various vertical collision locations are in each case defined by the ratio between the partial area for the corresponding collision case and the total area of the rectangle shown in the Figure in 9.3.4.3.1.2.2.1.1.

For example, for collision case 1 (see figure in 9.3.4.3.1.2.2.1.3) the weighting factor equals the ratio between the triangular lower right area of the rectangle, and the area of the rectangle between minimum and maximum draughts of striking and struck vessels.

9.3.4.3.1.3.2.2 Tank vessel type G

The weighting factor for the vertical collision location has the value 1.0, if only one collision location is assumed. When the recognised classification society requires additional collision locations, the weighting factor shall be determined analogous to the procedure for tank vessels type C and N.

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9.3.4.3.1.3.3 Longitudinal collision locations

9.3.4.3.1.3.3.1 Tank vessel type C and N

The weighting factor for each longitudinal collision location is the ratio between the “calculational span length” and the tank length.

The calculational span length shall be calculated as follows:

(a) collision on bulkhead:

0.2 • distance between web frame and bulkhead, but not larger than 450 mm,

(b) collision on web frame:

sum of 0.2 • web frame spacing forward of the web frame, but not larger than 450 mm, and 0.2 • web frame spacing aft of the web frame, but not larger than 450 mm, and

(c) collision between web frames:

cargo tank length minus the length “collision at bulkhead” and minus the length "collision at web frame".

9.3.4.3.1.3.3.2 Tank vessel type G

The weighting factor for each longitudinal collision location is the ratio between the “calculational span length” and the length of the hold space.

The calculational span length shall be calculated as follows:

(a) collision at cargo tank end:

distance between bulkhead and the start of the cylindrical part of the cargo tank,

(b) collision on web frame:

sum of 0.2 • web frame spacing forward of the web frame, but not larger than 450 mm, and 0.2 • web frame spacing aft of the web frame, but not larger than 450 mm, and

(c) collision between web frames:

cargo tank length minus the length “collision at cargo tank end” and minus the length "collision at web frame".

9.3.4.3.1.4 *Step 4*

9.3.4.3.1.4.1 For each collision location the collision energy absorbing capacity shall be calculated. For that matter the collision energy absorbing capacity is the amount of collision energy absorbed by the vessel structure up to initial rupture of the cargo tank (see the table in 9.3.4.3.1, column D: $E_{loc(i)}$). For this purpose a finite element analysis in accordance with 9.3.4.4.2 shall be used.

These calculations shall be done for two collision scenarios according to the following table. Collision scenario I shall be analysed under the assumption of a push barge bow shape. Collision scenario II shall be analysed under the assumption of a V–shaped bow.

These bow shapes are defined in 9.3.4.4.8.

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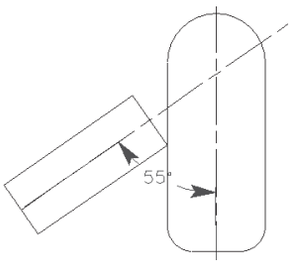
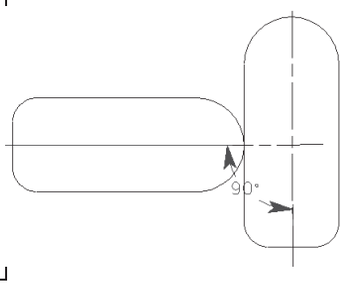
Table : Speed reduction factors for scenario I or scenario II with weighting factors

				Causes		
				Communication error and poor visibility	**Technical error**	**Human error**
				0,50	0,20	0,30
Worst case scenarios	I		Push barge–bow, striking angle 55° 0,80	0.66	0.50	1.00
	II		V–shaped–bow, striking angle 90° 0,20	0.30		1.00

9.3.4.3.1.5 *Step 5*

9.3.4.3.1.5.1 For each collision energy absorption capacity $E_{loc(i)}$, the associated probability of exceedance is to be calculated, i.e. the probability of cargo tank rupture. For this purpose, the formula for the cumulative probability density functions (CPDF) below shall be used. The appropriate coefficients shall be selected from the Table in 9.3.4.3.1.5.6 for the effective mass of the struck vessel.

$$P_{x\%} = C_1(E_{loc(i)})^3 + C_2(E_{loc(i)})^2 + C_3E_{loc(i)} + C_4$$

with: $P_{x\%}$ probability of tank rupture,

$C_{1–4}$ coefficients from table in 9.3.4.3.1.5.6,

$E_{loc(i)}$ collision energy absorbing capacity.

9.3.4.3.1.5.2 The effective mass shall be equal to the maximum displacement of the vessel multiplied by a factor of 1.4. Both collision scenarios (9.3.4.3.1.4.2) shall be considered.

9.3.4.3.1.5.3 In the case of collision scenario I (push barge bow at 55°), three CPDF formulas shall be used:

CPDF 50% (velocity 0.5 V_{max}),

CPDF 66% (velocity 2/3 V_{max}) and

CPDF 100% (velocity V_{max}).

9.3.4.3.1.5.4 In the case of scenario II (V–shaped bow at 90°), the following two CPDF formulas shall be used:

CPDF 30% (velocity 0.3 V_{max}) and

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CPDF 100% (velocity V_{max}).

9.3.4.3.1.5.5 In the table in 9.3.4.3.1, column F, these probabilities are called *P50%*, *P66%*, *P100%* and *P30%*, *P100%* respectively.

9.3.4.3.1.5.6 Table: Coefficients for the CPDF formulas

Effective mass of struck vessel in tonnes	velocity = 1 x V_{max} coefficients				
	C_1	C_2	C_3	C_4	range
14000	4.106E–05	–2.507E–03	9.727E–03	9.983E–01	$4<E_{loc}<39$
12000	4.609E–05	–2.761E–03	1.215E–02	9.926E–01	$4<E_{loc}<36$
10000	5.327E–05	–3.125E–03	1.569E–02	9.839E–01	$4<E_{loc}<33$
8000	6.458E–05	–3.691E–03	2.108E–02	9.715E–01	$4<E_{loc}<31$
6000	7.902E–05	–4.431E–03	2.719E–02	9.590E–01	$4<E_{loc}<27$
4500	8.823E–05	–5.152E–03	3.285E–02	9.482E–01	$4<E_{loc}<24$
3000	2.144E–05	–4.607E–03	2.921E–02	9.555E–01	$2<E_{loc}<19$
1500	– 2.071E–03	2.704E–02	–1.245E–01	1.169E+00	$2<E_{loc}<12$

Effective mass of struck vessel in tonnes	velocity = 0.66 x V_{max} coefficients				
	C_1	C_2	C_3	C_4	range
14000	4.638E–04	–1.254E–02	2.041E–02	1.000E+00	$2<E_{loc}<17$
12000	5.377E–04	–1.427E–02	2.897E–02	9.908E–01	$2<E_{loc}<17$
10000	6.262E–04	–1.631E–02	3.849E–02	9.805E–01	$2<E_{loc}<15$
8000	7.363E–04	–1.861E–02	4.646E–02	9.729E–01	$2<E_{loc}<13$
6000	9.115E–04	–2.269E–02	6.285E–02	9.573E–01	$2<E_{loc}<12$
4500	1.071E–03	–2.705E–02	7.738E–02	9.455E–01	$1<E_{loc}<11$
3000	–1.709E–05	–1.952E–02	5.123E–02	9.682E–01	$1<E_{loc}<8$
1500	–2.479E–02	1.500E–01	–3.218E–01	1.204E+00	$1<E_{loc}<5$

Effective mass of struck vessel in tonnes	velocity = 0.5 x V_{max} coefficients				
	C_1	C_2	C_3	C_4	range
14000	2.621E–03	–3.978E–02	3.363E–02	1.000E+00	$1<E_{loc}<10$
12000	2.947E–03	–4.404E–02	4.759E–02	9.932E–01	$1<E_{loc}<9$
10000	3.317E–03	–4.873E–02	5.843E–02	9.878E–01	$2<E_{loc}<8$
8000	3.963E–03	–5.723E–02	7.945E–02	9.739E–01	$2<E_{loc}<7$
6000	5.349E–03	–7.407E–02	1.186E–01	9.517E–01	$1<E_{loc}<6$
4500	6.303E–03	–8.713E–02	1.393E–01	9.440E–01	$1<E_{loc}<6$
3000	2.628E–03	–8.504E–02	1.447E–01	9.408E–01	$1<E_{loc}<5$
1500	–1.566E–01	5.419E–01	–6.348E–01	1.209E+00	$1<E_{loc}<3$

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Effective mass of struck vessel in tonnes	velocity = 0.3 x V_{max} coefficients				
	C_1	C_2	C_3	C_4	range
14000	5.628E–02	–3.081E–01	1.036E–01	9.991E–01	$1<E_{loc}<3$
12000	5.997E–02	–3.212E–01	1.029E–01	1.002E+00	$1<E_{loc}<3$
10000	7.477E–02	–3.949E–01	1.875E–01	9.816E–01	$1<E_{loc}<3$
8000	1.021E–02	–5.143E–01	2.983E–01	9.593E–01	$1<E_{loc}<2$
6000	9.145E–02	–4.814E–01	2.421E–01	9.694E–01	$1<E_{loc}<2$
4500	1.180E–01	–6.267E–01	3.542E–01	9.521E–01	$1<E_{loc}<2$
3000	7.902E–02	–7.546E–01	5.079E–01	9.218E–01	$1<E_{loc}<2$
1500	–1.031E+00	2.214E–01	1.891E–01	9.554E–01	$0.5<E_{loc}<1$

The range where the formula is valid is given in column 6. In case of an E_{loc} value below the range the probability equals $P_{x\%} = 1.0$. In case of a value above the range $P_{x\%}$ equals 0.

9.3.4.3.1.6 *Step 6*

The weighted probabilities of cargo tank rupture $P_{wx\%}$ (table in 9.3.4.3.1, column H) shall be calculated by multiplying each cargo tank rupture probability $P_{x\%}$ (table in 9.3.4.3.1, column F) by the weighting factors $wf_{x\%}$ according to the following table:

Table: Weighting factors for each characteristic collision speed

			weighting factor
Scenario I	CPDF 50%	wf50%	0.2
	CPDF 66%	wf66%	0.5
	CPDF 100%	wf100%	0.3
Scenario II	CPDF 30%	wf30%	0.7
	CPDF 100%	wf100%	0.3

9.3.4.3.1.7 *Step 7*

The total probabilities of cargo tank rupture $P_{loc(i)}$ (table in 9.3.4.3.1, column I) resulting from 9.3.4.3.1.6 (step 6) shall be calculated as the sum of all weighted cargo tank rupture probabilities $P_{wx\%}$ (table in 9.3.4.3.1, column H) for each collision location considered.

9.3.4.3.1.8 *Step 8*

For both collision scenarios the weighted total probabilities of cargo tank rupture $P_{wloc(i)}$ shall, in each case, be calculated by multiplying the total tank probabilities of cargo tank rupture $P_{loc(i)}$ for each collision location, by the weighting factors $wf_{loc(i)}$ corresponding to the respective collision location (see 9.3.4.3.1.3 (step 3) and table in 9.3.4.3.1, column J).

9.3.4.3.1.9 *Step 9*

Through the addition of the weighted total probabilities of cargo tank rupture $P_{wloc(i)}$, the scenario specific total probabilities of cargo tank rupture P_{scenI} and P_{scenII} (table in 9.3.4.3.1, column L) shall be calculated, for each collision scenario I and II separately.

9.3.4.3.1.10 *Step 10*

Finally the weighted value of the overall total probability of cargo tank rupture P_w shall be calculated by the formula below (table in 9.3.4.3.1, column O):

$$P_w = 0.8 \bullet P_{scenI} + 0.2 \bullet P_{scenII}$$

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9.3.4.3.1.11 *Step 11*

The overall total probability of cargo tank rupture P_w for the alternative design is called P_n. The overall total probability of cargo tank rupture P_w for the reference design is called P_r.

9.3.4.3.1.12 *Step 12*

9.3.4.3.1.12.1 The ratio (C_n/C_r) between the consequence (measure of damage) C_n of a cargo tank rupture of the alternative design and the consequence C_r of a cargo tank rupture of the reference design shall be determined with the following formula:

$C_n/C_r = V_n / V_r$

With C_n/C_r the ratio between the consequence related to the alternative design, and the consequence related to the reference design,

V_n maximum capacity of the largest cargo tank in the alternative design,

V_r maximum capacity of the largest cargo tank reference design.

9.3.4.3.1.12.2 This formula was derived for characteristic cargoes as listed in the following table.

Table: Characteristic cargoes

	UN No.	**Description**
Benzene	1114	Flammable liquid Packing group II Hazardous to health
Acrylonitrile Stabilised ACN	1093	Flammable liquid Packing group I Toxic, stabilised
n–Hexane	1208	Flammable liquid Packing group II
Nonane	1920	Flammable liquid Packing group III
Ammonia	1005	Toxic, corrosive gas Liquefied under pressure
Propane	1978	Flammable gas Liquefied under pressure

9.3.4.3.1.12.3 For cargo tanks with capacities between 380 m^3 and 1000 m^3 containing flammable, toxic and acid liquids or gases it shall be assumed that the effect increase relates linearly to the increased tank capacity (proportionality factor 1.0).

9.3.4.3.1.12.4 If substances are to be carried in tank vessels, which have been analysed according to this calculation procedure, where the proportionality factor between the total cargo tank capacity and the affected area is expected to be larger than 1.0, as assumed in the previous paragraph, the affected area shall be determined through a separate calculation. In this case the comparison as described in 9.3.4.3.1.13 (step 13) shall be carried out with this different value for the size of the affected area, t.

9.3.4.3.1.13 *Step 13*

Finally the ratio $\frac{P_r}{P_n}$ between the overall total probability of cargo tank rupture P_r for the reference design and the overall total probability of cargo tank rupture P_n for the alternative

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design shall be compared with the ratio $\frac{C_n}{C_r}$ between the consequence related to the alternative design, and the consequence related to the reference design.

When $\frac{C_n}{C_r} \leq \frac{P_r}{P_n}$ is fulfilled, the evidence according to 9.3.4.1.3 for the alternative design is provided.

9.3.4.4 ***Determination of the collision energy absorbing capacity***

9.3.4.4.1 *General*

9.3.4.4.1.1 The determination of the collision energy absorbing capacity shall be carried out by means of a finite element analysis (FEA). The analysis shall be carried out using a customary finite element code (e.g. LS–DYNA[6], PAM–CRASH[7], ABAQUS[8] etc.) capable of dealing with both geometrical and material non–linear effects. The code shall also be able to simulate rupture realistically.

9.3.4.4.1.2 The program actually used and the level of detail of the calculations shall be agreed upon with a recognised classification society.

9.3.4.4.2 Creating the finite element models (FE models)

9.3.4.4.2.1 First of all, FE models for the more crashworthy design and one for the reference design shall be generated. Each FE model shall describe all plastic deformations relevant for all collision cases considered. The section of the cargo area to be modelled shall be agreed upon with a recognised classification society.

9.3.4.4.2.2 At both ends of the section to be modelled all three translational degrees of freedom are to be restrained. Because in most collision cases the global horizontal hull girder bending of the vessel is not of significant relevance for the evaluation of plastic deformation energy it is sufficient that only half beam of the vessel needs to be considered. In these cases the transverse displacements at the centre line (CL) shall be constrained. After generating the FE model, a trial collision calculation shall be carried out to ensure that there is no occurrence of plastic deformations near the constraint boundaries. Otherwise the FE modelled area has to be extended.

9.3.4.4.2.3 Structural areas affected during collisions shall be sufficiently finely idealized, while other parts may be modelled more coarsely. The fineness of the element mesh shall be suitable for an adequate description of local folding deformations and for determination of realistic rupture of elements.

9.3.4.4.2.4 The calculation of rupture initiation must be based on fracture criteria which are suitable for the elements used. The maximum element size shall be less than 200 mm in the collision areas. The ratio between the longer and the shorter shell element edge shall not exceed the value of three. The element length L for a shell element is defined as the longer length of both sides of the element. The ratio between element length and element thickness shall be larger than five. Other values shall be agreed upon with the recognised classification society.

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[6] *LSTC, 7374 Las Positas Rd, Livermore, CA 94551, USA Tel : +1 925 245–4500.*

[7] *ESI Group, 8, Rue Christophe Colomb, 75008 Paris, France Tel: +33 (0)1 53 65 14 14, Fax: +33 (0)1 53 65 14 12, E–mail: info@esi–group.com.*

[8] *SIMULIA, Rising Sun Mills, 166 Valley Street, Providence, RI 02909–2499 USA Tel: +1 401 276–4400, Fax: +1 401 276–4408, E–mail: info@simulia.com.*

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9.3.4.4.2.5 Plate structures, such as shell, inner hull (tank shell in the case of gas tanks), webs as well as stringers can be modelled as shell elements and stiffeners as beam elements. While modelling, cut outs and manholes in collision areas shall be taken into account.

9.3.4.4.2.6 In the FE calculation the 'node on segment penalty' method shall be used for the contact option. For this purpose the following options shall be activated in the codes mentioned:

- "contact_automatic_single_surface" in LS–DYNA,
- "self impacting" in PAMCRASH, and
- similar contact types in other FE–programs.

9.3.4.4.3 *Material properties*

9.3.4.4.3.1 Because of the extreme behaviour of material and structure during a collision, with both geometrical and material non–linear effects, true stress–strain relations shall be used:

$$\sigma = C \cdot \varepsilon^n ,$$

where

$$n = \ln(1 + A_g) ,$$

$$C = R_m \cdot \left(\frac{e}{n} \right)^n ,$$

Ag = the maximum uniform strain related to the ultimate tensile stress Rm and

e = the natural logarithmic constant.

9.3.4.4.3.2 The values Ag and Rm shall be determined through tensile tests.

9.3.4.4.3.3 If only the ultimate tensile stress Rm is available, for shipbuilding steel with a yield stress ReH of not more than 355 N/mm² the following approximation shall be used in order to obtain the Ag value from a known Rm [N/mm²] value:

$$A_g = \frac{1}{0.24 + 0.01395 \cdot R_m}$$

9.3.4.4.3.4 If the material properties from tensile tests are not available when starting the calculations, minimum values of A_g and R_m, as defined in the rules of the recognised classification society, shall be used instead. For shipbuilding steel with a yield stress higher than 355 N/mm² or materials other than shipbuilding steel, material properties shall be agreed upon with a recognised classification society.

9.3.4.4.4 *Rupture criteria*

9.3.4.4.4.1 The first rupture of an element in a FEA is defined by the failure strain value. If the calculated strain, such as plastic effective strain, principal strain or, for shell elements, the strain in the thickness direction of this element exceeds its defined failure strain value, the element shall be deleted from the FE model and the deformation energy in this element will no longer change in the following calculation steps.

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9.3.4.4.4.2 The following formula shall be used for the calculation of rupture strain:

$$\varepsilon_f(l_e) = \varepsilon_g + \varepsilon_e \cdot \frac{t}{l_e}$$

where
ε_g = *uniform strain*
ε_e = *necking*
t = *plate thickness*
l_e = *individual element length.*

9.3.4.4.4.3 The values of uniform strain and the necking for shipbuilding steel with a yield stress R_{eH} of not more than 355 N/mm² shall be taken from the following table:

stress states	1–D	2–D
ε_g	0.079	0.056
ε_e	0.76	0.54
element type	truss beam	shell plate

9.3.4.4.4.4 Other ε_g and ε_e values taken from thickness measurements of exemplary damage cases and experiments may be used in agreement with the recognised classification society.

9.3.4.4.4.5 Other rupture criteria may be accepted by the recognised classification society if proof from adequate tests is provided.

9.3.4.4.4.6 *Tank vessel type G*

For a tank vessel type G the rupture criterion for the pressure tank shall be based on equivalent plastic strain. The value to be used while applying the rupture criterion shall be agreed upon with the recognised classification society. Equivalent plastic strains associated with compressions shall be ignored.

9.3.4.4.5 Calculation of the collision energy absorbing capacity

9.3.4.4.5.1 The collision energy absorbing capacity is the summation of internal energy (energy associated with deformation of structural elements) and friction energy.

The friction coefficient μ_c is defined as:

$$\mu_c = FD + (FS - FD) \cdot e^{-DC|v_{rel}|},$$

with FD = *0.1,*
FS = *0.3,*
DC = *0.01*
$|v_{rel}|$ = *relative friction velocity.*

NOTE: *Values are default for shipbuilding steel.*

9.3.4.4.5.2 The force penetration curves resulting from the FE model calculation shall be submitted to the recognised classification society.

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9.3.4.4.5.3 *Tank vessel type G*

9.3.4.4.5.3.1 In order to obtain the total energy absorbing capacity of a tank vessel type G the energy absorbed through compression of the vapour during the collision shall be calculated.

9.3.4.4.5.3.2 The energy *E* absorbed by the vapour shall be calculated as follows:

$$E = \frac{p_1 \cdot V_1 - p_0 \cdot V_0}{1 - \gamma}$$

with:

γ 1.4
(Note: The value 1.4 is the default value c_p/c_v with, in principle:
c_p = specific heat at constant pressure [J/(kgK)]
c_v = specific heat at constant volume [J/(kgK)])
p_0 = pressure at start of compression [Pa]
p_1 = pressure at end of compression [Pa]
V_0 = volume at start of compression [m^3]
V_1 = volume at end of compression [m^3]

9.3.4.4.6 Definition of striking vessel and striking bow

9.3.4.4.6.1 At least two types of bow shapes of the striking vessel shall be used for calculating the collision energy absorbing capacities:

– bow shape I: push barge bow (see 9.3.4.4.8),

– bow shape II: V–shape bow without bulb (see 9.3.4.4.8).

9.3.4.4.6.2 Because in most collision cases the bow of the striking vessel shows only slight deformations compared to the side structure of the struck vessel, a striking bow will be defined as rigid. Only for special situations, where the struck vessel has an extremely strong side structure compared to the striking bow and the structural behaviour of the struck vessel is influenced by the plastic deformation of the striking bow, the striking bow shall be considered as deformable. In this case the structure of the striking bow should also be modelled. This shall be agreed upon with the recognised classification society.

9.3.4.4.7 Assumptions for collision cases

For the collision cases the following shall be assumed:

As collision angle between striking and struck vessel 90° shall be taken in case of a V–shaped bow and 55° in case of a push barge bow; and

The struck vessel has zero speed, while the striking vessel runs into the side of the struck ship with a constant speed of 10 m/s.

The collision velocity of 10 m/s is an assumed value to be used in the FE analysis.

9.3.4.4.8 *Types of bow shapes*

9.3.4.4.8.1 Push barge bow

Characteristic dimensions shall be taken from the table below:

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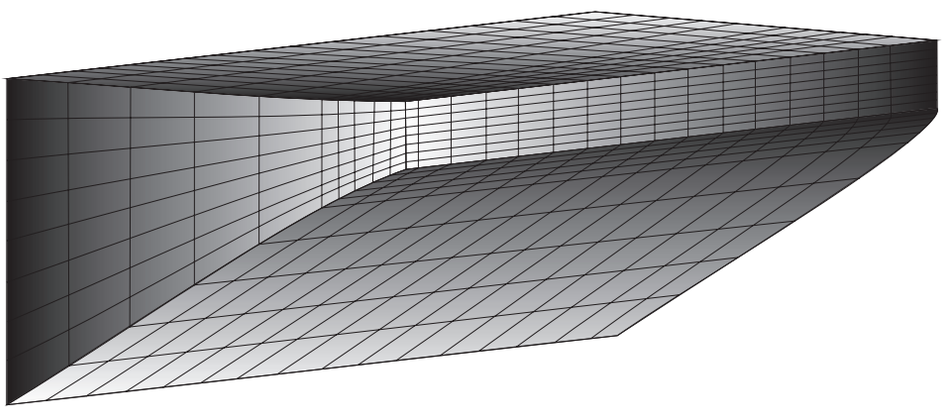
	half breadths		
fr	**Knuckle 1**	**Knuckle 2**	**deck**
145	4.173	5.730	5.730
146	4.100	5.730	5.730
147	4.028	5.730	5.730
148	3.955	5.711	5.711
149	3.883	5.653	5.653
150	3.810	5.555	5.555
151	3.738	5.415	5.415
152	3.665	5.230	5.230
transom	3.600	4.642	4.642

heights			
stem	**Knuckle 1**	**Knuckle 2**	**deck**
0.769	1.773	2.882	5.084
0.993	2.022	3.074	5.116
1.255	2.289	3.266	5.149
1.559	2.576	3.449	5.181
1.932	2.883	3.621	5.214
2.435	3.212	3.797	5.246
3.043	3.536	3.987	5.278
3.652	3.939	4.185	5.315
4.200	4.300	4.351	5.340

The following figures are intended to provide illustration.



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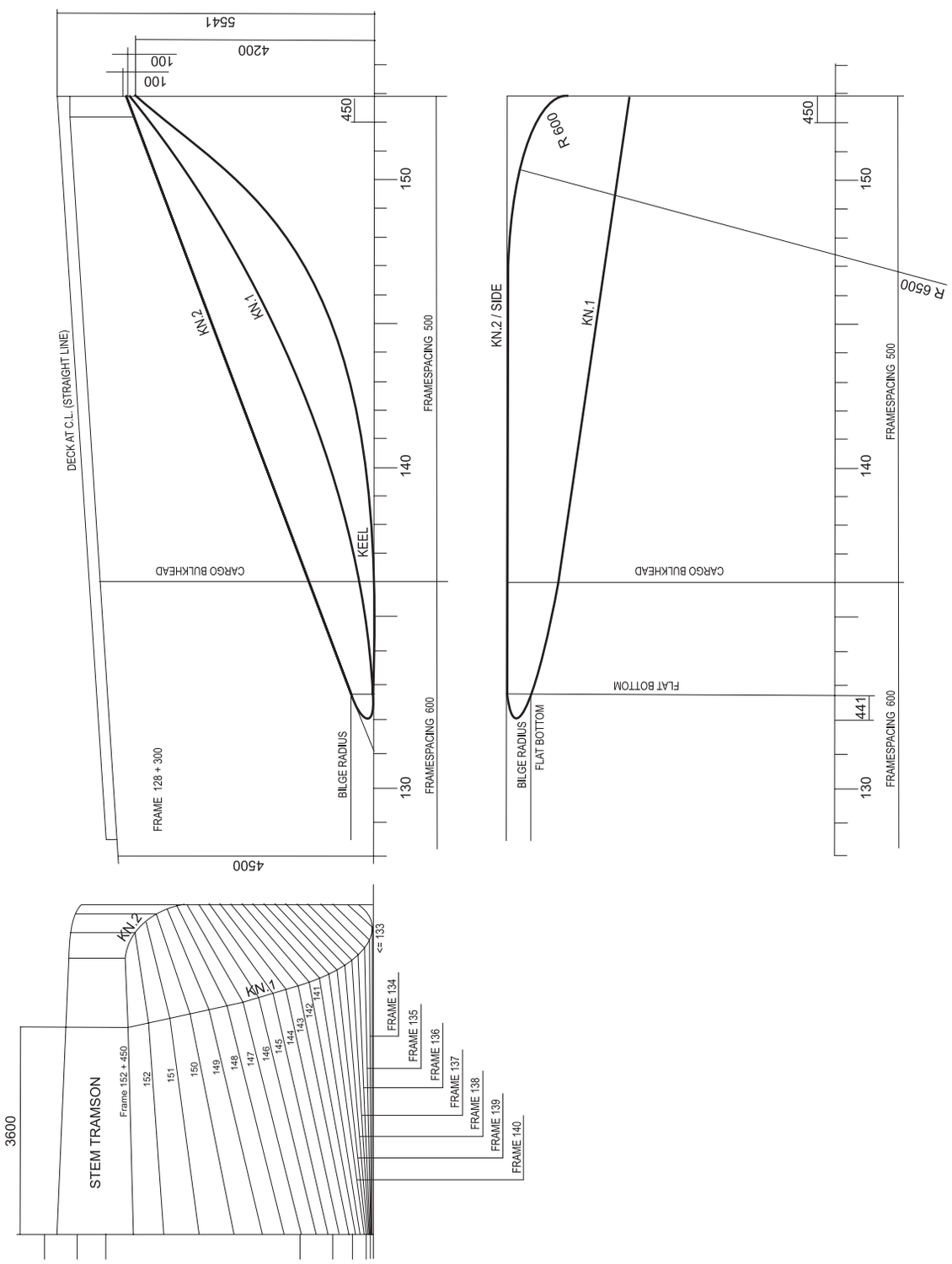

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9.3.4.4.8.2 V–bow

Characteristic dimensions shall be taken from the table below:

Reference number	x	y	z
1	0.000	3.923	4.459
2	0.000	3.923	4.852
11	0.000	3.000	2.596
12	0.652	3.000	3.507
13	1.296	3.000	4.535
14	1.296	3.000	4.910
21	0.000	2.000	0.947
22	1.197	2.000	2.498
23	2.346	2.000	4.589
24	2.346	2.000	4.955
31	0.000	1.000	0.085
32	0.420	1.000	0.255
33	0.777	1.000	0.509
34	1.894	1.000	1.997
35	3.123	1.000	4.624
36	3.123	1.000	4.986
41	1.765	0.053	0.424
42	2.131	0.120	1.005
43	2.471	0.272	1.997
44	2.618	0.357	2.493
45	2.895	0.588	3.503
46	3.159	0.949	4.629
47	3.159	0.949	4.991
51	0.000	0.000	0.000
52	0.795	0.000	0.000
53	2.212	0.000	1.005
54	3.481	0.000	4.651
55	3.485	0.000	5.004

The following figures are intended to provide illustration.

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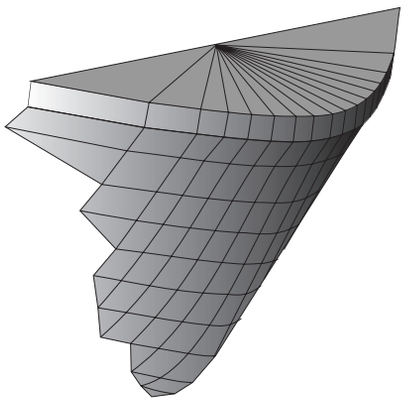

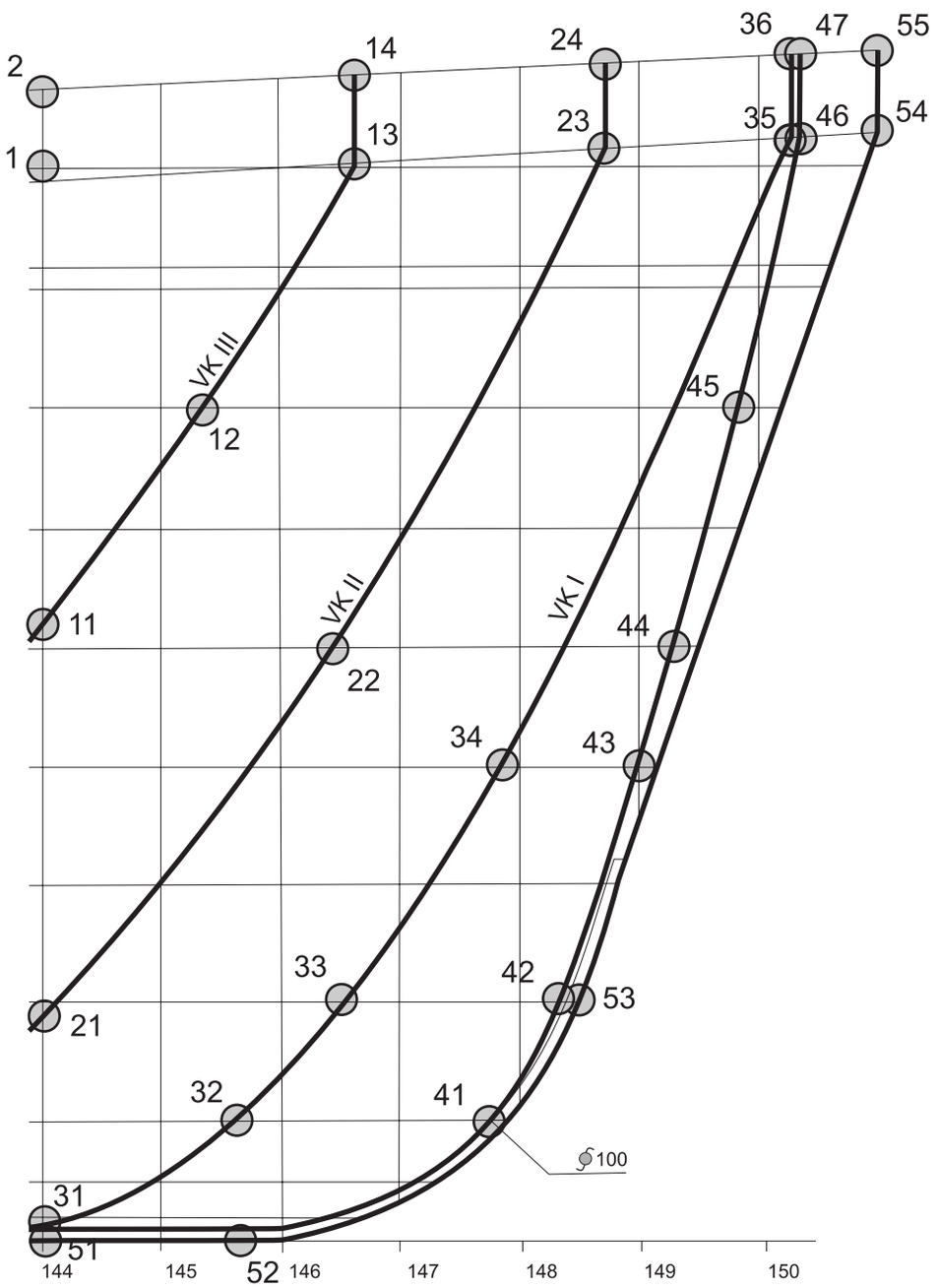

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ECE/TRANS/276 (Vol. II)

ECONOMIC COMMISSION FOR EUROPE

Committee on Inland Transport

European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)

including the Annexed Regulations, applicable as from 1 January 2019

Volume II

UNITED NATIONS
New York and Geneva, 2018

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ECE/TRANS/276 (Vol. II)

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UNITED NATIONS PUBLICATIONS

Sales No.: E.18.VIII.2
ISBN: 978-92-1-139164-0
(Complete set of 2 volumes)
e-ISBN: 978-92-1-045175-8

ISSN: 2411-8583
eISSN: 2411-8591

Volumes I and II not to be sold separately.

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ANNEXED REGULATIONS
(continued)

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PART 2

Classification

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CHAPTER 2.1

GENERAL PROVISIONS

2.1.1 Introduction

2.1.1.1 The classes of dangerous goods according to ADN are the following:

Class 1	Explosive substances and articles
Class 2	Gases
Class 3	Flammable liquids
Class 4.1	Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives
Class 4.2	Substances liable to spontaneous combustion
Class 4.3	Substances which, in contact with water, emit flammable gases
Class 5.1	Oxidizing substances
Class 5.2	Organic peroxides
Class 6.1	Toxic substances
Class 6.2	Infectious substances
Class 7	Radioactive material
Class 8	Corrosive substances
Class 9	Miscellaneous dangerous substances and articles

2.1.1.2 Each entry in the different classes has been assigned a UN number. The following types of entries are used:

A. Single entries for well defined substances or articles including entries for substances covering several isomers, e.g.:

UN No. 1090	ACETONE
UN No. 1104	AMYL ACETATES
UN No. 1194	ETHYL NITRITE SOLUTION

B. Generic entries for a well defined group of substances or articles, which are not n.o.s. entries, e.g.:

UN No. 1133	ADHESIVES
UN No. 1266	PERFUMERY PRODUCTS
UN No. 2757	CARBAMATE PESTICIDE, SOLID, TOXIC
UN No. 3101	ORGANIC PEROXIDE TYPE B, LIQUID

C. Specific n.o.s. entries covering a group of substances or articles of a particular chemical or technical nature, not otherwise specified, e.g.:

UN No. 1477	NITRATES, INORGANIC, N.O.S.
UN No. 1987	ALCOHOLS, N.O.S.

D. General n.o.s. entries covering a group of substances or articles having one or more dangerous properties, not otherwise specified, e.g.:

UN No. 1325	FLAMMABLE SOLID, ORGANIC, N.O.S.
UN No. 1993	FLAMMABLE LIQUID, N.O.S.

The entries defined under B, C and D are defined as collective entries.

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2.1.1.3 For packing purposes, substances other than those of Classes 1, 2, 5.2, 6.2 and 7, and other than self-reactive substances of Class 4.1 are assigned to packing groups in accordance with the degree of danger they present:

Packing group I: Substances presenting high danger;

Packing group II: Substances presenting medium danger;

Packing group III: Substances presenting low danger.

The packing group(s) to which a substance is assigned is (are) indicated in Table A of Chapter 3.2.

Articles are not assigned to packing groups. For packing purposes any requirement for a specific packaging performance level is set out in the applicable packing instruction.

2.1.1.4 For the purpose of carriage in tank vessels, some substances may be further subdivided.

2.1.2 Principles of classification

2.1.2.1 The dangerous goods covered by the heading of a class are defined on the basis of their properties according to sub-section 2.2.x.1 of the relevant class. Assignment of dangerous goods to a class and a packing group is made according to the criteria mentioned in the same sub-section 2.2.x.1. Assignment of one or several subsidiary hazard(s) to a dangerous substance or article is made according to the criteria of the class or classes corresponding to those hazards, as mentioned in the appropriate sub-section(s) 2.2.x.1.

2.1.2.2 All dangerous goods entries are listed in Table A of Chapter 3.2 in the numerical order of their UN Number. This table contains relevant information on the goods listed, such as name, class, packing group(s), label(s) to be affixed, packing and carriage provisions[1]. The substances listed by name in column (2) of Table A of Chapter 3.2 shall be carried according to their classification in Table A or under the conditions specified in 2.1.2.8.

2.1.2.3 A substance may contain technical impurities (for example those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance mentioned by name, i.e. listed as a single entry in Table A of Chapter 3.2, containing technical impurities or additives for stability or other purposes affecting its classification shall be considered a solution or mixture (see 2.1.3.3).

2.1.2.4 Dangerous goods which are listed or defined in sub-section 2.2.x.2 of each class are not to be accepted for carriage.

2.1.2.5 Goods not mentioned by name, i.e. goods not listed as single entries in Table A of Chapter 3.2 and not listed or defined in one of the above-mentioned sub-sections 2.2.x.2 shall be assigned to the relevant class in accordance with the procedure of section 2.1.3. In addition, the subsidiary hazard (if any) and the packing group (if any) shall be determined. Once the class, subsidiary hazard (if any) and packing group (if any) have been established the relevant UN number shall be determined. The decision trees in sub-sections 2.2.x.3 (list of collective entries) at the end of each class indicate the relevant parameters for selecting the relevant collective entry (UN number). In all cases the most specific collective entry covering the properties of the substance or article shall be selected, according to the hierarchy indicated in 2.1.1.2 by the letters B, C and D respectively. If the substance or article cannot be classified under entries of type B or C according to 2.1.1.2, then, and only then shall it be classified under an entry of type D.

[1] ***Note by the secretariat:*** *An alphabetic list of these entries has been prepared by the secretariat and is reproduced in Table B of Chapter 3.2. This table is not an official part of the ADN.*

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2.1.2.6 On the basis of the test procedures of Chapter 2.3 and the criteria set out in sub-sections 2.2.x.1 of the various classes when it is so specified, it may be determined that a substance, solution or mixture of a certain class, mentioned by name in Table A of Chapter 3.2, does not meet the criteria of that class. In such a case, the substance, solution or mixture is deemed not to belong to that class.

2.1.2.7 For the purposes of classification, substances with a melting point or initial melting point of 20 °C or lower at a pressure of 101.3 kPa shall be considered to be liquids. A viscous substance for which a specific melting point cannot be determined shall be subjected to the ASTM D 4359-90 test or to the test for determining fluidity (penetrometer test) prescribed in 2.3.4.

2.1.2.8 A consignor who has identified, on the basis of test data, that a substance listed by name in column 2 of Table A of Chapter 3.2 meets classification criteria for a class that is not identified in column 3a or 5 of Table A of Chapter 3.2, may, with the approval of the competent authority, consign the substance:

- Under the most appropriate collective entry listed in sub-sections 2.2.x.3 reflecting all hazards; or

- Under the same UN number and name but with additional hazard communication information as appropriate to reflect the additional subsidiary hazard(s) (documentation, label, placard) provided that the class remains unchanged and that any other carriage conditions (e.g. limited quantity, packaging and tank provisions) that would normally apply to substances possessing such a combination of hazards are the same as those applicable to the substance listed.

NOTE 1: *The competent authority granting the approval may be the competent authority of any ADN Contracting Party who may also recognize an approval granted by the competent authority of a country which is not an ADN Contracting Party provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions.*

NOTE 2: *When a competent authority grants such approvals, it should inform the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods accordingly and submit a relevant proposal of amendment to the Dangerous Goods List of the UN Model Regulations. Should the proposed amendment be rejected, the competent authority should withdraw its approval.*

NOTE 3: *For carriage in accordance with 2.1.2.8, see also 5.4.1.1.20.*

2.1.3 Classification of substances, including solutions and mixtures (such as preparations and wastes), not mentioned by name

2.1.3.1 Substances including solutions and mixtures not mentioned by name shall be classified according to their degree of danger on the basis of the criteria mentioned in sub-section 2.2.x.1 of the various classes. The danger(s) presented by a substance shall be determined on the basis of its physical and chemical characteristics and physiological properties. Such characteristics and properties shall also be taken into account when such experience leads to a more stringent assignment.

2.1.3.2 A substance not mentioned by name in Table A of Chapter 3.2 presenting a single hazard shall be classified in the relevant class under a collective entry listed in sub-section 2.2.x.3 of that class.

2.1.3.3 A solution or mixture meeting the classification criteria of ADN composed of a single predominant substance mentioned by name in Table A of Chapter 3.2 and one or more substances not subject to ADN and/or traces of one or more substances mentioned by name in

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Table A of Chapter 3.2, shall be assigned the UN number and proper shipping name of the predominant substance mentioned by name in Table A of Chapter 3.2 unless:

(a) The solution or mixture is mentioned by name in Table A of Chapter 3.2;

(b) The name and description of the substance mentioned by name in Table A of Chapter 3.2 specifically indicate that they apply only to the pure substance;

(c) The class, classification code, packing group, or physical state of the solution or mixture is different from that of the substance mentioned by name in Table A of Chapter 3.2; or

(d) The hazard characteristics and properties of the solution or mixture necessitate emergency response measures that are different from those required for the substance mentioned by name in Table A of Chapter 3.2.

In those other cases, except the one described in (a), the solution or mixture shall be classified as a substance not mentioned by name in the relevant class under a collective entry listed in sub-section 2.2.x.3 of that class taking account of the subsidiary hazards presented by that solution or mixture, if any, unless the solution or mixture does not meet the criteria of any class, in which case it is not subject to ADN.

2.1.3.4 Solutions and mixtures containing a substance belonging to one of the entries mentioned in 2.1.3.4.1 or 2.1.3.4.2 shall be classified in accordance with the provisions of these paragraphs.

2.1.3.4.1 Solutions and mixtures containing one of the following substances mentioned by name shall always be classified under the same entry as the substance they contain, provided they do not have the hazard characteristics as indicated in 2.1.3.5.3:

– Class 3

UN No. 1921 PROPYLENEIMINE, STABILIZED;

UN No. 3064 NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin;

– Class 6.1

UN No. 1051 HYDROGEN CYANIDE, STABILIZED, containing less than 3% water;

UN No. 1185 ETHYLENEIMINE, STABILIZED;

UN No. 1259 NICKEL CARBONYL;

UN No. 1613 HYDROCYANIC ACID, AQUEOUS SOLUTION (HYDROGEN CYANIDE, AQUEOUS SOLUTION) with not more than 20% hydrogen cyanide;

UN No. 1614 HYDROGEN CYANIDE, STABILIZED, containing not more than 3% water and absorbed in a porous inert material;

UN No. 1994 IRON PENTACARBONYL;

UN No. 2480 METHYL ISOCYANATE;

UN No. 2481 ETHYL ISOCYANATE;

UN No. 3294 HYDROGEN CYANIDE, SOLUTION IN ALCOHOL, with not more than 45% hydrogen cyanide;

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– Class 8

UN No. 1052 HYDROGEN FLUORIDE, ANHYDROUS;

UN No. 1744 BROMINE or UN No. 1744 BROMINE SOLUTION;

UN No. 1790 HYDROFLUORIC ACID with more than 85% hydrogen fluoride;

UN No. 2576 PHOSPHORUS OXYBROMIDE, MOLTEN.

2.1.3.4.2 Solutions and mixtures containing a substance belonging to one of the following entries of Class 9:

UN No. 2315 POLYCHLORINATED BIPHENYLS, LIQUID;

UN No. 3151 POLYHALOGENATED BIPHENYLS, LIQUID;

UN No. 3151 HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUID;

UN No. 3151 POLYHALOGENATED TERPHENYLS, LIQUID;

UN No. 3152 POLYHALOGENATED BIPHENYLS, SOLID;

UN No. 3152 HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID;

UN No. 3152 POLYHALOGENATED TERPHENYLS, SOLID; or

UN No. 3432 POLYCHLORINATED BIPHENYLS, SOLID

shall always be classified under the same entry of Class 9 provided that:

− they do not contain any additional dangerous component other than components of packing group III of classes 3, 4.1, 4.2, 4.3, 5.1, 6.1 or 8; and

− they do not have the hazard characteristics as indicated in 2.1.3.5.3.

2.1.3.5 Substances not mentioned by name in Table A of Chapter 3.2, having more than one hazard characteristic and solutions or mixtures meeting the classification criteria of ADN containing several dangerous substances shall be classified under a collective entry (see 2.1.2.5) and packing group of the appropriate class in accordance with their hazard characteristics. Such classification according to the hazard characteristics shall be carried out as follows:

2.1.3.5.1 The physical and chemical characteristics and physiological properties shall be determined by measurement or calculation and the substance, solution or mixture shall be classified according to the criteria mentioned in sub-section 2.2.x.1 of the various classes.

2.1.3.5.2 If this determination is not possible without disproportionate cost or effort (as for some kinds of wastes), the substance, solution or mixture shall be classified in the class of the component presenting the major hazard.

2.1.3.5.3 If the hazard characteristics of the substance, solution or mixture fall within more than one class or group of substances listed below then the substance, solution or mixture shall be classified in the class or group of substances corresponding to the major hazard on the basis of the following order of precedence:

(a) Material of Class 7 (apart from radioactive material in excepted packages, for which, except for UN 3507 URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, special provision 290 of Chapter 3.3 applies, where the other hazardous properties take precedence);

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(b) Substances of Class 1;

(c) Substances of Class 2;

(d) Liquid desensitized explosives of Class 3;

(e) Self-reactive substances and solid desensitized explosives of Class 4.1;

(f) Pyrophoric substances of Class 4.2;

(g) Substances of Class 5.2;

(h) Substances of Class 6.1 meeting the inhalation toxicity criteria of packing group I (Substances meeting the classification criteria of Class 8 and having an inhalation toxicity of dust and mist (LC_{50}) in the range of packing group I and a toxicity through oral ingestion or dermal contact only in the range of packing group III or less, shall be allocated to Class 8);

(i) Infectious substances of Class 6.2.

2.1.3.5.4 If the hazard characteristics of the substance fall within more than one class or group of substances not listed in 2.1.3.5.3 above, the substance shall be classified in accordance with the same procedure but the relevant class shall be selected according to the precedence of hazards table in 2.1.3.10.

If the hazard characteristics of the substance are such that the substance can be assigned to a UN number or an identification number, then the UN number shall take precedence.

2.1.3.5.5 If the substance to be carried is a waste, with a composition that is not precisely known, its assignment to a UN number and packing group in accordance with 2.1.3.5.2 may be based on the consignor's knowledge of the waste, including all available technical and safety data as requested by safety and environmental legislation in force. [2]

In case of doubt, the highest danger level shall be taken.

If, however, on the basis of the knowledge of the composition of the waste and the physical and chemical properties of the identified components, it is possible to demonstrate that the properties of the waste do not correspond to the properties of the packing group I level, the waste may be classified by default in the most appropriate n.o.s. entry of packing group II. However, if it is known that the waste possesses only environmentally hazardous properties, it may be assigned to packing group III under UN Nos. 3077 or 3082.

This procedure may not be used for wastes containing substances mentioned in 2.1.3.5.3, substances of Class 4.3, substances of the case mentioned in 2.1.3.7 or substances which are not accepted for carriage in accordance with 2.2.x.2.

2.1.3.6 The most specific applicable collective entry (see 2.1.2.5) shall always be used, i.e. a general n.o.s. entry shall only be used if a generic entry or a specific n.o.s. entry cannot be used.

---

[2] *Such legislation is for instance the Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous wastes pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous wastes (Official Journal of the European Communities No. L 226 of 6 September 2000, page 3), as amended; and Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Official Journal of the European Union No. L312 of 22 November 2008, pages 3-30), as amended.*

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2.1.3.7 Solutions and mixtures of oxidizing substances or substances with an oxidizing subsidiary hazard may have explosive properties. In such a case they are not to be accepted for carriage unless they meet the requirements for Class 1. For solid ammonium nitrate based fertilizers, see also 2.2.51.2.2, thirteenth and fourteenth indent and Manual of Tests and Criteria, Part III, Section 39.

2.1.3.8 Substances of classes 1 to 6.2, 8 and 9, other than those assigned to UN Nos. 3077 and 3082, meeting the criteria of 2.2.9.1.10 are additionally to their hazards of classes 1 to 6.2, 8 and 9 considered to be environmentally hazardous substances. Other substances meeting the criteria of no other class, but those of 2.2.9.1.10 are to be assigned to UN Nos. 3077 and 3082 or to identification numbers 9005 and 9006, as appropriate.

Wastes which do not meet the criteria for classification in classes 1 to 9 but are covered by the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* may be carried under UN Nos. 3077 or 3082.

2.1.3.10 *Table of precedence of hazards*

Class and packing group	4.1, II	4.1, III	4.2, II	4.2, III	4.3, I	4.3, II	4.3, III	5.1, I	5.1, II	5.1, III	6.1, I DERMAL	6.1, I ORAL	6.1, II	6.1, III	8, I	8, II	8, III	9
3, I	SOL LIQ 4.1 3, I	SOL LIQ 4.1 3, I	SOL LIQ 4.2 3, I	SOL LIQ 4.2 3, I	4.3, I	4.3, I	4.3, I	SOL LIQ 5.1, I 3, I	SOL LIQ 5.1, I 3, I	SOL LIQ 5.1, I 3, I	3, I	3, I	3, I	3, I	3, I	3, I	3, I	3, I
3, II	SOL LIQ 4.1 3, II	SOL LIQ 4.1 3, II	SOL LIQ 4.2 3, II	SOL LIQ 4.2 3, II	4.3, I	4.3, II	4.3, II	SOL LIQ 5.1, I 3, I	SOL LIQ 5.1, II 3, II	SOL LIQ 5.1, II 3, II	3, I	3, I	3, II	3, II	8, I	3, II	3, II	3, II
3, III	SOL LIQ 4.1 3, II	SOL LIQ 4.1 3, III	SOL LIQ 4.2 3, II	SOL LIQ 4.2 3, III	4.3, I	4.3, II	4.3, III	SOL LIQ 5.1, I 3, I	SOL LIQ 5.1, II 3, II	SOL LIQ 5.1, III 3, III	6.1, I	6.1, I	6.1, II	3, III */	8, I	8, II	3, III	3, III
4.1, II			4.2, II	4.2, II	4.3, I	4.3, II	4.3, II	5.1, I	4.1, II	4.1, II	6.1, I	6.1, I	SOL LIQ 4.1, II 6.1, II	SOL LIQ 4.1, II 6.1, II	8, I	SOL LIQ 4.1, II 8, II	SOL LIQ 4.1, II 8, II	4.1, II
4.1, III			4.2, II	4.2, III	4.3, I	4.3, II	4.3, III	5.1, I	4.1, II	4.1, III	6.1, I	6.1, I	6.1, II	SOL LIQ 4.1, III 6.1, III	8, I	8, II	SOL LIQ 4.1, III 8, III	4.1, III
4.2, II					4.3, I	4.3, II	4.3, II	5.1, I	4.2, II	4.2, II	6.1, I	6.1, I	4.2, II	4.2, II	8, I	4.2, II	4.2, II	4.2, II
4.2, III					4.3, I	4.3, II	4.3, III	5.1, I	5.1, II	4.2, III	6.1, I	6.1, I	6.1, II	4.2, III	8, I	8, II	4.2, III	4.2, III
4.3, I								5.1, I	4.3, I	4.3, I	6.1, I	4.3, I	4.3, I	4.3, I	4.3, I	4.3, I	4.3, I	4.3, I
4.3, II								5.1, I	4.3, II	4.3, II	6.1, I	4.3, I	4.3, II	4.3, II	8, I	4.3, II	4.3, II	4.3, II
4.3, III								5.1, I	5.1, II	4.3, III	6.1, I	6.1, I	6.1, II	4.3, III	8, I	8, II	4.3, III	4.3, III
5.1, I											5.1, I	5.1, I	5.1, I	5.1, I	5.1, I	5.1, I	5.1, I	5.1, I
5.1, II											6.1, I	5.1, I	5.1, II	5.1, II	8, I	5.1, II	5.1, II	5.1, II
5.1, III											6.1, I	6.1, I	6.1, II	5.1, III	8, I	8, II	5.1, III	5.1, III
6.1, I DERMA															SOL LIQ 6.1, I 8, I	6.1, I	6.1, I	6.1, I
6.1, I ORAL															SOL LIQ 6.1, I 8, I	6.1, I	6.1, I	6.1, I
6.1, II INHAL															SOL LIQ 6.1, I 8, I	6.1, II	6.1, II	6.1, II
6.1, II DERMA															SOL LIQ 6.1, I 8, I	SOL LIQ 6.1, II 8, II	6.1, II	6.1, II
6.1, II ORAL															8.1	SOL LIQ 6.1, II 8, II	6.1, II	6.1, II
6.1, III															8, I	8, II	8, III	6.1, III
8, I																		8, I
8, II																		8, II
8, III																		8, III

SOL = Solid substances and mixtures
LIQ = Liquid substances, mixtures and solutions
DERMAL = Dermal toxicity
ORAL = Oral toxicity
INHAL = Inhalation toxicity
*/ *Class 6.1 for pesticides*

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NOTE 1: *Examples to explain the use of the table*

Classification of a single substance

Description of the substance to be classified:

An amine not mentioned by name meeting the criteria for Class 3, packing group II as well as those for Class 8, packing group I.

Procedure:

The intersection of line 3 II with column 8 I gives 8 I.
This amine has therefore to be classified in Class 8 under:

UN No. 2734 AMINES LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or UN No. 2734 POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.
packing group I

Classification of a mixture

Description of the mixture to be classified:

Mixture consisting of a flammable liquid classified in Class 3, packing group III, a toxic substance in Class 6.1, packing group II and a corrosive substance in Class 8, packing group I.

Procedure

The intersection of line 3 III with column 6.1 II gives 6.1 II.
The intersection of line 6.1 II with column 8 I gives 8 I LIQ.
This mixture not further defined has therefore to be classified in Class 8 under:

UN No. 2922 CORROSIVE LIQUID, TOXIC, N.O.S.
packing group I.

NOTE 2: *Examples for the classification of mixtures and solutions under a class and a packing group:*

A phenol solution of Class 6.1, (II), in benzene of Class 3, (II) is to be classified in Class 3, (II); this solution is to be classified under UN No. 1992 FLAMMABLE LIQUID, TOXIC, N.O.S., Class 3, (II), by virtue of the toxicity of the phenol.

A solid mixture of sodium arsenate of Class 6.1, (II) and sodium hydroxide of Class 8, (II) is to be classified under UN No. 3290 TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S., in Class 6.1 (II).

A solution of crude or refined naphthalene of Class 4.1, (III) in petrol of Class 3, (II), is to be classified under UN No. 3295 HYDROCARBONS, LIQUID, N.O.S. in Class 3, (II).

A mixture of hydrocarbons of Class 3, (III), and of polychlorinated biphenyls (PCB) of Class 9, (II), is to be classified under UN No. 2315 POLYCHLORINATED BIPHENYLS, LIQUID or UN No. 3432 POLYCHLORINATED BIPHENYLS, SOLID in Class 9, (II).

A mixture of propyleneimine of Class 3, and polychlorinated biphenyls (PCB) of Class 9, (II), is to be classified under UN No. 1921 PROPYLENEIMINE, INHIBITED in Class 3.

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2.1.4 Classification of samples

2.1.4.1 When the class of a substance is uncertain and it is being carried for further testing, a tentative class, proper shipping name and UN number shall be assigned on the basis of the consignor's knowledge of the substance and application of:

(a) the classification criteria of Chapter 2.2; and

(b) the requirements of this Chapter.

The most severe packing group possible for the proper shipping name chosen shall be used.

Where this provision is used the proper shipping name shall be supplemented with the word "SAMPLE" (e.g., "FLAMMABLE LIQUID, N.O.S., SAMPLE"). In certain instances, where a specific proper shipping name is provided for a sample of a substance considered to meet certain classification criteria (e.g., GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, UN No. 3167) that proper shipping name shall be used. When an N.O.S. entry is used to carry the sample, the proper shipping name need not be supplemented with the technical name as required by special provision 274 of Chapter 3.3.

2.1.4.2 Samples of the substance shall be carried in accordance with the requirements applicable to the tentative assigned proper shipping name provided:

(a) the substance is not considered to be a substance not accepted for carriage by sub-sections 2.2.x.2 of Chapter 2.2 or by Chapter 3.2;

(b) the substance is not considered to meet the criteria for Class 1 or considered to be an infectious substance or a radioactive material;

(c) the substance is in compliance with 2.2.41.1.15 or 2.2.52.1.9 if it is a self-reactive substance or an organic peroxide, respectively;

(d) the sample is carried in a combination packaging with a net mass per package not exceeding 2.5 kg; and

(e) the sample is not packed together with other goods.

2.1.4.3 *Samples of energetic materials for testing purposes*

2.1.4.3.1 Samples of organic substances carrying functional groups listed in tables A6.1 and/or A6.3 in Appendix 6 (Screening Procedures) of the Manual of Tests and Criteria may be carried under UN No. 3224 (self-reactive solid type C) or UN No. 3223 (self-reactive liquid type C), as applicable, of Class 4.1 provided that:

(a) The samples do not contain any:

– Known explosives;

– Substances showing explosive effects in testing;

– Compounds designed with the view of producing a practical explosive or pyrotechnic effect; or

– Components consisting of synthetic precursors of intentional explosives;

(b) For mixtures, complexes or salts of inorganic oxidizing substances of Class 5.1 with organic material(s), the concentration of the inorganic oxidizing substance is:

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– Less than 15%, by mass, if assigned to packing group I (high hazard) or II (medium hazard); or

– Less than 30%, by mass, if assigned to packing group III (low hazard);

(c) Available data do not allow a more precise classification;

(d) The sample is not packed together with other goods; and

(e) The sample is packed in accordance with packing instruction P520 and special packing provisions PP94 or PP95 of 4.1.4.1 of ADR, as applicable.

2.1.5 Classification of articles as articles containing dangerous goods, n.o.s.

NOTE: *For articles which do not have a proper shipping name, other than UN 3537 to 3548 and which contain only dangerous goods within the permitted limited quantity amounts specified in Column (7a) of Table A of Chapter 3.2, see UN No. 3363 and special provisions 301 and 672 of Chapter 3.3.*

2.1.5.1 Articles containing dangerous goods may be classified as otherwise provided by ADN under the proper shipping name for the dangerous goods they contain or in accordance with this section.

For the purposes of this section "article" means machinery, apparatus or other devices containing one or more dangerous goods (or residues thereof) that are an integral element of the article, necessary for its functioning and that cannot be removed for the purpose of carriage.

An inner packaging shall not be an article.

2.1.5.2 Such articles may in addition contain batteries. Lithium batteries that are integral to the article shall be of a type proven to meet the testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3, except when otherwise specified by ADN (e.g. for pre-production prototype articles containing lithium batteries or for a small production run, consisting of not more than 100 such articles).

2.1.5.3 This section does not apply to articles for which a more specific proper shipping name already exists in Table A of Chapter 3.2.

2.1.5.4 This section does not apply to dangerous goods of Class 1, Class 6.2, Class 7 or radioactive material contained in articles.

2.1.5.5 Articles containing dangerous goods shall be assigned to the appropriate Class determined by the hazards present using, where applicable, the table of precedence of hazard in 2.1.3.10 for each of the dangerous goods contained in the article. If dangerous goods classified as Class 9 are contained within the article, all other dangerous goods present in the article shall be considered to present a higher hazard.

2.1.5.6 Subsidiary hazards shall be representative of the primary hazards posed by the other dangerous goods contained within the article. When only one item of dangerous goods is present in the article, the subsidiary hazard(s), if any, shall be the subsidiary hazard(s) identified by the subsidiary hazard label(s) in column (5) of Table A of Chapter 3.2. If the article contains more than one item of dangerous goods and these could react dangerously with one another during carriage, each of the dangerous goods shall be enclosed separately (see 4.1.1.6 of ADR).

2.1.6 Classification of packagings, discarded, empty, uncleaned

Empty uncleaned packagings, large packagings or IBCs, or parts thereof, carried for disposal, recycling or recovery of their material, other than reconditioning, repair, routine maintenance, remanufacturing or reuse, may be assigned to UN 3509 if they meet the requirements for this entry.

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CHAPTER 2.2

CLASS SPECIFIC PROVISIONS

2.2.1 Class 1 Explosive substances and articles

2.2.1.1 *Criteria*

2.2.1.1.1 The heading of Class 1 covers:

(a) Explosive substances: solid or liquid substances (or mixtures of substances) capable by chemical reaction of producing gases at such a temperature and pressure and at such a speed as to cause damage to the surroundings.

Pyrotechnic substances: substances or mixtures of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonating self-sustaining exothermic chemical reactions.

NOTE 1*: Substances which are not themselves explosive but which may form an explosive mixture of gas, vapour or dust are not substances of Class 1.*

NOTE 2*: Also excluded from Class 1 are: water- or alcohol-wetted explosives of which the water or alcohol content exceeds the limits specified and those containing plasticizers - these explosives are assigned to Class 3 or Class 4.1 - and those explosives which, on the basis of their predominant hazard, are assigned to Class 5.2.*

(b) Explosive articles: articles containing one or more explosive or pyrotechnic substances.

NOTE*: Devices containing explosive or pyrotechnic substances in such small quantity or of such a character that their inadvertent or accidental ignition or initiation during carriage would not cause any manifestation external to the device by projection, fire, smoke, heat or loud noise are not subject to the requirements of Class 1.*

(c) Substances and articles not mentioned above which are manufactured with a view to producing a practical explosive or pyrotechnic effect.

For the purposes of Class 1, the following definition applies:

Phlegmatized means that a substance (or "phlegmatizer") has been added to an explosive to enhance its safety in handling and carriage. The phlegmatizer renders the explosive insensitive, or less sensitive, to the following actions: heat, shock, impact, percussion or friction. Typical phlegmatizing agents include, but are not limited to: wax, paper, water, polymers (such as chlorofluoropolymers), alcohol and oils (such as petroleum jelly and paraffin).

2.2.1.1.2 Any substance or article having or suspected of having explosive properties shall be considered for assignment to Class 1 in accordance with the tests, procedures and criteria prescribed in Part I, Manual of Tests and Criteria.

A substance or article assigned to Class 1 can only be accepted for carriage when it has been assigned to a name or n.o.s. entry listed in Table A of Chapter 3.2 and meets the criteria of the Manual of Tests and Criteria.

2.2.1.1.3 The substances and articles of Class 1 shall be assigned to a UN Number and a name or n.o.s. entry listed in Table A of Chapter 3.2. Interpretation of the names of substances and articles in Table A of Chapter 3.2 shall be based upon the glossary in 2.2.1.4.

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Samples of new or existing explosive substances or articles carried for purposes including: testing, classification, research and development, quality control, or as a commercial sample, other than initiating explosive, may be assigned to UN No. 0190 SAMPLES, EXPLOSIVE.

The assignment of explosive substances and articles not mentioned by name as such in Table A of Chapter 3.2 to an n.o.s entry of Class 1 or UN No. 0190 SAMPLES, EXPLOSIVE as well as the assignment of certain substances the carriage of which is subject to a specific authorization by the competent authority according to the special provisions referred to in Column (6) of Table A of Chapter 3.2 shall be made by the competent authority of the country of origin. This competent authority shall also approve in writing the conditions of carriage of these substances and articles. If the country of origin is not a Contracting Party to ADN, the classification and the conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADN reached by the consignment.

2.2.1.1.4 Substances and articles of Class 1 shall have been assigned to a division in accordance with 2.2.1.1.5 and to a compatibility group in accordance with 2.2.1.1.6. The division shall be based on the results of the tests described in section 2.3.1 applying the definitions in 2.2.1.1.5. The compatibility group shall be determined in accordance with the definitions in 2.2.1.1.6. The classification code shall consist of the division number and the compatibility group letter.

2.2.1.1.5 *Definition of divisions*

Division 1.1 Substances and articles which have a mass explosion hazard (a mass explosion is an explosion which affects almost the entire load virtually instantaneously).

Division 1.2 Substances and articles which have a projection hazard but not a mass explosion hazard.

Division 1.3 Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard:

(a) combustion of which gives rise to considerable radiant heat; or

(b) which burn one after another, producing minor blast or projection effects or both.

Division 1.4 Substances and articles which present only a slight hazard of explosion in the event of ignition or initiation during carriage. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5 Very insensitive substances having a mass explosion hazard which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of carriage. As a minimum requirement they must not explode in the external fire test.

Division 1.6 Extremely insensitive articles which do not have a mass explosion hazard. The articles predominantly contain extremely insensitive substances and demonstrate a negligible probability of accidental initiation or propagation.

NOTE: *The hazard from articles of Division 1.6 is limited to the explosion of a single article.*

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2.2.1.1.6 *Definition of compatibility groups of substances and articles*

A Primary explosive substance.

B Article containing a primary explosive substance and not having two or more effective protective features. Some articles, such as detonators for blasting, detonator assemblies for blasting and primers, cap-type, are included, even though they do not contain primary explosives.

C Propellant explosive substance or other deflagrating explosive substance or article containing such explosive substance.

D Secondary detonating explosive substance or black powder or article containing a secondary detonating explosive substance, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substance and having two or more effective protective features.

E Article containing a secondary detonating explosive substance, without means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids).

F Article containing a secondary detonating explosive substance with its own means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids) or without a propelling charge.

G Pyrotechnic substance, or article containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating, incendiary, tear- or smoke-producing substance (other than a water-activated article or one which contains white phosphorus, phosphides, a pyrophoric substance, a flammable liquid or gel or hypergolic liquids).

H Article containing both an explosive substance and white phosphorus.

J Article containing both an explosive substance and a flammable liquid or gel.

K Article containing both an explosive substance and a toxic chemical agent.

L Explosive substance or article containing an explosive substance and presenting a special hazard (e.g. due to water activation or the presence of hypergolic liquids, phosphides or a pyrophoric substance) necessitating isolation of each type.

N Articles predominantly containing extremely insensitive substances.

S Substance or article so packed or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder or prevent fire-fighting or other emergency response efforts in the immediate vicinity of the package.

NOTE 1: *Each substance or article, packed in a specified packaging, may be assigned to one compatibility group only. Since the criterion of compatibility group S is empirical, assignment to this group is necessarily linked to the tests for assignment of a classification code.*

NOTE 2: *Articles of compatibility groups D and E may be fitted or packed together with their own means of initiation provided that such means have at least two effective protective features designed to prevent an explosion in the event of accidental functioning of the means of initiation. Such articles and packages shall be assigned to compatibility groups D or E.*

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NOTE 3: *Articles of compatibility groups D and E may be packed together with their own means of initiation, which do not have two effective protective features (i.e. means of initiation assigned to compatibility group B), provided that they comply with mixed packing provision MP 21 of Section 4.1.10 of ADR. Such packages shall be assigned to compatibility groups D or E.*

NOTE 4: *Articles may be fitted or packed together with their own means of ignition provided that the means of ignition cannot function during normal conditions of carriage.*

NOTE 5: *Articles of compatibility groups C, D and E may be packed together. Such packages shall be assigned to compatibility group E.*

2.2.1.1.7 *Assignment of fireworks to divisions*

2.2.1.1.7.1 Fireworks shall normally be assigned to divisions 1.1, 1.2, 1.3 and 1.4 on the basis of test data derived from Test Series 6 of the Manual of Tests and Criteria. However:

(a) waterfalls containing flash composition (see Note 2 of 2.2.1.1.7.5) shall be classified as 1.1G regardless of the results of Test Series 6;

(b) since the range of fireworks is very extensive and the availability of test facilities may be limited, assignment to divisions may also be made in accordance with the procedure in 2.2.1.1.7.2.

2.2.1.1.7.2 Assignment of fireworks to UN No. 0333, 0334, 0335 or 0336 may be made on the basis of analogy, without the need for Test Series 6 testing, in accordance with the default fireworks classification table in 2.2.1.1.7.5. Such assignment shall be made with the agreement of the competent authority. Items not specified in the table shall be classified on the basis of test data derived from Test Series 6.

NOTE 1: *The addition of other types of fireworks to column 1 of the table in 2.2.1.1.7.5 shall only be made on the basis of full test data submitted to the UN Sub-Committee of Experts on the Transport of Dangerous Goods for consideration.*

NOTE 2: *Test data derived by competent authorities which validates, or contradicts the assignment of fireworks specified in column 4 of the table in 2.2.1.1.7.5 to divisions in column 5 should be submitted to the UN Sub-Committee of Experts on the Transport of Dangerous Goods for information.*

2.2.1.1.7.3 Where fireworks of more than one division are packed in the same package they shall be classified on the basis of the highest division unless test data derived from Test Series 6 indicate otherwise.

2.2.1.1.7.4 The classification shown in the table in 2.2.1.1.7.5 applies only for articles packed in fibreboard boxes (4G).

2.2.1.1.7.5 *Default fireworks classification table* [1]

***NOTE 1*:** *References to percentages in the table, unless otherwise stated, are to the mass of all pyrotechnic substances (e.g. rocket motors, lifting charge, bursting charge and effect charge).*

[1] *This table contains a list of firework classifications which may be used in the absence of Test Series 6 data (see 2.2.1.1.7.2).*

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NOTE 2: *"Flash composition" in this table refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks that are used in waterfalls, or to produce an aural effect or used as a bursting charge, or propellant charge unless:*

(a) The time taken for the pressure rise in the HSL Flash Composition Test in Appendix 7 of the Manual of Tests and Criteria is demonstrated to be more than 6 ms for 0.5 g of pyrotechnic substance; or

(b) The pyrotechnic substance gives a negative "-" result in the US Flash Composition Test in Appendix 7 of the Manual of Tests and Criteria.

NOTE 3**:** *Dimensions in mm refer to:*

- *for spherical and peanut shells the diameter of the sphere of the shell;*
- *for cylinder shells the length of the shell;*
- *for a shell in mortar, Roman candle, shot tube firework or mine, the inside diameter of the tube comprising or containing the firework;*
- *for a bag mine or cylinder mine, the inside diameter of the mortar intended to contain the mine*

.

Type	Includes: / Synonym:	Definition	Specification	Classification
Shell, spherical or cylindrical	Spherical display shell: aerial shell, colour shell, dye shell, multi-break shell, multi-effect shell, nautical shell, parachute shell, smoke shell, star shell; report shell: maroon, salute, sound shell, thunderclap, aerial shell kit	Device with or without propellant charge, with delay fuse and bursting charge, pyrotechnic unit(s) or loose pyrotechnic substance and designed to be projected from a mortar	All report shells	1.1G
			Colour shell: ≥ 180 mm	1.1G
			Colour shell: < 180 mm with > 25% flash composition, as loose powder and/or report effects	1.1G
			Colour shell: < 180 mm with ≤ 25% flash composition, as loose powder and/or report effects	1.3G
			Colour shell: ≤ 50 mm, or ≤ 60 g pyrotechnic substance, with ≤ 2% flash composition as loose powder and/or report effects	1.4G
	Peanut shell	Device with two or more spherical aerial shells in a common wrapper propelled by the same propellant charge with separate external delay fuses	The most hazardous spherical aerial shell determines the classification	
	Preloaded mortar, shell in mortar	Assembly comprising a spherical or cylindrical shell inside a mortar from which the shell is designed to be projected	All report shells	1.1G
			Colour shell: ≥ 180 mm	1.1G
			Colour shell: > 25% flash composition as loose powder and/or report effects	1.1G
			Colour shell: > 50 mm and < 180 mm	1.2G
			Colour shell: ≤ 50 mm, or ≤ 60 g pyrotechnic substance, with ≤ 25% flash composition as loose powder and/or report effects	1.3G

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Type	Includes: / Synonym:	Definition	Specification	Classification
Shell, spherical or cylindrical *(cont'd)*	Shell of shells (spherical) (*Reference to percentages for shell of shells are to the gross mass of the fireworks article*)	Device without propellant charge, with delay fuse and bursting charge, containing report shells and inert materials and designed to be projected from a mortar	> 120 mm	1.1G
		Device without propellant charge, with delay fuse and bursting charge, containing report shells ≤ 25g flash composition per report unit, with ≤ 33% flash composition and ≥ 60% inert materials and designed to be projected from a mortar	≤ 120 mm	1.3G
		Device without propellant charge, with delay fuse and bursting charge, containing colour shells and/or pyrotechnic units and designed to be projected from a mortar	> 300 mm	1.1G
		Device without propellant charge, with delay fuse and bursting charge, containing colour shells ≤ 70mm and/or pyrotechnic units, with ≤ 25% flash composition and ≤ 60% pyrotechnic substance and designed to be projected from a mortar	> 200 mm and ≤ 300 mm	1.3G
		Device with propellant charge, with delay fuse and bursting charge, containing colour shells ≤ 70 mm and/or pyrotechnic units, with ≤ 25% flash composition and ≤ 60% pyrotechnic substance and designed to be projected from a mortar	≤ 200 mm	1.3G
Battery/ combination	Barrage, bombardos, cakes, finale box, flowerbed, hybrid, multiple tubes, shell cakes, banger batteries, flash banger batteries	Assembly including several elements either containing the same type or several types each corresponding to one of the types of fireworks listed in this table, with one or two points of ignition	The most hazardous firework type determines the classification	

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Type	Includes: / Synonym:	Definition	Specification	Classification
Roman candle	Exhibition candle, candle, bombettes	Tube containing a series of pyrotechnic units consisting of alternate pyrotechnic composition, propellant charge, and transmitting fuse	≥ 50 mm inner diameter, containing flash composition, or < 50 mm with > 25% flash composition	1.1G
			≥ 50 mm inner diameter, containing no flash composition	1.2G
			< 50 mm inner diameter and ≤ 25% flash composition	1.3G
			≤ 30 mm inner diameter, each pyrotechnic unit ≤ 25 g and ≤ 5% flash composition	1.4G
Shot tube	Single shot Roman candle, small preloaded mortar	Tube containing a pyrotechnic unit consisting of pyrotechnic substance, propellant charge with or without transmitting fuse	≤ 30 mm inner diameter and pyrotechnic unit > 25 g, or > 5% and ≤ 25% flash composition	1.3G
			≤ 30 mm inner diameter, pyrotechnic unit ≤ 25 g and ≤ 5% flash composition	1.4G
Rocket	Avalanche rocket, signal rocket, whistling rocket, bottle rocket, sky rocket, missile type rocket, table rocket	Tube containing pyrotechnic substance and/or pyrotechnic units, equipped with stick(s) or other means for stabilization of flight, and designed to be propelled into the air	Flash composition effects only	1.1G
			Flash composition > 25% of the pyrotechnic substance	1.1G
			> 20 g pyrotechnic substance and flash composition ≤ 25%	1.3G
			≤ 20 g pyrotechnic substance, black powder bursting charge and ≤ 0.13 g flash composition per report and ≤ 1 g in total	1.4G

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Type	Includes: / Synonym:	Definition	Specification	Classification
Mine	Pot-a-feu, ground mine, bag mine, cylinder mine	Tube containing propellant charge and pyrotechnic units and designed to be placed on the ground or to be fixed in the ground. The principal effect is ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual and/or aural effect in the air; or Cloth or paper bag or cloth or paper cylinder containing propellant charge and pyrotechnic units, designed to be placed in a mortar and to function as a mine	> 25% flash composition, as loose powder and/ or report effects	1.1G
			≥ 180 mm and ≤ 25% flash composition, as loose powder and/ or report effects	1.1G
			< 180 mm and ≤ 25% flash composition, as loose powder and/ or report effects	1.3G
			≤ 150 g pyrotechnic substance, containing ≤ 5% flash composition as loose powder and/ or report effects. Each pyrotechnic unit ≤ 25 g, each report effect < 2g; each whistle, if any, ≤ 3 g	1.4G
Fountain	Volcanos, gerbs, lances, Bengal fire, flitter sparkle, cylindrical fountains, cone fountains, illuminating torch	Non-metallic case containing pressed or consolidated pyrotechnic substance producing sparks and flame ***NOTE:*** *Fountains intended to produce a vertical cascade or curtain of sparks are considered to be waterfalls (see row below).*	≥ 1 kg pyrotechnic substance	1.3G
			< 1 kg pyrotechnic substance	1.4G
Waterfall	Cascades, showers	Pyrotechnic fountain intended to produce a vertical cascade or curtain of sparks	Containing flash composition regardless of the results of Test Series 6 (see 2.2.1.1.7.1 (a))	1.1G
			Not containing flash composition	1.3G
Sparkler	Handheld sparklers, non-handheld sparklers, wire sparklers		Perchlorate based sparklers: > 5 g per item or > 10 items per pack	1.3G

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Type	Includes: / Synonym:	Definition	Specification	Classification
		Rigid wire partially coated (along one end) with slow burning pyrotechnic substance with or without an ignition tip	Perchlorate based sparklers: ≤ 5 g per item and ≤ 10 items per pack; Nitrate based sparklers: ≤ 30 g per item	1.4G
Bengal stick	Dipped stick	Non-metallic stick partially coated (along one end) with slow-burning pyrotechnic substance and designed to be held in the hand	Perchlorate based items: > 5 g per item or > 10 items per pack	1.3 G
			Perchlorate based items: ≤ 5 g per item and ≤ 10 items per pack; nitrate based items: ≤ 30 g per item	1.4G
Low hazard fireworks and novelties	Table bombs, throwdowns, crackling granules, smokes, fog, snakes, glow worm, serpents, snaps, party poppers	Device designed to produce very limited visible and/ or audible effect which contains small amounts of pyrotechnic and/or explosive composition.	Throwdowns and snaps may contain up to 1.6 mg of silver fulminate; snaps and party poppers may contain up to 16 mg of potassium chlorate/red phosphorous mixture; other articles may contain up to 5 g of pyrotechnic substance, but no flash composition	1.4G
Spinner	Aerial spinner, helicopter, chaser, ground spinner	Non-metallic tube or tubes containing gas- or spark-producing pyrotechnic substance, with or without noise producing composition, with or without aerofoils attached	Pyrotechnic substance per item > 20 g, containing ≤ 3% flash composition as report effects, or whistle composition ≤ 5 g	1.3G
			Pyrotechnic substance per item ≤ 20 g, containing ≤ 3% flash composition as report effects, or whistle composition ≤ 5 g	1.4G
Wheels	Catherine wheels, Saxon	Assembly including drivers containing pyrotechnic substance and provided with a means of attaching it to a support so that it can rotate	≥ 1 kg total pyrotechnic substance, no report effect, each whistle (if any) ≤ 25 g and ≤ 50 g whistle composition per wheel	1.3G

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Type	Includes: / Synonym:	Definition	Specification	Classification
			< 1 kg total pyrotechnic substance, no report effect, each whistle (if any) ≤ 5 g and ≤ 10 g whistle composition per wheel	1.4G
Aerial wheel	Flying Saxon, UFO's, rising crown	Tubes containing propellant charges and sparks-flame- and/or noise-producing pyrotechnic substances, the tubes being fixed to a supporting ring	> 200 g total pyrotechnic substance or > 60 g pyrotechnic substance per driver, ≤ 3% flash composition as report effects, each whistle (if any) ≤ 25 g and ≤ 50 g whistle composition per wheel	1.3G
			≤ 200 g total pyrotechnic substance and ≤ 60 g pyrotechnic substance per driver, ≤ 3% flash composition as report effects, each whistle (if any) ≤ 5 g and ≤ 10 g whistle composition per wheel	1.4G
Selection pack	Display selection box, display selection pack, garden selection box, indoor selection box; assortment	A pack of more than one type each corresponding to one of the types of fireworks listed in this table	The most hazardous firework type determines the classification	
Firecracker	Celebration cracker, celebration roll, string cracker	Assembly of tubes (paper or cardboard) linked by a pyrotechnic fuse, each tube intended to produce an aural effect	Each tube ≤ 140 mg of flash composition or ≤ 1 g black powder	1.4G
Banger	Salute, flash banger, lady cracker	Non-metallic tube containing report composition intended to produce an aural effect	> 2 g flash composition per item	1.1G
			≤ 2 g flash composition per item and ≤ 10 g per inner packaging	1.3G
			≤ 1 g flash composition per item and ≤ 10 g per inner packaging or ≤ 10 g black powder per item	1.4G

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2.2.1.1.8 *Exclusion from Class 1*

2.2.1.1.8.1 An article or a substance may be excluded from Class 1 by virtue of test results and the Class 1 definition with the approval of the competent authority of any ADN Contracting Party who may also recognize an approval granted by the competent authority of a country which is not an ADN Contracting Party provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions.

2.2.1.1.8.2 With the approval of the competent authority in accordance with 2.2.1.1.8.1, an article may be excluded from Class 1 when three unpackaged articles, each individually activated by its own means of initiation or ignition or external means to function in the designed mode, meet the following test criteria:

(a) No external surface shall have a temperature of more than 65 °C. A momentary spike in temperature up to 200 ºC is acceptable;

(b) No rupture or fragmentation of the external casing or movement of the article or detached parts thereof of more than one metre in any direction;

***NOTE**: Where the integrity of the article may be affected in the event of an external fire these criteria shall be examined by a fire test, such as described in ISO 12097-3.*

(c) No audible report exceeding 135 dB(C) peak at a distance of one metre;

(d) No flash or flame capable of igniting a material such as a sheet of 80 ± 10 g/m² paper in contact with the article; and

(e) No production of smoke, fumes or dust in such quantities that the visibility in a one cubic metre chamber equipped with appropriately sized blow out panels is reduced more than 50% as measured by a calibrated light (lux) meter or radiometer located one metre from a constant light source located at the midpoint on opposite walls . The general guidance on Optical Density Testing in ISO 5659-1 and the general guidance on the Photometric System described in Section 7.5 in ISO 5659-2 may be used or similar optical density measurement methods designed to accomplish the same purpose may also be employed. A suitable hood cover surrounding the back and sides of the light meter shall be used to minimize effects of scattered or leaking light not emitted directly from the source.

***NOTE 1:** If during the tests addressing criteria (a), (b), (c) and (d) no or very little smoke is observed the test described in (e) may be waived.*

***NOTE 2:** The competent authority referred to in 2.2.1.1.8.1 may require testing in packaged form if it is determined that, as packaged for carriage, the article may pose a greater hazard.*

2.2.1.1.9 *Classification documentation*

2.2.1.1.9.1 A competent authority assigning an article or substance into Class 1 shall confirm with the applicant that classification in writing.

2.2.1.1.9.2 A competent authority classification document may be in any form and may consist of more than one page, provided pages are numbered consecutively. The document shall have a unique reference.

2.2.1.1.9.3 The information provided shall be easy to identify, legible and durable.

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2.2.1.1.9.4 Examples of the information that may be provided in the classification documents are as follows:

(a) The name of the competent authority and the provisions in national legislation under which it is granted its authority;

(b) The modal or national regulations for which the classification document is applicable;

(c) Confirmation that the classification has been approved, made or agreed in accordance with the UN Model Regulations or the relevant modal regulations;

(d) The name and address of the person in law to which the classification has been assigned and any company registration which uniquely identifies a company or other body corporate under national legislation;

(e) The name under which the explosives will be placed onto the market or otherwise supplied for carriage;

(f) The proper shipping name, UN number, class, division and corresponding compatibility group of the explosives;

(g) Where appropriate, the maximum net explosive mass of the package or article;

(h) The name, signature, stamp, seal or other identification of the person authorised by the competent authority to issue the classification document is clearly visible;

(i) Where safety in carriage or the division is assessed as being dependent upon the packaging, the packaging mark or a description of the permitted:

– Inner packagings;

– Intermediate packagings;

– Outer packagings;

(j) The classification document states the part number, stock number or other identifying reference under which the explosives will be placed onto the market or otherwise supplied for carriage;

(k) The name and address of the person in law who manufactured the explosives and any company registration which uniquely identifies a company or other body corporate under national legislation;

(l) Any additional information regarding the applicable packing instruction and special packing provisions where appropriate;

(m) The basis for assigning the classification, i.e. whether on the basis of test results, default for fireworks, analogy with classified explosive, by definition from Table A of Chapter 3.2 etc.;

(n) Any special conditions or limitations that the competent authority has identified as relevant to the safety for carriage of the explosives, the communication of the hazard and international carriage;

(o) The expiry date of the classification document is given where the competent authority considers one to be appropriate

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2.2.1.2 ***Substances and articles not accepted for carriage***

2.2.1.2.1 Explosive substances which are unduly sensitive according to the criteria of the Manual of Tests and Criteria, Part I, or are liable to spontaneous reaction, as well as explosive substances and articles which cannot be assigned to a name or n.o.s. entry listed in Table A of Chapter 3.2, shall not be accepted for carriage.

2.2.1.2.2 Articles of compatibility group K shall not be accepted for carriage (1.2K, UN No. 0020 and 1.3K, UN No. 0021).

2.2.1.3 ***List of collective entries***

Classification code (see 2.2.1.1.4)	UN No	Name of the substance or article
1.1A	0473	SUBSTANCES, EXPLOSIVE, N.O.S.
1.1B	0461	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.1C	0474	SUBSTANCES, EXPLOSIVE, N.O.S.
	0497	PROPELLANT, LIQUID
	0498	PROPELLANT, SOLID
	0462	ARTICLES, EXPLOSIVE, N.O.S.
1.1D	0475	SUBSTANCES, EXPLOSIVE, N.O.S.
	0463	ARTICLES, EXPLOSIVE, N.O.S.
1.1E	0464	ARTICLES, EXPLOSIVE, N.O.S.
1.1F	0465	ARTICLES, EXPLOSIVE, N.O.S.
1.1G	0476	SUBSTANCES, EXPLOSIVE, N.O.S.
1.1L	0357	SUBSTANCES, EXPLOSIVE, N.O.S.
	0354	ARTICLES, EXPLOSIVE, N.O.S.
1.2B	0382	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.2C	0466	ARTICLES, EXPLOSIVE, N.O.S.
1.2D	0467	ARTICLES, EXPLOSIVE, N.O.S.
1.2E	0468	ARTICLES, EXPLOSIVE, N.O.S.
1.2F	0469	ARTICLES, EXPLOSIVE, N.O.S.
1.2L	0358	SUBSTANCES, EXPLOSIVE, N.O.S.
	0248	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge
	0355	ARTICLES, EXPLOSIVE, N.O.S.
1.3C	0132	DEFLAGRATING METAL SALTS OF AROMATIC NITRO-DERIVATIVES, N.O.S.
	0477	SUBSTANCES, EXPLOSIVE, N.O.S.
	0495	PROPELLANT, LIQUID
	0499	PROPELLANT, SOLID
	0470	ARTICLES, EXPLOSIVE, N.O.S.
1.3G	0478	SUBSTANCES, EXPLOSIVE, N.O.S.
1.3L	0359	SUBSTANCES, EXPLOSIVE, N.O.S.
	0249	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge
	0356	ARTICLES, EXPLOSIVE, N.O.S.
1.4B	0350	ARTICLES, EXPLOSIVE, N.O.S.
	0383	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.4C	0479	SUBSTANCES, EXPLOSIVE, N.O.S.
	0351	ARTICLES, EXPLOSIVE, N.O.S.
	0501	PROPELLANT, SOLID
1.4D	0480	SUBSTANCES, EXPLOSIVE, N.O.S.
	0352	ARTICLES, EXPLOSIVE, N.O.S.
1.4E	0471	ARTICLES, EXPLOSIVE, N.O.S.
1.4F	0472	ARTICLES, EXPLOSIVE, N.O.S.

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Classification code (see 2.2.1.1.4)	UN No	Name of the substance or article
1.4G	0485 0353	SUBSTANCES, EXPLOSIVE, N.O.S. ARTICLES, EXPLOSIVE, N.O.S.
1.4S	0481 0349 0384	SUBSTANCES, EXPLOSIVE, N.O.S. ARTICLES, EXPLOSIVE, N.O.S. COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.5D	0482	SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI) N.O.S.
1.6N	0486	ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)
	0190	SAMPLES, EXPLOSIVE other than initiating explosive ***NOTE:*** *Division and Compatibility Group shall be defined as directed by the competent authority and according to the principles in 2.2.1.1.4.*

2.2.1.4 ***Glossary of names***

NOTE 1: *The descriptions in the glossary are not intended to replace the test procedures, nor to determine the hazard classification of a substance or article of Class 1. Assignment to the correct division and a decision on whether Compatibility Group S is appropriate shall be based on testing of the product in accordance with the Manual of Tests and Criteria, Part I or by analogy with similar products which have already been tested and assigned in accordance with the procedures of the Manual of Tests and Criteria.*

NOTE 2*: The figures given after the names refer to the relevant UN numbers (Column (1) of Table A of Chapter 3.2). For the classification code, see 2.2.1.1.4.*

AMMUNITION, ILLUMINATING, with or without burster, expelling charge or propelling charge: UN Nos. 0171, 0254, 0297

Ammunition designed to produce a single source of intense light for lighting up an area. The term includes illuminating cartridges, grenades and projectiles; and illuminating and target identification bombs.

NOTE*: The following articles: CARTRIDGES, SIGNAL; SIGNAL DEVICES HAND; SIGNALS, DISTRESS; FLARES, AERIAL; FLARES, SURFACE are not included in this definition. They are listed separately.*

AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge: UN No. 0247

Ammunition containing liquid or gelatinous incendiary substance. Except when the incendiary substance is an explosive per se, it also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge: UN Nos. 0243, 0244

Ammunition containing white phosphorus as incendiary substance. It also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge: UN Nos. 0009, 0010, 0300

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Ammunition containing incendiary composition. Except when the composition is an explosive per se, it also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, PRACTICE: UN Nos. 0362, 0488

Ammunition without a main bursting charge, containing a burster or expelling charge. Normally it also contains a fuze and a propelling charge.

***NOTE**: GRENADES, PRACTICE are not included in this definition. They are listed separately.*

AMMUNITION, PROOF: UN No. 0363

Ammunition containing pyrotechnic substances, used to test the performance or strength of new ammunition, weapon components or assemblies.

AMMUNITION, SMOKE, WHITE PHOSPHORUS, with burster, expelling charge or propelling charge: UN Nos. 0245, 0246

Ammunition containing white phosphorus as a smoke-producing substance. It also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge. The term includes grenades, smoke.

AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge: UN Nos. 0015, 0016, 0303

Ammunition containing a smoke-producing substance such as chlorosulphonic acid mixture or titanium tetrachloride; or a smoke-producing pyrotechnic composition based on hexachloroethane or red phosphorus. Except when the substance is an explosive per se, the ammunition also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge. The term includes grenades, smoke.

***NOTE:** SIGNALS, SMOKE are not included in this definition. They are listed separately.*

AMMUNITION, TEAR-PRODUCING, with burster, expelling charge or propelling charge: UN Nos. 0018, 0019, 0301

Ammunition containing a tear-producing substance. It also contains one or more of the following: a pyrotechnic substance; a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES EEI): UN No. 0486

Articles containing only extremely insensitive substances which demonstrate a negligible probability of accidental initiation or propagation under normal conditions of transport, and which have passed Test Series 7.

ARTICLES, PYROPHORIC: UN No. 0380

Articles which contain a pyrophoric substance (capable of spontaneous ignition when exposed to air) and an explosive substance or component. The term excludes articles containing white phosphorus.

ARTICLES, PYROTECHNIC, for technical purposes: UN Nos. 0428, 0429, 0430, 0431, 0432

Articles which contain pyrotechnic substances and are used for technical purposes such as heat generation, gas generation, theatrical effects, etc.

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***NOTE**: The following articles: all ammunition; CARTRIDGES, SIGNAL; CUTTERS, CABLE, EXPLOSIVE; FIREWORKS; FLARES, AERIAL; FLARES, SURFACE; RELEASE DEVICES, EXPLOSIVE; RIVETS, EXPLOSIVE; SIGNAL DEVICES, HAND; SIGNALS, DISTRESS; SIGNALS, RAILWAY TRACK, EXPLOSIVES; SIGNALS, SMOKE are not included in this definition. They are listed separately.*

BLACK POWDER (GUNPOWDER), COMPRESSED or BLACK POWDER (GUNPOWDER), IN PELLETS: UN No. 0028

Substance consisting of a pelletized form of black powder.

BLACK POWDER (GUNPOWDER), granular or as meal: UN No. 0027

Substance consisting of an intimate mixture of charcoal or other carbon and either potassium nitrate or sodium nitrate, with or without sulphur.

BOMBS, WITH FLAMMABLE LIQUID, with bursting charge: UN Nos. 0399, 0400

Articles which are dropped from aircraft, consisting of a tank filled with inflammable liquid and bursting charge.

BOMBS, PHOTO-FLASH: UN No. 0038

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a charge of detonating explosive without means of initiation or with means of initiation containing two or more effective protective features.

BOMBS, PHOTO-FLASH: UN No. 0037

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a charge of detonating explosive with means of initiation not containing two or more effective protective features.

BOMBS, PHOTO-FLASH: UN Nos. 0039, 0299

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a photo-flash composition.

BOMBS with bursting charge: UN Nos. 0034; 0035

Explosive articles which are dropped from aircraft, without means of initiation or with means of initiation containing two or more effective protective features.

BOMBS with bursting charge: UN Nos. 0033, 0291

Explosive articles which are dropped from aircraft, with means of initiation not containing two or more effective protective features.

BOOSTERS WITH DETONATOR: UN Nos. 0225, 0268

Articles consisting of a charge of detonating explosive with means of initiation. They are used to increase the initiating power of detonators or detonating cord.

BOOSTERS without detonator: UN Nos. 0042, 0283

Articles consisting of a charge of detonating explosive without means of initiation. They are used to increase the initiating power of detonators or detonating cord.

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BURSTERS, explosive: UN No. 0043

Articles consisting of a small charge of explosive used to open projectiles or other ammunition in order to disperse their contents.

CARTRIDGES, FLASH: UN Nos. 0049, 0050

Articles consisting of a casing, a primer and flash powder, all assembled in one piece ready for firing.

CARTRIDGES FOR TOOLS, BLANK: UN No. 0014

Article, used in tools, consisting of a closed cartridge case with a centre or rim fire primer with or without a charge of smokeless or black powder but with no projectile.

CARTRIDGES FOR WEAPONS, BLANK: UN Nos. 0326, 0413, 0327, 0338, 0014

Ammunition consisting of a closed cartridge case with a centre or rim fire primer and a charge of smokeless or black powder but no projectile. It produces a loud noise and is used for training, saluting, propelling charge, starter pistols, etc. The term includes ammunition, blank.

CARTRIDGES FOR WEAPONS, INERT PROJECTILE: UN Nos. 0328, 0417, 0339, 0012

Ammunition consisting of a projectile without bursting charge but with a propelling charge with or without a primer. The articles may include a tracer, provided that the predominant hazard is that of the propelling charge.

CARTRIDGES FOR WEAPONS with bursting charge: UN Nos. 0006, 0321, 0412

Ammunition consisting of a projectile with a bursting charge without means of initiation or with means of initiation containing two or more effective protective features; and a propelling charge with or without a primer. The term includes fixed (assembled) ammunition, semi-fixed (partially assembled) ammunition and separate loading ammunition when the components are packed together.

CARTRIDGES FOR WEAPONS with bursting charge: UN Nos. 0005, 0007, 0348

Ammunition consisting of a projectile with a bursting charge with means of initiation not containing two or more effective protective features; and a propelling charge with or without a primer. The term includes fixed (assembled) ammunition, semi-fixed (partially assembled) ammunition and separate loading ammunition when the components are packed together.

CARTRIDGES, OIL WELL: UN Nos. 0277, 0278

Articles consisting of a thin casing of fibreboard, metal or other material containing only propellant powder which projects a hardened projectile to perforate an oil well casing.

***NOTE**: CHARGES, SHAPED are not included in this definition. They are listed separately.*

CARTRIDGES, POWER DEVICE: UN Nos. 0275, 0276, 0323, 0381

Articles designed to accomplish mechanical actions. They consist of a casing with a charge of deflagrating explosive and a means of ignition. The gaseous products of the deflagration produce inflation, linear or rotary motion or activate diaphragms, valves or switches or project fastening devices or extinguishing agents.

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CARTRIDGES, SIGNAL: UN Nos. 0054, 0312, 0405

Articles designed to fire coloured flares or other signals from signal pistols, etc.

CARTRIDGES, SMALL ARMS: UN Nos. 0417, 0339, 0012

Ammunition consisting of a cartridge case fitted with a centre or rim fire primer and containing both a propelling charge and solid projectile. They are designed to be fired in weapons of calibre not larger than 19.1 mm. Shot-gun cartridges of any calibre are included in this description.

***NOTE**: CARTRIDGES, SMALL ARMS, BLANK, are not included in this definition. They are listed separately. Some military small arms cartridges are not included in this definition. They are listed under CARTRIDGES FOR WEAPONS, INERT PROJECTILE.*

CARTRIDGES, SMALL ARMS, BLANK: UN Nos. 0014, 0327, 0338

Ammunition consisting of a closed cartridge case with a centre or rim fire primer and a charge of smokeless or black powder. The cartridge cases contain no projectiles. The cartridges are designed to be fired from weapons with a calibre of at most 19.1 mm and serve to produce a loud noise and are used for training, saluting, propelling charge, starter pistols, etc.

CASES, CARTRIDGE, EMPTY, WITH PRIMER: UN Nos. 0379; 0055

Articles consisting of a cartridge case made from metal, plastics or other non-inflammable material, in which the only explosive component is the primer.

CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER: UN Nos. 0447, 0446

Articles consisting of a cartridge case made partly or entirely from nitrocellulose.

CHARGES, BURSTING, PLASTICS BONDED: UN Nos. 0457, 0458, 0459, 0460

Articles consisting of a charge of detonating explosive, plastics bonded, manufactured in a specific form without a casing and without means of initiation. They are designed as components of ammunition such as warheads.

CHARGES, DEMOLITION: UN No. 0048

Articles containing a charge of a detonating explosive in a casing of fibreboard, plastics, metal or other material. The articles are without means of initiation or with means of initiation containing two or more effective protective features.

***NOTE**: The following articles: BOMBS; MINES; PROJECTILES are not included in this definition. They are listed separately.*

CHARGES, DEPTH: UN No. 0056

Articles consisting of a charge of detonating explosive contained in a drum or projectile without means of initiation or with means of initiation containing two or more effective protective features. They are designed to detonate under water.

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CHARGES, EXPLOSIVE, COMMERCIAL without detonator: UN Nos. 0442, 0443, 0444, 0445

Articles consisting of a charge of detonating explosive without means of initiation, used for explosive welding, jointing, forming and other metallurgical processes.

CHARGES, PROPELLING, FOR CANNON: UN Nos. 0242, 0279, 0414

Charges of propellant in any physical form for separate-loading ammunition for cannon.

CHARGES, PROPELLING: UN Nos. 0271, 0272, 0415, 0491

Articles consisting of a charge of a propellant charge in any physical form, with or without a casing, as a component of rocket motors or for reducing the drag of projectiles.

CHARGES, SHAPED, without detonator: UN Nos. 0059, 0439, 0440, UN 0441

Articles consisting of a casing containing a charge of detonating explosive with a cavity lined with rigid material, without means of initiation. They are designed to produce a powerful, penetrating jet effect.

CHARGES, SHAPED, FLEXIBLE, LINEAR: UN Nos. 0237, 0288

Articles consisting of a V-shaped core of a detonating explosive clad by a flexible sheath.

CHARGES, SUPPLEMENTARY, EXPLOSIVE: UN No. 0060

Articles consisting of a small removable booster placed in the cavity of a projectile between the fuse and the bursting charge.

COMPONENTS, EXPLOSIVE TRAIN, N.O.S.: UN Nos. 0382, 0383, 0384, 0461

Articles containing an explosive designed to transmit detonation or deflagration within an explosive train.

CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge: UN Nos. 0248, 0249

Articles whose functioning depends upon physic-chemical reaction of their contents with water.

CORD, DETONATING, flexible: UN Nos. 0065, 0289

Article consisting of a core of detonating explosive enclosed in spun fabric and a plastics or other covering. The covering is not necessary if the spun fabric is sift-proof.

CORD (FUSE) DETONATING, metal clad: UN Nos. 0102, 0290

Article consisting of a core of detonating explosive clad by a soft metal tube with or without protective covering.

CORD (FUSE) DETONATING, MILD EFFECT, metal clad: UN No. 0104

Article consisting of a core of detonating explosive clad by a soft metal tube with or without a protective covering. The quantity of explosive substance is so small that only a mild effect is manifested outside the cord.

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CORD, IGNITER: UN No. 0066

Article consisting of textile yarns covered with black powder or another fast burning pyrotechnic composition and of a flexible protective covering; or it consists of a core of black powder surrounded by a flexible woven fabric. It burns progressively along its length with an external flame and is used to transmit ignition from a device to a charge or primer.

CUTTERS, CABLE, EXPLOSIVE: UN No. 0070

Articles consisting of a knife-edged device which is driven by a small charge of deflagrating explosive into an anvil.

DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting: UN Nos. 0360, 0361, 0500

Non-electric detonators assembled with and activated by such means as safety fuse, shock tube, flash tube or detonating cord. They may be of instantaneous design or incorporate delay elements. Detonating relays incorporating detonating cord are included.

DETONATORS, ELECTRIC for blasting: UN Nos. 0030, 0255, 0456

Articles specially designed for the initiation of blasting explosives. These detonators may be constructed to detonate instantaneously or may contain a delay element. Electric detonators are activated by an electric current.

DETONATORS FOR AMMUNITION: UN Nos. 0073, 0364, 0365, 0366

Articles consisting of a small metal or plastics tube containing explosives such as lead azide, PETN or combinations of explosives. They are designed to start a detonation train.

DETONATORS, NON-ELECTRIC for blasting: UN Nos. 0029, 0267, 0455

Articles specially designed for the initiation of blasting explosives. These detonators may be constructed to detonate instantaneously or may contain a delay element. Non-electric detonators are activated by such means as shock tube, flash tube, safety fuse, other igniferous device or flexible detonating cord. Detonating relays without detonating cord are included.

EXPLOSIVE, BLASTING, TYPE A: UN No. 0081

Substances consisting of liquid organic nitrates such as nitroglycerine or a mixture of such ingredients with one or more of the following: nitrocellulose; ammonium nitrate or other inorganic nitrates; aromatic nitro-derivatives, or combustible materials, such as wood-meal and aluminium powder. They may contain inert components such as kieselguhr, and additives such as colouring agents and stabilizers. Such explosives shall be in powdery, gelatinous or elastic form. The term includes dynamite; gelatine, blasting and gelatine dynamites.

EXPLOSIVE, BLASTING, TYPE B: UN Nos. 0082, 0331

Substances consisting of

(a) a mixture of ammonium nitrate or other inorganic nitrates with an explosive such as trinitrotoluene, with or without other substances such as wood-meal and aluminium powder; or

(b) a mixture of ammonium nitrate or other inorganic nitrates with other combustible substances which are not explosive ingredients. In both cases they may contain inert components such as kieselguhr, and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine, similar liquid organic nitrates or chlorates.

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EXPLOSIVE, BLASTING, TYPE C: UN No. 0083

Substances consisting of a mixture of either potassium or sodium chlorate or potassium, sodium or ammonium perchlorate with organic nitro-derivatives or combustible materials such as wood-meal or aluminium powder or a hydrocarbon. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine or similar liquid organic nitrates.

EXPLOSIVE, BLASTING, TYPE D: UN No. 0084

Substances consisting of a mixture of organic nitrated compounds and combustible materials such as hydrocarbons and aluminium powder. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine, similar liquid organic nitrates, chlorates and ammonium nitrate. The term generally includes plastic explosives.

EXPLOSIVES, BLASTING, TYPE E: UN Nos. 0241, 0332

Substances consisting of water as an essential ingredient and high proportions of ammonium nitrate or other oxidizers, some or all of which are in solution. The other constituents may include nitro-derivatives such as trinitrotoluene, hydrocarbons or aluminium powder. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. The term includes explosives, emulsion, explosives, slurry and explosives, watergel.

FIREWORKS: UN Nos. 0333, 0334, 0335, 0336, 0337

Pyrotechnic articles designed for entertainment.

FLARES, AERIAL: UN Nos. 0093, 0403, 0404, 0420, 0421;

Articles containing pyrotechnic substances which are designed to be dropped from an aircraft to illuminate, identify, signal or warn.

FLARES, SURFACE: UN Nos. 0092, 0418, 0419

Articles containing pyrotechnic substances which are designed for use on the surface to illuminate, identify, signal or warn.

FLASH POWDER: UN Nos. 0094, 0305

Pyrotechnic substance which, when ignited, produces an intense light.

FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells: UN No. 0099

Articles consisting of a charge of detonating explosive contained in a casing without means of initiation. They are used to fracture the rock around a drill shaft to assist the flow of crude oil from the rock.

FUSE, IGNITER, tubular, metal clad: UN No. 0103

Article consisting of a metal tube with a core of deflagrating explosive.

FUSE, NON-DETONATING: UN No. 0101

Article consisting of cotton yarns impregnated with fine black powder (quickmatch). It burns with an external flame and is used in ignition trains for fireworks, etc.

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FUSE, SAFETY: UN No. 0105

Article consisting of a core of fine grained black powder surrounded by a flexible woven fabric with one or more protective outer coverings. When ignited, it burns at a predetermined rate without any external explosive effect.

FUZES, DETONATING: UN Nos. 0106, 0107, 0257, 0367

Articles with explosive components designed to produce a detonation in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to initiate the detonation. They generally incorporate protective features.

FUZES, DETONATING with protective features: UN Nos. 0408, 0409, 0410

Articles with explosive components designed to produce a detonation in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to initiate the detonation. The detonating fuze must incorporate two or more effective protective features.

FUZES, IGNITING: UN Nos. 0316, 0317, 0368

Articles with primary explosive components designed to produce a deflagration in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to start the deflagration. They generally incorporate protective features.

GRENADES, hand or rifle, with bursting charge: UN Nos. 0284, 0285

Articles which are designed to be thrown by hand or to be projected by a rifle. They are without means of initiation or with means of initiation containing two or more effective protective features.

GRENADES, hand or rifle, with bursting charge: UN Nos. 0292, 0293

Articles which are designed to be thrown by hand or to be projected by a rifle. They are with means of initiation not containing two or more effective protective features.

GRENADES, PRACTICE, hand or rifle: UN Nos. 0110, 0372, 0318, 0452

Articles without a main bursting charge which are designed to be thrown by hand or to be projected by a rifle. They contain the priming device and may contain a spotting charge.

HEXOTONAL: UN No. 0393

Substance consisting of an intimate mixture of cyclotrimethylenetrinitramine (RDX), trinitrotoluene (TNT) and aluminium.

HEXOLITE (HEXOTOL), dry or wetted with less than 15 % water, by mass: UN No. 0118

Substance consisting of an intimate mixture of cyclotrimethylenetrinitramine (RDX) and trinitrotoluene (TNT). The term includes "Composition B".

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IGNITERS: UN Nos. 0121, 0314, 0315, 0325, 0454

Articles containing one or more explosive substances designed to produce a deflagration in an explosive train. They may be actuated chemically, electrically or mechanically.

***NOTE**: The following articles: CORD, IGNITER; FUSE, IGNITER; FUSE, NON-DETONATING; FUZES, IGNITING; LIGHTERS, FUSE; PRIMERS, CAP TYPE; PRIMERS, TUBULAR are not included in this definition. They are listed separately.*

JET PERFORATING GUNS, CHARGED, oil well, without detonator: UN Nos. 0124, 0494

Articles consisting of a steel tube or metallic strip, into which are inserted shaped charges connected by detonating cord, without means of initiation.

LIGHTERS, FUSE: UN No. 0131

Articles of various design actuated by friction, percussion or electricity and used to ignite safety fuse.

MINES with bursting charge: UN Nos. 0137, 0138

Articles consisting normally of metal or composition receptacles filled with a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be operated by the passage of ships, vehicles or personnel. The term includes "Bangalore torpedoes".

MINES with bursting charge: UN Nos. 0136, 0294

Articles consisting normally of metal or composition receptacles filled with a detonating explosive, with means of initiation not containing two or more effective protective features. They are designed to be operated by the passage of ships, vehicles or personnel. The term includes "Bangalore torpedoes".

OCTOLITE (OCTOL), dry or wetted with less than 15 % water, by mass: UN No. 0266

Substance consisting of an intimate mixture of cyclotetramethylenetetranitramine (HMX) and trinitrotoluene (TNT).

OCTONAL: UN No. 0496

Substance consisting of an intimate mixture of cyclotetramethylenetetranitramine (HMX), trinitrotoluene (TNT) and aluminium.

PENTOLITE, dry or wetted with less than 15 % water, by mass: UN No. 0151

Substance consisting of an intimate mixture of pentaerythrite tetranitrate (PETN) and trinitrotoluene (TNT).

POWDER CAKE (POWDER PASTE), WETTED with not less than 17 % alcohol, by mass; POWDER CAKE (POWDER PASTE), WETTED with not less than 25 % water, by mass: UN Nos. 0433, 0159

Substance consisting of nitrocellulose impregnated with not more than 60 % of nitroglycerine or other liquid organic nitrates or a mixture of these.

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POWDER, SMOKELESS: UN Nos. 0160, 0161, 0509

Substance based on nitrocellulose used as propellant. The term includes propellants with a single base (nitrocellulose (NC) alone), those with a double base (such as NC and nitroglycerine (NG)) and those with a triple base (such as NC/NG/nitroguanidine).

***NOTE**: Cast, pressed or bag-charges of smokeless powder are listed under CHARGES, PROPELLING or CHARGES, PROPELLING, FOR CANNON.*

PRIMERS, CAP TYPE: UN Nos. 0044, 0377, 0378

Articles consisting of a metal or plastics cap containing a small amount of primary explosive mixture that is readily ignited by impact. They serve as igniting elements in small arms cartridges and in percussion primers for propelling charges.

PRIMERS, TUBULAR: UN Nos. 0319, 0320, 0376

Articles consisting of a primer for ignition and an auxiliary charge of deflagrating explosive such as black powder used to ignite the propelling charge in a cartridge case for cannon, etc.

PROJECTILES, inert with tracer: UN Nos. 0345, 0424, 0425

Articles such as a shell or bullet, which are projected from a cannon or other gun, rifle or other small arm.

PROJECTILES with burster or expelling charge: UN Nos. 0346, 0347

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are without means of initiation or with means of initiation containing two or more effective protective features. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with burster or expelling charge: UN Nos. 0426, 0427

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are with means of initiation not containing two or more effective protective features. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with burster or expelling charge: UN Nos. 0434, 0435

Articles such as a shell or bullet, which are projected from a cannon or other gun, rifle or other small arm. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with bursting charge: UN Nos. 0168, 0169, 0344

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are without means of initiation or with means of initiation containing two or more effective protective features.

PROJECTILES with bursting charge: UN Nos. 0167, 0324

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are with means of initiation not containing two or more effective protective features.

PROPELLANT, LIQUID: UN Nos. 0495, 0497

Substance consisting of a deflagrating liquid explosive, used for propulsion.

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PROPELLANT, SOLID: UN Nos. 0498, 0499, 0501

Substance consisting of a deflagrating solid explosive, used for propulsion.

RELEASE DEVICES, EXPLOSIVE: UN No. 0173

Articles consisting of a small charge of explosive with means of initiation and rods or links. They sever the rods or links to release equipment quickly.

RIVETS, EXPLOSIVE: UN No. 0174

Articles consisting of a small charge of explosive inside a metallic rivet.

ROCKET MOTORS: UN Nos. 0186, 0280, 0281, 0510

Articles consisting of a charge of explosive, generally a solid propellant, contained in a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKET MOTORS, LIQUID FUELLED: UN Nos. 0395, 0396

Articles consisting of a liquid fuel within a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge: UN Nos. 0322, 0250

Articles consisting of a hypergolic fuel contained in a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKETS, LINE THROWING: UN Nos. 0238, 0240, 0453

Articles consisting of a rocket motor which is designed to extend a line.

ROCKETS, LIQUID FUELLED with bursting charge: UN Nos. 0397, 0398

Articles consisting of a liquid fuel within a cylinder fitted with one or more nozzles and fitted with a warhead. The term includes guided missiles.

ROCKETS with bursting charge: UN Nos. 0181, 0182

Articles consisting of a rocket motor and a warhead without means of initiation or with means of initiation containing two or more effective protective features. The term includes guided missiles.

ROCKETS with bursting charge: UN Nos. 0180, 0295

Articles consisting of a rocket motor and a warhead with means of initiation not containing two or more effective protective features. The term includes guided missiles.

ROCKETS with expelling charge: UN Nos. 0436, 0437, 0438

Articles consisting of a rocket motor and a charge to expel the payload from a rocket head. The term includes guided missiles.

ROCKETS with inert head: UN Nos. 0183, 0502

Articles consisting of a rocket motor and an inert head. The term includes guided missiles.

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SAFETY DEVICES, PYROTECHNIC: UN No. 0503

Articles which contain pyrotechnic substances or dangerous goods of other classes and are used in vehicles, vessels or aircraft to enhance safety to persons. Examples are: air bag inflators, air bag modules, seat-belt pretensioners and pyromechanical devices. These pyromechanical devices are assembled components for tasks such as but not limited to separation, locking, or occupant restraint.

SAMPLES, EXPLOSIVE, other than initiating explosive UN No. 0190

New or existing explosive substances or articles, not yet assigned to a name in Table A of Chapter 3.2 and carried in conformity with the instructions of the competent authority and generally in small quantities, *inter alia*, for the purposes of testing, classification, research and development, or quality control, or as commercial samples.

NOTE: *Explosive substances or articles already assigned to another name in Table A of Chapter 3.2 are not included in this definition.*

SIGNAL DEVICES, HAND: UN Nos. 0191, 0373

Portable articles containing pyrotechnic substances which produce visual signals or warnings. The term includes small surface flares such as highway or railway flares and small distress flares.

SIGNALS, DISTRESS, ship: UN Nos. 0194, 0195, 0505, 0506

Articles containing pyrotechnic substances designed to produce signals by means of sound, flame or smoke or any combination thereof.

SIGNALS, RAILWAY TRACK, EXPLOSIVE: UN Nos. 0192, 0193, 0492, 0493

Articles containing a pyrotechnic substance which explodes with a loud report when the article is crushed. They are designed to be placed on a rail.

SIGNALS, SMOKE: UN Nos. 0196, 0197, 0313, 0487, 0507

Articles containing pyrotechnic substances which emit smoke. In addition they may contain devices for emitting audible signals.

SOUNDING DEVICES, EXPLOSIVE: UN Nos. 0374, 0375

Articles consisting of a charge of detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are dropped from ships and function when they reach a predetermined depth or the sea bed.

SOUNDING DEVICES, EXPLOSIVE: UN Nos. 0204, 0296

Articles consisting of a charge of detonating explosive with means of initiation not containing two or more effective protective features. They are dropped from ships and function when they reach a predetermined depth or the sea bed.

SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (Substances, EVI), N.O.S.: UN No. 0482

Substances presenting a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport, and which have passed Test Series 5.

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TORPEDOES, LIQUID FUELLED with inert head: UN No. 0450

Articles consisting of a liquid explosive system to propel the torpedo through the water, with an inert head.

TORPEDOES, LIQUID FUELLED with or without bursting charge: UN No. 0449

Articles consisting of either a liquid explosive system to propel the torpedo through the water, with or without a warhead; or a liquid non-explosive system to propel the torpedo through the water, with a warhead.

TORPEDOES with bursting charge: UN No. 0451

Articles consisting of a non-explosive system to propel the torpedo through the water, and a warhead without means of initiation or with means of initiation containing two or more effective protective features.

TORPEDOES with bursting charge: UN No. 0329

Articles consisting of an explosive system to propel the torpedo through the water, and a warhead without means of initiation or with means of initiation containing two or more effective protective features.

TORPEDOES with bursting charge: UN No. 0330

Articles consisting of an explosive or non-explosive system to propel the torpedo through the water, and a warhead with means of initiation not containing two or more effective protective features.

TRACERS FOR AMMUNITION: UN Nos. 0212, 0306

Sealed articles containing pyrotechnic substances, designed to reveal the trajectory of a projectile.

TRITONAL: UN No. 0390

Substance consisting of trinitrotoluene (TNT) mixed with aluminium.

WARHEADS, ROCKET with burster or expelling charge: UN No. 0370

Articles consisting of an inert payload and a small charge of detonating or deflagrating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a rocket motor to scatter inert material. The term includes warheads for guided missiles.

WARHEADS, ROCKET with burster or expelling charge: UN No. 0371

Articles consisting of an inert payload and a small charge of detonating or deflagrating explosive, with means of initiation not containing two or more effective protective features. They are designed to be fitted to a rocket motor to scatter inert material. The term includes warheads for guided missiles.

WARHEADS, ROCKET with bursting charge: UN Nos. 0286, 0287

Articles consisting of a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a rocket. The term includes warheads for guided missiles.

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WARHEADS, ROCKET with bursting charge: UN No. 0369

Articles consisting of a detonating explosive, with means of initiation not containing two or more effective protective features. They are designed to be fitted to a rocket. The term includes warheads for guided missiles.

WARHEADS, TORPEDO with bursting charge: UN No. 0221

Articles consisting of a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a torpedo.

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2.2.2 Class 2 Gases

2.2.2.1 *Criteria*

2.2.2.1.1 The heading of Class 2 covers pure gases, mixtures of gases, mixtures of one or more gases with one or more other substances and articles containing such substances.

A gas is a substance which:

(a) at 50 °C has a vapour pressure greater than 300 kPa (3 bar); or

(b) is completely gaseous at 20° C at the standard pressure of 101.3 kPa.

NOTE 1: *UN No. 1052 HYDROGEN FLUORIDE, ANHYDROUS is nevertheless classified in Class 8.*

NOTE 2: *A pure gas may contain other components deriving from its production process or added to preserve the stability of the product, provided that the level of these components does not change its classification or its conditions of carriage, such as filling ratio, filling pressure, test pressure.*

NOTE 3: *N.O.S. entries in 2.2.2.3 may cover pure gases as well as mixtures.*

2.2.2.1.2 The substances and articles of Class 2 are subdivided as follows:

1. *Compressed gas:* a gas which when packaged under pressure for carriage is entirely gaseous at -50 °C; this category includes all gases with a critical temperature less than or equal to -50 °C;

2. *Liquefied gas:* a gas which when packaged under pressure for carriage is partially liquid at temperatures above -50 °C. A distinction is made between:

   High pressure liquefied gas: a gas with a critical temperature above -50 °C and equal to or below +65 °C; and

   Low pressure liquefied gas: a gas with a critical temperature above +65 °C;

3. *Refrigerated liquefied gas*: a gas which when packaged for carriage is made partially liquid because of its low temperature;

4. *Dissolved gas:* a gas which when packaged under pressure for carriage is dissolved in a liquid phase solvent;

5. Aerosol dispensers and receptacles, small, containing gas (gas cartridges);

6. Other articles containing gas under pressure;

7. Non-pressurized gases subject to special requirements (gas samples);

8. Chemicals under pressure: liquids, pastes or powders, pressurized with a propellant that meets the definition of a compressed or liquefied gas and mixtures thereof.

9. *Adsorbed gas:* a gas which when packaged for carriage is adsorbed onto a solid porous material resulting in an internal receptacle pressure of less than 101.3 kPa at 20 °C and less than 300 kPa at 50 °C.

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2.2.2.1.3 Substances and articles (except aerosols and chemicals under pressure) of Class 2 are assigned to one of the following groups according to their hazardous properties, as follows:

A asphyxiant;

O oxidizing;

F flammable;

T toxic;

TF toxic, flammable;

TC toxic, corrosive;

TO toxic, oxidizing;

TFC toxic, flammable, corrosive;

TOC toxic, oxidizing, corrosive.

For gases and gas mixtures presenting hazardous properties associated with more than one group according to the criteria, the groups designated by letter T take precedence over all other groups. The groups designated by letter F take precedence over the groups designated by letters A or O.

NOTE 1: *In the UN Model Regulations, the IMDG Code and the ICAO Technical Instructions, gases are assigned to one of the following three divisions, based on the primary hazard:*

Division 2.1: flammable gases (corresponding to the groups designated by the capital letter F);

Division 2.2: non-flammable, non-toxic gases (corresponding to the groups designated by the capital letters A or O);

Division 2.3: toxic gases (corresponding to the groups designated by the capital letter T (i.e. T, TF, TC, TO, TFC and TOC).

NOTE 2*: Receptacles, small containing gas (UN No. 2037) shall be assigned to the groups A to TOC according to the hazard of the contents. For aerosols (UN No. 1950), see 2.2.2.1.6. For chemicals under pressure (UN Nos. 3500 to 3505), see 2.2.2.1.7.*

NOTE 3*: Corrosive gases are considered to be toxic, and are therefore assigned to the group TC, TFC or TOC.*

2.2.2.1.4 If a mixture of Class 2 mentioned by name in Table A of Chapter 3.2 meets different criteria as mentioned in 2.2.2.1.2 and 2.2.2.1.5, this mixture shall be classified according to the criteria and assigned to an appropriate N.O.S. entry.

2.2.2.1.5 Substances and articles (except aerosols and chemicals under pressure) of Class 2 which are not mentioned by name in Table A of Chapter 3.2 shall be classified under a collective entry listed in 2.2.2.3 in accordance with 2.2.2.1.2 and 2.2.2.1.3. The following criteria shall apply:

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Asphyxiant gases

Gases which are non-oxidizing, non-flammable and non-toxic and which dilute or replace oxygen normally in the atmosphere.

Flammable gases

Gases which at 20 °C and a standard pressure of 101.3 kPa:

(a) are ignitable when in a mixture of 13% or less by volume with air; or

(b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit.

Flammability shall be determined by tests or by calculation, in accordance with methods adopted by ISO (see ISO 10156:2010).

Where insufficient data are available to use these methods, tests by a comparable method recognized by the competent authority of the country of origin may be used.

If the country of origin is not a Contracting Party to ADN these methods shall be recognized by the competent authority of the first country Contracting Party to ADN reached by the consignment.

Oxidizing gases

Gases, which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. These are pure gases or gas mixtures with an oxidizing power greater than 23.5% as determined by a method specified in ISO 10156:2010.

Toxic gases

NOTE: *Gases meeting the criteria for toxicity in part or completely owing to their corrosivity are to be classified as toxic. See also the criteria under the heading "Corrosive gases" for a possible subsidiary corrosivity hazard.*

Gases which:

(a) are known to be so toxic or corrosive to humans as to pose a hazard to health; or

(b) are presumed to be toxic or corrosive to humans because they have a LC_{50} value for acute toxicity equal to or less than 5 000 ml/m³ (ppm) when tested in accordance with 2.2.61.1.

In the case of gas mixtures (including vapours of substances from other classes) the following formula may be used:

$$LC_{50}\ \text{Toxic (mixture)} = \frac{1}{\sum_{i=1}^{n} \frac{f_i}{T_i}}$$

where f_i = mole fraction of the i^{th} component substance of the mixture;

T_i = toxicity index of the i^{th} component substance of the mixture. The T_i equals the LC_{50} value as found in packing instruction P200 of 4.1.4.1 of ADR.

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When no LC_{50} value is listed in packing instruction P200 of 4.1.4.1 of ADR, a LC_{50} value available in scientific literature shall be used. When the LC_{50} value is unknown, the toxicity index is determined by using the lowest LC_{50} value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility.

Corrosive gases

Gases or gas mixtures meeting the criteria for toxicity completely owing to their corrosivity are to be classified as toxic with a subsidiary corrosivity hazard.

A gas mixture that is considered to be toxic due to the combined effects of corrosivity and toxicity has a subsidiary hazard of corrosivity when the mixture is known by human experience to be destructive to the skin, eyes or mucous membranes or when the LC_{50} value of the corrosive components of the mixture is equal to or less than 5 000 ml/m^3 (ppm) when the LC_{50} is calculated by the formula:

$$LC_{50}\ \text{Corrosive}\ (\text{mixture}) = \frac{1}{\sum_{i=1}^{n} \frac{f_{ci}}{T_{ci}}}$$

where f_{ci} = mole fraction of the i^{th} corrosive component substance of the mixture;

T_{ci} = toxicity index of the i^{th} corrosive component substance of the mixture.
The T_{ci} equals the LC_{50} value as found in packing instruction P200 of 4.1.4.1 of ADR.
When no LC_{50} value is listed in packing instruction P200 of 4.1.4.1 of ADR, a LC_{50} value available in scientific literature shall be used. When the LC_{50} value is unknown the toxicity index is determined by using the lowest LC_{50} value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility.

2.2.2.1.6 *Aerosols*

Aerosols (UN No. 1950) are assigned to one of the following groups according to their hazardous properties, as follows:

A asphyxiant;

O oxidizing;

F flammable;

T toxic;

C corrosive;

CO corrosive, oxidizing;

FC flammable, corrosive;

TF toxic, flammable;

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TC toxic, corrosive;

TO toxic, oxidizing;

TFC toxic, flammable, corrosive

TOC toxic, oxidizing, corrosive.

The classification depends on the nature of the contents of the aerosol dispenser.

NOTE: *Gases, which meet the definition of toxic gases according to 2.2.2.1.5 and gases identified as "Considered as pyrophoric" by table note c of Table 2 of packing instruction P200 of ADR, shall not be used as a propellant in an aerosol dispenser. Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity shall not be accepted for carriage (see also 2.2.2.2.2).*

The following criteria shall apply:

(a) Assignment to group A shall apply when the contents do not meet the criteria for any other group according to sub-paragraphs (b) to (f) below;

(b) Assignment to group O shall apply when the aerosol contains an oxidizing gas according to 2.2.2.1.5;

(c) Assignment to group F shall apply if the contents include 85% by mass or more flammable components and the chemical heat of combustion is 30 kJ/g or more.

It shall not apply if the contents contain 1% by mass or less flammable components and the heat of combustion is less than 20 kJ/g.

Otherwise the aerosol shall be tested for flammability in accordance with the tests described in the *Manual of Tests and Criteria*, Part III, section 31. Extremely flammable and flammable aerosols shall be assigned to group F;

NOTE: *Flammable components are flammable liquids, flammable solids or flammable gases and gas mixtures as defined in Notes 1 to 3 of sub-section 31.1.3 of Part III of the Manual of Tests and Criteria. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion shall be determined by one of the following methods ASTM D 240, ISO/FDIS 13943: 1999 (E/F) 86.1 to 86.3 or NFPA 30B.*

(d) Assignment to group T shall apply when the contents, other than the propellant of aerosol dispensers to be ejected, are classified as Class 6.1, packing groups II or III;

(e) Assignment to group C shall apply when the contents, other than the propellant of aerosol dispensers to be ejected, meet the criteria for Class 8, packing groups II or III;

(f) When the criteria for more than one group amongst groups O, F, T, and C are met, assignment to groups CO, FC, TF, TC TO, TFC or TOC shall apply, as relevant.

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2.2.2.1.7 *Chemicals under pressure*

Chemicals under pressure (UN Nos. 3500 to 3505) are assigned to one of the following groups according to their hazardous properties, as follows:

A asphyxiant;

F flammable;

T toxic;

C corrosive;

FC flammable, corrosive;

TF toxic, flammable.

The classification depends on the hazard characteristics of the components in the different states:

The propellant;

The liquid; or

The solid.

NOTE 1: *Gases, which meet the definition of toxic gases or of oxidizing gases according to 2.2.2.1.5 or gases identified as "Considered as pyrophoric" by table note c of Table 2 of packing instruction P200 in 4.1.4.1 of ADR, shall not be used as a propellant in chemicals under pressure.*

NOTE 2: *Chemicals under pressure with contents meeting the criteria for packing group I for toxicity or corrosivity or with contents meeting both the criteria for packing group II or III for toxicity and for packing group II or III for corrosivity shall not be accepted for carriage under these UN numbers.*

NOTE 3: *Chemicals under pressure with components meeting the properties of Class 1; liquid desensitized explosives of Class 3; self-reactive substances and solid desensitized explosives of Class 4.1; Class 4.2; Class 4.3; Class 5.1; Class 5.2; Class 6.2; or Class 7, shall not be used for carriage under these UN numbers.*

NOTE 4: *A chemical under pressure in an aerosol dispenser shall be carried under UN No. 1950.*

The following criteria shall apply:

(a) Assignment to group A shall apply when the contents do not meet the criteria for any other group according to sub-paragraphs (b) to (e) below;

(b) Assignment to group F shall apply if one of the components, which can be a pure substance or a mixture, needs to be classified as flammable. Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:

(i) A flammable liquid is a liquid having a flashpoint of not more than 93 °C;

(ii) A flammable solid is a solid which meets the criteria in 2.2.41.1;

(iii) A flammable gas is a gas which meets the criteria in 2.2.2.1.5;

(c) Assignment to group T shall apply when the contents, other than the propellant, are classified as dangerous goods of Class 6.1, packing groups II or III;

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(d) Assignment to group C shall apply when the contents, other than the propellant, are classified as dangerous goods of Class 8, packing groups II or III;

(e) When the criteria for two groups amongst groups F, T, and C are met, assignment to groups FC or TF shall apply, as relevant.

2.2.2.2 ***Gases not accepted for carriage***

2.2.2.2.1 Chemically unstable gases of Class 2 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage or unless carried in accordance with special packing provision (r) of packing instruction P200 (10) of 4.1.4.1 of ADR, as applicable. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions.

2.2.2.2.2 The following substances and mixtures shall not be accepted for carriage:

– UN No. 2186 HYDROGEN CHLORIDE, REFRIGERATED LIQUID;

– UN No. 2421 NITROGEN TRIOXIDE;

– UN No. 2455 METHYL NITRITE;

– Refrigerated liquefied gases which cannot be assigned to classification codes 3A, 3O or 3F, with the exception of substance identification number 9000 AMMONIA ANHYDROUS, DEEPLY REFRIGERATED of classification code 3TC in tank vessels;

– Dissolved gases which cannot be classified under UN Nos. 1001, 2073 or 3318;

– Aerosols where gases which are toxic according to 2.2.2.1.5 or pyrophoric according to packing instruction P200 in 4.1.4.1 of ADR are used as propellants;

– Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity (see 2.2.61 and 2.2.8);

– Receptacles, small, containing gases which are very toxic (LC_{50} lower than 200 ppm) or pyrophoric according to packing instruction P200 in 4.1.4.1 of ADR.

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2.2.2.3 *List of collective entries*

Compressed gases		
Classification code	**UN No**	**Name and description**
1A	1956	COMPRESSED GAS, N.O.S.
1O	3156	COMPRESSED GAS, OXIDIZING, N.O.S.
1F	1964	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.
	1954	COMPRESSED GAS, FLAMMABLE, N.O.S.
1T	1955	COMPRESSED GAS, TOXIC, N.O.S.
1TF	1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.
1TC	3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.
1TO	3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.
1TFC	3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
1TOC	3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.

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Liquefied gases		
Classification code	**UN No**	**Name and description**
2A	1058	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air
	1078	REFRIGERANT GAS, N.O.S. such as mixtures of gases, indicated by the letter R, which as: Mixture F1, have a vapour pressure at 70 °C not exceeding 1.3 MPa (13 bar) and a mass density at 50 °C not lower than that of dichlorofluoromethane (1.30 kg/l); Mixture F2, have a vapour pressure at 70 °C not exceeding 1.9 MPa (19 bar) and a mass density at 50 °C not lower than that of dichlorodifluoromethane (1.21 kg/l); Mixture F3, have a vapour pressure at 70 °C not exceeding 3 MPa (30 bar) and a mass density at 50 °C not lower than that of chlorodifluoromethane (1.09 kg/l). ***NOTE:*** *Trichlorofluoromethane (Refrigerant R 11), 1,1,2-trichloro-1,2,2-trifluoroethane (Refrigerant R 113), 1,1,1-trichloro-2,2,2-trifluoroethane (Refrigerant R 113a), 1-chloro-1,2,2-trifluoroethane (Refrigerant R 133) and 1-chloro-1,1,2-trifluoroethane (Refrigerant R 133b) are not substances of Class 2. They may, however, enter into the composition of mixtures F1 to F3.*
	1968	INSECTICIDE GAS, N.O.S.
	3163	LIQUEFIED GAS, N.O.S.
2O	3157	LIQUEFIED GAS, OXIDIZING, N.O.S.
2F	1010	BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, having a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a mass density at 50 °C not lower than 0.525 kg/l. ***NOTE****: Butadienes, stabilized are also classified under UN No. 1010, see Table A of Chapter 3.2.*
	1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED such as mixtures of methylacetylene and propadiene with hydrocarbons, which as: Mixture P1, contain not more than 63% methylacetylene and propadiene by volume and not more than 24% propane and propylene by volume, the percentage of C_4-saturated hydrocarbons being not less than 14% by volume; and as Mixture P2, contain not more than 48% methylacetylene and propadiene by volume and not more than 50% propane and propylene by volume, the percentage of C_4- saturated hydrocarbons being not less than 5% by volume, as well as mixtures of propadiene with 1 to 4% methylacetylene.

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Liquefied gases (cont'd)		
Classification code	**UN No**	**Name and description**
	1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S such as mixtures, which as: Mixture A, have a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a mass density at 50 °C not lower than 0.525 kg/l; Mixture A01, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a mass density at 50 °C not lower than 0.516 kg/l; Mixture A02, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a mass density at 50 °C not lower than 0.505 kg/l; Mixture A0, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a mass density at 50 °C not lower than 0.495 kg/l; Mixture A1, have a vapour pressure at 70 °C not exceeding 2.1 MPa (21 bar) and a mass density at 50 °C not lower than 0.485 kg/l; Mixture B1 have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a mass density at 50 °C not lower than 0.474 kg/l; Mixture B2 have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a mass density at 50 °C not lower than 0.463 kg/l; Mixture B, have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a mass density at 50 °C not lower than 0.450 kg/l; Mixture C, have a vapour pressure at 70 °C not exceeding 3.1 MPa (31 bar) and a mass density at 50 °C not lower than 0.440 kg/l; ***NOTE 1:*** *In the case of the foregoing mixtures, the use of the following names customary in the trade is permitted for describing these substances: for mixture A01, A02 and A0: BUTANE; for mixture C: PROPANE.* ***NOTE 2:*** *UN No. 1075 PETROLEUM GASES, LIQUEFIED may be used as an alternative entry for UN No. 1965 HYDROCARBON GAS MIXTURE LIQUEFIED, N.O.S. for carriage prior to or following maritime or air carriage.*
	3354 3161	INSECTICIDE GAS, FLAMMABLE, N.O.S. LIQUEFIED GAS, FLAMMABLE, N.O.S.
2T	1967 3162	INSECTICIDE GAS, TOXIC, N.O.S. LIQUEFIED GAS, TOXIC, N.O.S.
2TF	3355 3160	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S. LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.
2TC	3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.
2TO	3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.
2TFC	3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
2TOC	3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.

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Refrigerated liquefied gases		
Classification code	**UN No**	**Name and description**
3A	3158	GAS, REFRIGERATED LIQUID, N.O.S.
3O	3311	GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.
3F	3312	GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.

Dissolved gases		
Classification code	**UN No**	**Name and description**
4		Only substances listed in Table A of Chapter 3.2 are to be accepted for carriage.

Aerosols and receptacles, small, containing gas		
Classification code	**UN No**	**Name and description**
5	1950	AEROSOLS
	2037	RECEPTACLES, SMALL CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable

Other articles containing gas under pressure		
Classification code	**UN No**	**Name and description**
6A	2857	REFRIGERATING MACHINES containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)
	3164	ARTICLES, PRESSURIZED, PNEUMATIC (containing non-flammable gas) or
	3164	ARTICLES, PRESSURIZED, HYDRAULIC (containing non-flammable gas)
	3538	ARTICLES CONTAINING NON-FLAMMABLE, NON TOXIC GAS, N.O.S.
6F	3150	DEVICES, SMALL, HYDROCARBON GAS POWERED or
	3150	HYDROCARBON GAS REFILLS FOR SMALL DEVICES, with release device
	3478	FUEL CELL CARTRIDGES, containing liquefied flammable gas or
	3478	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing liquefied flammable gas or
	3478	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas
	3479	FUEL CELL CARTRIDGES, containing hydrogen in metal hydride or
	3479	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing hydrogen in metal hydride or
	3479	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride
	3529	ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED
	3529	ENGINE, FUEL CELL, FLAMMABLE GAS POWERED
	3529	MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED
	3529	MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED
	3537	ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.
6T	3539	ARTICLES CONTAINING TOXIC GAS, N.O.S.

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Gas samples		
Classification code	**UN No**	**Name and description**
7F	3167	GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid
7T	3169	GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid
7TF	3168	GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid

Chemicals under pressure		
Classification code	**UN No**	**Name of the substance or article**
8A	3500	CHEMICAL UNDER PRESSURE, N.O.S.
8F	3501	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.
8T	3502	CHEMICAL UNDER PRESSURE, TOXIC, N.O.S.
8C	3503	CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.
8TF	3504	CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.
8FC	3505	CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S

Adsorbed gases		
Classification code	**UN No.**	**Name of the substance or article**
9A	3511	ADSORBED GAS, N.O.S.
9O	3513	ADSORBED GAS, OXIDIZING, N.O.S.
9F	3510	ADSORBED GAS, FLAMMABLE, N.O.S.
9T	3512	ADSORBED GAS, TOXIC, N.O.S.
9TF	3514	ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.
9TC	3516	ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.
9TO	3515	ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.
9TFC	3517	ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
9TOC	3518	ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.

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2.2.3 Class 3 Flammable liquids

2.2.3.1 *Criteria*

2.2.3.1.1 The heading of Class 3 covers substances and articles containing substances of this Class which:

– are liquids according to subparagraph (a) of the definition for "liquid" in 1.2.1;

– have at 50 °C a vapour pressure of not more than 300 kPa (3 bar) and are not completely gaseous at 20 °C and at standard pressure of 101.3 kPa; and

– have a flash-point of not more than 60 °C (see 2.3.3.1 for the relevant test).

The heading of Class 3 also covers liquid substances and molten solid substances with a flash-point of more than 60 °C and which are carried or handed over for carriage whilst heated at temperatures equal to or higher than their flash-point. These substances are assigned to UN No. 3256.

The heading of Class 3 also covers liquid desensitized explosives. Liquid desensitized explosives are explosive substances which are dissolved or suspended in water or other liquid substances, to form an homogeneous liquid mixture to suppress their explosive properties. Such entries in Table A of Chapter 3.2 are UN Nos. 1204, 2059, 3064, 3343, 3357 and 3379.

For the purpose of carriage in tank vessels, the heading of Class 3 also covers the following substances which:

– have a flash-point above 60 °C and which are carried or handed over for carriage at a temperature within a range of 15 K below the flash-point;

– have an auto-ignition temperature of 200 °C or below and which are not mentioned elsewhere.

NOTE 1: *Substances having a flash-point above 35 °C, which, do not sustain combustion according to the criteria of 32.2.5 of Part III of the Manual of Tests and Criteria are not substances of Class 3; if, however, these substances are handed over for carriage and carried whilst heated at temperatures equal to or higher than their flash-point, they are substances of Class 3.*

NOTE 2: *By derogation from paragraph 2.2.3.1.1 above, diesel fuel, gas oil, heating oil (light) including synthetically manufactured products having a flash-point above 60 °C and not more than 100 °C shall be deemed substances of Class 3, UN No. 1202.*

NOTE 3: *Flammable liquids which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9, and toxic substances having a flash-point of 23 °C or above are substances of Class 6.1 (see 2.2.61.1). Liquids which are highly toxic by inhalation are indicated as "toxic by inhalation" in their proper shipping name in Column (2) or by special provision 354 in Column (6) of Table A of Chapter 3.2.*

NOTE 4: *Flammable liquid substances and preparations used as pesticides, which are highly toxic, toxic or slightly toxic and have a flash-point of 23 °C or above are substances of Class 6.1 (see 2.2.61.1).*

NOTE 5: *For the purpose of carriage in tank vessels, substances having a flash-point above 60 °C and not more than 100 °C are substances of Class 9 (identification number 9003).*

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2.2.3.1.2 The substances and articles of Class 3 are subdivided as follows:

F Flammable liquids, without subsidiary hazard and articles containing such substances:

F1 Flammable liquids having a flash-point of or below 60 °C;
F2 Flammable liquids having a flash-point above 60 °C which are carried or handed over for carriage at or above their flash-point (elevated temperature substances);
F3 Articles containing inflammable liquids;
F4 Substances having a flash-point above 60 °C which are carried or handed over for carriage at a temperature within a range of 15 K below the flash-point;
F5 Substances having an auto-ignition temperature of 200 °C or below and which are not mentioned elsewhere.

FT Flammable liquids, toxic:

FT1 Flammable liquids, toxic;
FT2 Pesticides;

FC Flammable liquids, corrosive;

FTC Flammable liquids, toxic, corrosive;

D Liquid desensitized explosives.

2.2.3.1.3 Substances and articles classified in Class 3 are listed in Table A of Chapter 3.2. Substances not mentioned by name in Table A of Chapter 3.2 shall be assigned to the relevant entry of 2.2.3.3 and the relevant packing group in accordance with the provisions of this section. Flammable liquids shall be assigned to one of the following packing groups according to the degree of danger they present for carriage:

Packing Group	Flash-point (closed cup)	Initial boiling point
I	--	≤ 35°C
II [a]	< 23°C	> 35°C
III [a]	≥ 23°C and ≤ 60°C	> 35°C

[a] See also 2.2.3.1.4

For a liquid with (a) subsidiary hazard(s), the packing group determined in accordance with the table above and the packing group based on the severity of the subsidiary hazard(s) shall be considered; the classification and packing group shall then be determined in accordance with the table of precedence of hazards in 2.1.3.10.

2.2.3.1.4 Viscous flammable liquids such as paints, enamels, lacquers, varnishes, adhesives and polishes having a flash-point of less than 23 °C may be assigned to packing group III in conformity with the procedures prescribed in the *Manual of Tests and Criteria*, Part III, sub-section 32.3, provided that:

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(a) The viscosity[2] and flash-point are in accordance with the following table:

Kinematic viscosity (extrapolated) ν (at near-zero shear rate) mm²/s at 23°C	Flow-time t in seconds	Jet diameter (mm)	Flash-point, closed-cup (°C)
20 < ν ≤ 80	20 < t ≤ 60	4	above 17
80 < ν ≤ 135	60 < t ≤ 100	4	above 10
135 < ν ≤ 220	20 < t ≤ 32	6	above 5
220 < ν ≤ 300	32 < t ≤ 44	6	above -1
300 < ν ≤ 700	44 < t ≤ 100	6	above -5
700 < ν	100 < t	6	no limit

(b) Less than 3% of the clear solvent layer separates in the solvent separation test;

(c) The mixture or any separated solvent does not meet the criteria for Class 6.1 or Class 8;

(d) The substances are packed in receptacles of not more than 450 litre capacity.

NOTE: *These provisions also apply to mixtures containing no more than 20% nitrocellulose with a nitrogen content not exceeding 12.6% by dry mass. Mixtures containing more than 20% but not more than 55% nitrocellulose with a nitrogen content not exceeding 12.6% by dry mass are substances assigned to UN No. 2059.*

Mixtures having a flash-point below 23 °C and containing:

- *more than 55% nitrocellulose, whatever their nitrogen content; or*

- *not more than 55% nitrocellulose with a nitrogen content above 12.6% by dry mass,*

are substances of Class 1 (UN Nos. 0340 or 0342) or of Class 4.1 (UN Nos. 2555, 2556 or 2557).

2.2.3.1.5 *Viscous liquids*

2.2.3.1.5.1 Except as provided for in 2.2.3.1.5.2, viscous liquids which:

− have a flash-point of 23 °C or above and less than or equal to 60 °C;

− are not toxic, corrosive or environmentally hazardous;

− contain not more than 20% nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen by dry mass; and

− are packed in receptacles of not more than 450 litre capacity;

are not subject to ADN, if:

[2] *Viscosity determination: Where the substance concerned is non-Newtonian, or where a flow cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer shall be used to determine the dynamic viscosity coefficient of the substance, at 23 °C, at a number of shear rates. The values obtained are plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near-zero shear rate.*

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(a) in the solvent separation test (see *Manual of Tests and Criteria*, Part III, sub-section 32.5.1), the height of the separated layer of solvent is less than 3% of the total height; and

(b) the flowtime in the viscosity test (see *Manual of Tests and Criteria*, Part III, sub-section 32.4.3), with a jet diameter of 6 mm is equal to or greater than:

(i) 60 seconds; or

(ii) 40 seconds if the viscous substance contains not more than 60% of Class 3 substances.

2.2.3.1.5.2 Viscous liquids which are also environmentally hazardous, but meet all other criteria in 2.2.3.1.5.1, are not subject to any other provisions of ADN when they are carried in single or combination packagings containing a net quantity per single or inner packaging of 5 litres or less, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 of ADR

2.2.3.1.6 If substances of Class 3, as a result of admixtures, come into categories of hazard different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

***NOTE**: For the classification of solutions and mixtures (such as preparations and wastes) see also 2.1.3.*

2.2.3.1.7 On the basis of the test procedures in accordance with 2.3.3.1 and 2.3.4, and the criteria set out in 2.2.3.1.1, it may also be determined whether the nature of a solution or a mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the provisions for this Class (see also 2.1.3).

2.2.3.2 *Substances not accepted for carriage*

2.2.3.2.1 Substances of Class 3 which are liable to form peroxides easily (as happens with ethers or with certain heterocyclic oxygenated substances) shall not be accepted for carriage if their peroxide content, calculated as hydrogen peroxide (H_2O_2), exceeds 0.3%. The peroxide content shall be determined as indicated in 2.3.3.3.

2.2.3.2.2 Chemically unstable substances of Class 3 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions.

2.2.3.2.3 Liquid desensitized explosives other than those listed in Table A of Chapter 3.2 shall not be accepted for carriage as substances of Class 3.

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2.2.3.3 *List of collective entries*

Flammable liquids and articles containing such substances

Without subsidiary hazard

F

F1

1133	ADHESIVES containing flammable liquid
1136	COAL TAR DISTILLATES, FLAMMABLE
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining)
1169	EXTRACTS, AROMATIC, LIQUID
1197	EXTRACTS, FLAVOURING, LIQUID
1210	PRINTING INK, flammable or
1210	PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or
1263	PAINT RELATED MATERIAL (including paint thinning or reducing compound)
1266	PERFUMERY PRODUCTS with flammable solvents
1293	TINCTURES, MEDICINAL
1306	WOOD PRESERVATIVES, LIQUID
1866	RESIN SOLUTION, flammable
1999	TARS, LIQUID, including road oils, and cutback bitumens
3065	ALCOHOLIC BEVERAGES
1224	KETONES, LIQUID, N.O.S.
1268	PETROLEUM DISTILLATES, N.O.S. or
1268	PETROLEUM PRODUCTS, N.O.S.
1987	ALCOHOLS, N.O.S.
1989	ALDEHYDES, N.O.S.
2319	TERPENE HYDROCARBONS, N.O.S.
3271	ETHERS, N.O.S.
3272	ESTERS, N.O.S.
3295	HYDROCARBONS, LIQUID, N.O.S.
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or
3336	MERCAPTANS MIXTURE, LIQUID, FLAMMABLE, N.O.S.
1993	FLAMMABLE LIQUID, N.O.S.

elevated temperature

F2

3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S., with flash-point above 60 °C, at or above its flash-point

articles

F3

3269	POLYESTER RESIN KIT, liquid base material
3473	FUEL CELL CARTRIDGES or
3473	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or
3473	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT
3528	ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or
3528	ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or
3528	MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or
3528	MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED
3540	ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.

F4

9001	SUBSTANCES HAVING A FLASH-POINT ABOVE 60 °C carried or handed over for carriage at a TEMPERATURE WITHIN A RANGE OF 15 K BELOW THE FLASH-POINT

F5

9002	SUBSTANCES WITH A SELF-IGNITION TEMPERATURE OF 200 °C AND BELOW, n.o.s.

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2.2.3.3 *List of collective entries (cont'd)*

Toxic FT

FT1

1228	MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or
1228	MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.
1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.
2478	ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or
2478	ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.
3248	MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.
3273	NITRILES, FLAMMABLE, TOXIC, N.O.S.
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.

Pesticide (f.p<23 °C)

FT2

2758	CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2760	ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2762	ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2764	TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2772	THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2776	COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2778	MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2780	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2782	BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2784	ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC
2787	ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC
3024	COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC
3346	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC
3350	PYRETHROID PESTICIDE, LIQUID, FLAMMABLE TOXIC
3021	PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S.

***NOTE** : The classification of a pesticide under an entry shall be effected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary hazards it may exhibit.*

Corrosive

FC

3469	PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or
3469	PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning or reducing compound)
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or
2733	POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.
2985	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.
3274	ALCOHOLATES SOLUTION, N.O.S., in alcohol
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.

Toxic, corrosive

FTC

3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.

Liquid desensitised explosive

D

3343	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin by mass
3357	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin by mass
3379	DESENSITIZED EXPLOSIVE, LIQUID, N.O.S.

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2.2.41 Class 4.1 Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives

2.2.41.1 *Criteria*

2.2.41.1.1 The heading of Class 4.1 covers flammable substances and articles, desensitized explosives which are solids according to subparagraph (a) of the definition "solid" in 1.2.1, self-reactive liquids or solids and polymerizing substances.

The following are assigned to Class 4.1:

– readily flammable solid substances and articles (see paragraphs 2.2.41.1.3 to 2.2.41.1.8);

– self-reactive solids or liquids (see paragraphs 2.2.41.1.9 to 2.2.41.1.17);

– solid desensitized explosives (see 2.2.41.1.18);

– substances related to self-reactive substances (see 2.2.41.1.19);

– polymerizing substances (see 2.2.41.1.20 and 2.2.41.1.21).

2.2.41.1.2 The substances and articles of Class 4.1 are subdivided as follows:

F Flammable solids, without subsidiary hazard:

- F1 Organic;
- F2 Organic, molten;
- F3 Inorganic;
- F4 Articles;

FO Flammable solids, oxidizing;

FT Flammable solids, toxic:

- FT1 Organic, toxic;
- FT2 Inorganic, toxic;

FC Flammable solids, corrosive:

- FC1 Organic, corrosive;
- FC2 Inorganic, corrosive;

D Solid desensitized explosives without subsidiary hazard;

DT Solid desensitized explosives, toxic;

SR Self-reactive substances:

- SR1 Not requiring temperature control;
- SR2 Requiring temperature control.

PM Polymerizing substances

- PM1 Not requiring temperature control;
- PM2 Requiring temperature control.

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Flammable solids

Definition and properties

2.2.41.1.3 *Flammable solids* are readily combustible solids and solids which may cause fire through friction.

Readily combustible solids are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly. The danger may come not only from the fire but also from toxic combustion products. Metal powders are especially dangerous because of the difficulty of extinguishing a fire since normal extinguishing agents such as carbon dioxide or water can increase the hazard.

Classification

2.2.41.1.4 Substances and articles classified as flammable solids of Class 4.1 are listed in Table A of Chapter 3.2. The assignment of organic substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of sub-section 2.2.41.3 in accordance with the provisions of Chapter 2.1 can be based on experience or on the results of the test procedures in accordance with Part III, sub-section 33.2.1 of the Manual of Tests and Criteria. The assignment of inorganic substances not mentioned by name shall be based on the results of the test procedures in accordance with Part III, sub-section 33.2.1 of the Manual of Tests and Criteria; experience shall also be taken into account when it leads to a more stringent assignment.

2.2.41.1.5 When substances not mentioned by name are assigned to one of the entries listed in 2.2.41.3 on the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.2.1, the following criteria apply:

(a) With the exception of metal powders or powders of metal alloys, powdery, granular or pasty substances shall be classified as readily flammable substances of Class 4.1 if they can be easily ignited by brief contact with an ignition source (e.g. a burning match), or if, in the event of ignition, the flame spreads rapidly, the burning time is less than 45 seconds for a measured distance of 100 mm or the rate of burning is greater than 2.2 mm/s.

(b) Metal powders or powders of metal alloys shall be assigned to Class 4.1 if they can be ignited by a flame and the reaction spreads over the whole length of the sample in 10 minutes or less.

Solids which may cause fire through friction shall be classified in Class 4.1 by analogy with existing entries (e.g. matches) or in accordance with any appropriate special provision.

2.2.41.1.6 On the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, Section 33.2.1 and the criteria set out in 2.2.41.1.4 and 2.2.41.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for this Class.

2.2.41.1.7 If substances of Class 4.1, as a result of admixtures, come into different categories of hazard from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: *For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.*

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Assignment of packing groups

2.2.41.1.8 Flammable solids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, sub-section 33.2.1, in accordance with the following criteria:

(a) Readily flammable solids which, when tested, have a burning time of less than 45 seconds over a measured distance of 100 mm shall be assigned to:

Packing group II: if the flame passes the wetted zone;

Packing group III: if the wetted zone stops the flame for at least four minutes;

(b) Metal powders or powders of metal alloys shall be assigned to:

Packing group II: if, when tested, the reaction spreads over the whole length of the sample in five minutes or less;

Packing group III: if, when tested, the reaction spreads over the whole length of the sample in more than five minutes.

For solids which may cause fire through friction, the packing group shall be assigned by analogy with existing entries or in accordance with any special provision.

Self-reactive substances

Definitions

2.2.41.1.9 For the purposes of ADN, self-reactive substances are thermally unstable substances liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). Substances are not considered to be self-reactive substances of Class 4.1, if:

(a) they are explosives according to the criteria of Class 1;

(b) they are oxidizing substances according to the classification procedure for Class 5.1 (see 2.2.51.1) except that mixtures of oxidizing substances which contain 5.0% or more of combustible organic substances shall be subjected to the classification procedure defined in Note 2;

(c) they are organic peroxides according to the criteria of Class 5.2 (see 2.2.52.1);

(d) their heat of decomposition is less than 300 J/g; or

(e) their self-accelerating decomposition temperature (SADT) (see NOTE 2 below) is greater than 75 °C for a 50 kg package.

NOTE 1: *The heat of decomposition can be determined using any internationally recognised method e.g. differential scanning calorimetry and adiabatic calorimetry.*

NOTE 2: *Mixtures of oxidizing substances meeting the criteria of Class 5.1 which contain 5.0% or more of combustible organic substances, which do not meet the criteria mentioned in (a), (c), (d) or (e) above, shall be subjected to the self-reactive substance classification procedure.*

A mixture showing the properties of a self-reactive substance, type B to F, shall be classified as a self-reactive substance of Class 4.1.

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A mixture showing the properties of a self-reactive substance, type G, according to the principle given in 20.4.3 (g) of Part II of the Manual of Tests and Criteria shall be considered for classification as a substance of Class 5.1 (see 2.2.51.1).

NOTE 3: *The self-accelerating decomposition temperature (SADT) is the lowest temperature at which self-accelerating decomposition may occur with a substance in the packaging as used during carriage. Requirements for the determination of the SADT are given in the Manual of Tests and Criteria, Part II, Chapter 20 and section 28.4.*

NOTE 4: *Any substance which shows the properties of a self-reactive substance shall be classified as such, even if this substance gives a positive test result according to 2.2.42.1.5 for inclusion in Class 4.2.*

Properties

2.2.41.1.10 The decomposition of self-reactive substances can be initiated by heat, contact with catalytic impurities (e.g. acids, heavy-metal compounds, bases), friction or impact. The rate of decomposition increases with temperature and varies with the substance. Decomposition, particularly if no ignition occurs, may result in the evolution of toxic gases or vapours. For certain self-reactive substances, the temperature shall be controlled. Some self-reactive substances may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Certain self-reactive substances burn vigorously. Self-reactive substances are, for example, some compounds of the types listed below:

aliphatic azo compounds (-C-N=N-C-);
organic azides (-C-N_3);
diazonium salts (-CN_2^+ Z^-);
N-nitroso compounds (-N-N=O); and
aromatic sulphohydrazides (-SO_2-NH-NH_2).

This list is not exhaustive and substances with other reactive groups and some mixtures of substances may have similar properties.

Classification

2.2.41.1.11 Self-reactive substances are classified into seven types according to the degree of danger they present. The types of self-reactive substances range from type A, which is not accepted for carriage in the packaging in which it is tested, to type G, which is not subject to the provisions for self-reactive substances of Class 4.1. The classification of types B to F is directly related to the maximum quantity allowed in one packaging. The principles to be applied for classification as well as the applicable classification procedures, test methods and criteria and an example of a suitable test report are given in Part II of the Manual of Tests and Criteria.

2.2.41.1.12 Self-reactive substances which have already been classified and are already permitted for carriage in packagings are listed in 2.2.41.4, those already permitted for carriage in IBCs are listed in 4.1.4.2 of ADR, packing instruction IBC520 and those already permitted for carriage in portable tanks are listed in 4.2.5.2 of ADR, portable tank instruction T23. Each permitted substance listed is assigned to a generic entry of Table A of Chapter 3.2 (UN Nos. 3221 to 3240), and appropriate subsidiary hazards and remarks providing relevant transport information are given.

The collective entries specify:

– self-reactive substances types B to F, see 2.2.41.1.11 above;

– physical state (liquid/solid); and

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– temperature control (when required), see 2.2.41.1.17 below.

The classification of the self-reactive substances listed in 2.2.41.4 is based on the technically pure substance (except where a concentration of less than 100% is specified).

2.2.41.1.13 Classification of self-reactive substances not listed in 2.2.41.4, 4.1.4.2 of ADR, packing instruction IBC520 or 4.2.5.2 of ADR, portable tank instruction T23 and assignment to a collective entry shall be made by the competent authority of the country of origin on the basis of a test report. The statement of approval shall contain the classification and the relevant conditions of carriage. If the country of origin is not a Contracting Party to ADN, the classification and the conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADN reached by the consignment.

2.2.41.1.14 Activators, such as zinc compounds, may be added to some self-reactive substances to change their reactivity. Depending on both the type and the concentration of the activator, this may result in a decrease in thermal stability and a change in explosive properties. If either of these properties is altered, the new formulation shall be assessed in accordance with the classification procedure.

2.2.41.1.15 Samples of self-reactive substances or formulations of self-reactive substances not listed in 2.2.41.4, for which a complete set of test results is not available and which are to be carried for further testing or evaluation, shall be assigned to one of the appropriate entries for self-reactive substances type C provided the following conditions are met:

– the available data indicate that the sample would be no more dangerous than self-reactive substances type B;

– the sample is packaged in accordance with packing method OP2 of 4.1.4.1 of ADR and the quantity per cargo transport unit and per transport unit is limited to 10 kg;

– the available data indicate that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation.

Desensitization

2.2.41.1.16 In order to ensure safety during carriage, self-reactive substances are in many cases desensitized by use of a diluent. Where a percentage of a substance is stipulated, this refers to the percentage by mass, rounded to the nearest whole number. If a diluent is used, the self-reactive substance shall be tested with the diluent present in the concentration and form used in carriage. Diluents which may allow a self-reactive substance to concentrate to a dangerous extent in the event of leakage from a packaging shall not be used. Any diluent shall be compatible with the self-reactive substance. In this regard, compatible diluents are those solids or liquids which have no detrimental influence on the thermal stability and hazard type of the self-reactive substance. Liquid diluents in formulations requiring temperature control (see 2.2.41.1.14) shall have a boiling point of at least 60 °C and a flash-point not less than 5 °C. The boiling point of the liquid shall be at least 50 °C higher than the control temperature of the self-reactive substance.

Temperature control requirements

2.2.41.1.17 Self-reactive substances with an SADT not greater than 55 °C shall be subject to temperature control during carriage. See 7.1.7.

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Solid desensitized explosives

2.2.41.1.18 Solid desensitized explosives are substances which are wetted with water or alcohols or are diluted with other substances to suppress their explosive properties. Such entries in Table A of Chapter 3.2 are: UN Nos. 1310, 1320, 1321, 1322, 1336, 1337, 1344, 1347, 1348, 1349, 1354, 1355, 1356, 1357, 1517, 1571, 2555, 2556, 2557, 2852, 2907, 3317, 3319, 3344, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3376, 3380 and 3474.

Substances related to self-reactive substances

2.2.41.1.19 Substances that:

(a) have been provisionally accepted into Class 1 according to Test Series 1 and 2 but exempted from Class 1 by Test Series 6;

(b) are not self-reactive substances of Class 4.1; and

(c) are not substances of Classes 5.1 or 5.2;

are also assigned to Class 4.1. UN Nos. 2956, 3241, 3242 and 3251 are such entries.

Polymerizing substances

Definitions and properties

2.2.41.1.20 *Polymerizing substances* are substances which, without stabilization, are liable to undergo a strongly exothermic reaction resulting in the formation of larger molecules or resulting in the formation of polymers under conditions normally encountered in carriage. Such substances are considered to be polymerizing substances of Class 4.1 when:

(a) Their self-accelerating polymerization temperature (SAPT) is 75 °C or less under the conditions (with or without chemical stabilization as offered for carriage) and in the packaging, IBC or tank in which the substance or mixture is to be carried;

(b) They exhibit a heat of reaction of more than 300 J/g; and

(c) They do not meet any other criteria for inclusion in classes 1 to 8.

A mixture meeting the criteria of a polymerizing substance shall be classified as a polymerizing substance of Class 4.1.

Temperature control requirements

2.2.41.1.21 Polymerizing substances are subject to temperature control in carriage if their self-accelerating polymerization temperature (SAPT) is:

(a) When offered for carriage in a packaging or IBC, 50 °C or less in the packaging or IBC in which the substance is to be carried; or

(b) When offered for carriage in a tank, 45 °C or less in the tank in which the substance is to be carried.

See 7.1.7.

NOTE: *Substances meeting the criteria of polymerizing substances and also for inclusion in Classes 1 to 8 are subject to the requirements of special provision 386 of Chapter 3.3.*

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2.2.41.2 ***Substances not accepted for carriage***

2.2.41.2.1 The chemically unstable substances of Class 4.1 shall not be accepted for carriage unless the necessary steps have been taken to prevent their dangerous decomposition or polymerization during carriage. To this end, it shall in particular be ensured that receptacles and tanks do not contain any substance liable to promote these reactions.

2.2.41.2.2 Flammable solids, oxidizing, assigned to UN No. 3097 shall not be accepted for carriage unless they meet the requirements for Class 1 (see also 2.1.3.7).

2.2.41.2.3 The following substances shall not be accepted for carriage:

– Self-reactive substances of type A (see Manual of Tests and Criteria, Part II, paragraph 20.4.2 (a));

– Phosphorus sulphides which are not free from yellow and white phosphorus;

– Solid densitized explosives other than those listed in Table A of Chapter 3.2;

– Inorganic flammable substances in the molten form other than UN No. 2448 SULPHUR, MOLTEN;

– Barium azide with a water content less than 50% (mass).

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2.2.41.3 *List of collective entries*

Flammable solids F	without subsidiary hazard	organic	F1	3175 SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S. 1353 FIBRES IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S. or 1353 FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S. 1325 FLAMMABLE SOLID, ORGANIC, N.O.S.
		organic molten	F2	3176 FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.
		inorganic	F3	3089 METAL POWDER, FLAMMABLE, N.O.S. [a] [b] 3181 METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S. 3182 METAL HYDRIDES, FLAMMABLE, N.O.S. [c] 3178 FLAMMABLE SOLID, INORGANIC, N.O.S.
		articles	F4	3527 POLYESTER RESIN KIT, solid base material 3541 ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.
	oxidizing		FO	3097 FLAMMABLE SOLID, OXIDIZING, N.O.S. (not allowed, see 2.2.41.2.2)
	toxic FT	organic	FT1	2926 FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.
		inorganic	FT2	3179 FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.
	corrosive FC	organic	FC1	2925 FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.
		inorganic	FC2	3180 FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.
Solid desensitized explosives	without subsidiary hazard		D	3319 NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin by mass 3344 PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE, PETN) MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN by mass 3380 DESENSITIZED EXPLOSIVE, SOLID, N.O.S.
	toxic		DT	Only substances listed in Table A of Chapter 3.2 are to be accepted for carriage as substances of Class 4.1
Self-reactive substances SR	not requiring temperature control		SR1	SELF-REACTIVE LIQUID TYPE A } Not accepted for carriage, see 2.2.41.2.3 SELF-REACTIVE SOLID TYPE A } 3221 SELF-REACTIVE LIQUID TYPE B 3222 SELF-REACTIVE SOLID TYPE B 3223 SELF-REACTIVE LIQUID TYPE C 3224 SELF-REACTIVE SOLID TYPE C 3225 SELF-REACTIVE LIQUID TYPE D 3226 SELF-REACTIVE SOLID TYPE D 3227 SELF-REACTIVE LIQUID TYPE E 3228 SELF-REACTIVE SOLID TYPE E 3229 SELF-REACTIVE LIQUID TYPE F 3230 SELF-REACTIVE SOLID TYPE F SELF-REACTIVE LIQUID TYPE G } Not subject to the provisions applicable to Class 4.1, see 2.2.41.1.11 SELF-REACTIVE SOLID TYPE G }
	requiring temperature control		SR2	3231 SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED 3232 SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED 3233 SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED 3234 SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED 3235 SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED 3236 SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED 3237 SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED 3238 SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED 3239 SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED 3240 SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED

cont'd on next page

[a] *Metals and metal alloys in powdered or other flammable form, liable to spontaneous combustion, are substances of Class 4.2.*

[b] *Metals and metal alloys in powdered or other flammable form, which in contact with water, emit flammable gases, are substances of Class 4.3.*

[c] *Metals hydrides which, in contact with water, emit flammable gases, are substances of Class 4.3. Aluminium borohydride or aluminium borohydride in devices are substances of Class 4.2, UN No. 2870.*

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2.2.41.3 *List of collective entries (continued)*

Polymerizing substances PM	**not requiring temperature control**	**PM1**	3531	POLYMERIZING SUBSTANCE, SOLID, STABILIZED, N.O.S.
			3532	POLYMERIZING SUBSTANCE, LIQUID, STABILIZED, N.O.S.
	requiring temperature control	**PM2**	3533	POLYMERIZING SUBSTANCE, SOLID, TEMPERATURE CONTROLLED, N.O.S.
			3534	POLYMERIZING SUBSTANCE, LIQUID, TEMPERATURE CONTROLLED, N.O.S.

2.2.41.4 *List of currently assigned self-reactive substances in packagings*

In the column "Packing Method" codes "OP1" to "OP8" refer to packing methods in 4.1.4.1 of ADR, packing instruction P520 (see also 4.1.7.1 of ADR). Self-reactive substances to be carried shall fulfil the classification and the control and emergency temperatures (derived from the SADT) as listed. For substances permitted in IBCs, see 4.1.4.2 of ADR, packing instruction IBC520 and, for those permitted in tanks according Chapter 4.2 of ADR, see 4.2.5.2.6 of ADR, portable tank instruction T23. The formulations listed in packing instruction IBC520 of 4.1.4.2 of ADR and in portable tank instruction T23 of 4.2.5.2.6 of ADR may also be carried packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1 of ADR, with the same control and emergency temperatures, if applicable.

NOTE: *The classification given in this table is based on the technically pure substance (except where a concentration of less than 100 % is specified). For other concentrations, the substance may be classified differently following the procedures given in Part II of the Manual of Tests and Criteria and in 2.2.41.1.17.*

SELF-REACTIVE SUBSTANCE	Concen-tration (%)	Packing method	Control temperature (°C)	Emergency temperature (°C)	UN generic entry	Remarks
ACETONE-PYROGALLOL COPOLYMER 2-DIAZO-1-NAPHTHOL-5-SULPHONATE	100	OP8			3228	
AZODICARBONAMIDE FORMULATION TYPE B, TEMPERATURE CONTROLLED	< 100	OP5			3232	(1) (2)
AZODICARBONAMIDE FORMULATION TYPE C	< 100	OP6			3224	(3)
AZODICARBONAMIDE FORMULATION TYPE C, TEMPERATURE CONTROLLED	< 100	OP6			3234	(4)
AZODICARBONAMIDE FORMULATION TYPE D	< 100	OP7			3226	(5)
AZODICARBONAMIDE FORMULATION TYPE D, TEMPERATURE CONTROLLED	< 100	OP7			3236	(6)
2,2' -AZODI(2,4-DIMETHYL-4-METHOXYVALERONITRILE)	100	OP7	-5	+5	3236	
2,2' -AZODI(2,4-DIMETHYL-VALERONITRILE)	100	OP7	+10	+15	3236	
2,2' -AZODI(ETHYL-2-METHYLPROPIONATE)	100	OP7	+20	+25	3235	
1,1-AZODI(HEXAHYDROBENZONITRILE)	100	OP7			3226	
2,2' -AZODI(ISOBUTYRONITRILE)	100	OP6	+40	+45	3234	
2,2' -AZODI(ISOBUTYRONITRILE) as a water based paste	≤ 50	OP6			3224	
2,2' -AZODI(2-METHYLBUTYRO-NITRILE)	100	OP7	+35	+40	3236	
BENZENE-1,3-DISULPHONYL HYDRAZIDE, as a paste	52	OP7			3226	

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2.2.41.4 *List of currently assigned self-reactive substances in packagings (cont'd)*

SELF-REACTIVE SUBSTANCE	Concentration (%)	Packing method	Control temperature (°C)	Emergency temperature (°C)	UN generic entry	Remarks
BENZENE SULPHONYL HYDRAZIDE	100	OP7			3226	
4-(BENZYL(ETHYL)AMINO)-3-ETHOXY-BENZENEDIAZONIUM ZINC CHLORIDE	100	OP7			3226	
4-(BENZYL(METHYL)AMINO)-3-ETHOXYBENZENEDIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
3-CHLORO-4-DIETHYLAMINOBENZENE-DIAZONIUM ZINC CHLORIDE	100	OP7			3226	
2-DIAZO-1-NAPHTHOL-4-SULPHONYL CHLORIDE	100	OP5			3222	(2)
2-DIAZO-1-NAPHTHOL-5-SULPHONYL CHLORIDE	100	OP5			3222	(2)
2-DIAZO-1-NAPHTHOL SULPHONIC ACID ESTER MIXTURE, TYPE D	< 100	OP7			3226	(9)
2,5-DIBUTOXY-4-(4-MORPHOLINYL)-BENZENEDIAZONIUM, TETRACHLOROZINCATE (2:1)	100	OP8			3228	
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM ZINC CHLORIDE	67-100	OP7	+35	+40	3236	
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM ZINC CHLORIDE	66	OP7	+40	+45	3236	
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM TETRAFLUOROBORATE	100	OP7	+30	+35	3236	
2,5-DIETHOXY-4-(4-MORPHOLINYL)-BENZENEDIAZONIUM SULPHATE	100	OP7			3226	
2,5-DIETHOXY-4-(PHENYLSULPHONYL)-BENZENEDIAZONIUM ZINC CHLORIDE	67	OP7	+40	+45	3236	
DIETHYLENEGLYCOL BIS (ALLYL CARBONATE) + DI-ISOPROPYLPEROXYDICARBONATE	≥ 88 + ≤ 12	OP8	-10	0	3237	
2,5-DIMETHOXY-4-(4-METHYL-PHENYLSULPHONYL)BENZENE-DIAZONIUM ZINC CHLORIDE	79	OP7	+40	+45	3236	
4-(DIMETHYLAMINO)-BENZENEDIAZONIUM TRICHLOROZINCATE (-1)	100	OP8			3228	
4-DIMETHYLAMINO-6-(2-DIMETHYL-AMINOETHOXY) TOLUENE-2-DIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
N,N'-DINITROSO-N,N'- DIMETHYL TEREPHTHALAMIDE, as a paste	72	OP6			3224	
N,N'-DINITROSOPENTAMETHYLENE-TETRAMINE	82	OP6			3224	(7)
DIPHENYLOXIDE-4,4'-DISULPHONYL HYDRAZIDE	100	OP7			3226	
4-DIPROPYLAMINOBENZENE-DIAZONIUM ZINC CHLORIDE	100	OP7			3226	

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2.2.41.4 ***List of currently assigned self-reactive substances in packagings (cont'd)***

SELF-REACTIVE SUBSTANCE	Concentration (%)	Packing method	Control temperature (°C)	Emergency temperature (°C)	UN generic entry	Remarks
2-(N,N-ETHOXYCARBONYL-PHENYLAMINO)-3-METHOXY-4-(N-METHYL-N-CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	63-92	OP7	+ 40	+ 45	3236	
2-(N,N-ETHOXYCARBONYL-PHENYLAMINO)-3-METHOXY-4-(N-METHYL-N-CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	62	OP7	+ 35	+ 40	3236	
N-FORMYL-2-(NITROMETHYLENE) -1,3-PERHYDROTHIAZINE	100	OP7	+45	+50	3236	
2-(2-HYDROXYETHOXY)-1-(PYRROLIDIN-1-YL)BENZENE-4-DIAZONIUM ZINC CHLORIDE	100	OP7	+ 45	+ 50	3236	
3-(2-HYDROXYETHOXY)-4-(PYRROLIDIN-1-YL)BENZENE DIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
2-(N,N-METHYLAMINOETHYL-CARBONYL)-4-(3,4-DIMETHYL-PHENYLSULPHONYL)BENZENE-DIAZONIUM HYDROGEN SULPHATE	96	OP7	+45	+50	3236	
4-METHYLBENZENESULPHONYL-HYDRAZIDE	100	OP7			3226	
3-METHYL-4-(PYRROLIDIN-1-YL) BENZENEDIAZONIUM TETRAFLUOROBORATE	95	OP6	+45	+50	3234	
4-NITROSOPHENOL	100	OP7	+35	+40	3236	
PHOSPHOROTHIOIC ACID, O-[(CYANOPHENYL METHYLENE) AZANYL] O,O-DIETHYL ESTER	82-91 (Z isomer)	OP8			3227	(10)
SELF-REACTIVE LIQUID, SAMPLE		OP2			3223	(8)
SELF-REACTIVE LIQUID, SAMPLE, TEMPERATURE CONTROLLED		OP2			3233	(8)
SELF-REACTIVE SOLID, SAMPLE		OP2			3224	(8)
SELF-REACTIVE SOLID, SAMPLE, TEMPERATURE CONTROLLED		OP2			3234	(8)
SODIUM 2-DIAZO-1-NAPHTHOL-4-SULPHONATE	100	OP7			3226	
SODIUM 2-DIAZO-1-NAPHTHOL-5-SULPHONATE	100	OP7			3226	
TETRAMINE PALLADIUM (II) NITRATE	100	OP6	+30	+35	3234	

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Remarks

(1) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (b) of the *Manual of Tests and Criteria*. The control and emergency temperatures shall be determined by the procedure given in 7.1.7.3.1 to 7.1.7.3.6.

(2) "EXPLOSIVE" subsidiary hazard label required (Model No. 1, see 5.2.2.2.2).

(3) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (c) of the *Manual of Tests and Criteria*.

(4) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (c) of the *Manual of Tests and Criteria*. The control and emergency temperatures shall be determined by the procedure given in 7.1.7.3.1 to 7.1.7.3.6.

(5) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (d) of the *Manual of Tests and Criteria*.

(6) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (d) of the *Manual of Tests and Criteria*. The control and emergency temperatures shall be determined by the procedure given in 7.1.7.3.1 to 7.1.7.3.6.

(7) With a compatible diluent having a boiling point of not less than 150 °C.

(8) See 2.2.41.1.15.

(9) This entry applies to mixtures of esters of 2-diazo-1-naphthol-4-sulphonic acid and 2-diazo-1-naphthol-5-sulphonic acid which fulfil the criteria of paragraph 20.4.2 (d) of the *Manual of Test and Criteria*.

(10) This entry applies to the technical mixture in n-butanol within the specified concentration limits of the (Z) isomer.

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2.2.42 Class 4.2 Substances liable to spontaneous combustion

2.2.42.1 *Criteria*

2.2.42.1.1 The heading of Class 4.2 covers:

– *Pyrophoric substances* which are substances, including mixtures and solutions (liquid or solid), which even in small quantities ignite on contact with air within five minutes. These are the Class 4.2 substances, the most liable to spontaneous combustion; and

– *Self-heating substances and articles* which are substances and articles, including mixtures and solutions, which, on contact with air, without energy supply, are liable to self-heating. These substances will ignite only in large amounts (kilogrammes) and after long periods of time (hours or days).

2.2.42.1.2 The substances and articles of Class 4.2 are subdivided as follows:

S Substances liable to spontaneous combustion, without subsidiary hazard:

S1 Organic, liquid;
S2 Organic, solid;
S3 Inorganic, liquid;
S4 Inorganic, solid;
S5 Organometallic;
S6 Articles;

SW Substances liable to spontaneous combustion, which, in contact with water, emit flammable gases;

SO Substances liable to spontaneous combustion, oxidizing;

ST Substances liable to spontaneous combustion, toxic:

ST1 Organic, toxic, liquid;
ST2 Organic, toxic, solid;
ST3 Inorganic, toxic, liquid;
ST4 Inorganic, toxic, solid;

SC Substances liable to spontaneous combustion, corrosive:

SC1 Organic, corrosive, liquid;
SC2 Organic, corrosive, solid;
SC3 Inorganic, corrosive, liquid;
SC4 Inorganic, corrosive, solid.

Properties

2.2.42.1.3 Self-heating of a substance is a process where the gradual reaction of that substance with oxygen (in air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion.

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Classification

2.2.42.1.4 Substances and articles classified in Class 4.2 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant specific N.O.S. entry of 2.2.42.3 in accordance with the provisions of Chapter 2.1 can be based on experience or the results of the test procedures in accordance with the Manual of Tests and Criteria, Part III, Section 33.3. Assignment to general N.O.S. entries of Class 4.2 shall be based on the results of the test procedures in accordance with the Manual of Tests and Criteria, Part III, section 33.3; experience shall also be taken into account when it leads to a more stringent assignment.

2.2.42.1.5 When substances or articles not mentioned by name are assigned to one of the entries listed in 2.2.42.3 on the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, section 33.3, the following criteria shall apply:

(a) Solids liable to spontaneous combustion (pyrophoric) shall be assigned to Class 4.2 when they ignite on falling from a height of 1 m or within five minutes;

(b) Liquids liable to spontaneous combustion (pyrophoric) shall be assigned to Class 4.2 when:

(i) on being poured on an inert carrier, they ignite within five minutes, or

(ii) in the event of a negative result of the test according to (i), when poured on a dry, indented filter paper (Whatman No. 3 filter), they ignite or carbonize it within five minutes;

(c) Substances in which, in a 10 cm sample cube, at 140 °C test temperature, spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours shall be assigned to Class 4.2. This criterion is based on the temperature of the spontaneous combustion of charcoal, which is at 50 °C for a sample cube of 27 m^3. Substances with a temperature of spontaneous combustion higher than 50 °C for a volume of 27 m^3 are not to be assigned to Class 4.2.

NOTE 1: *Substances carried in packages with a volume of not more than 3 m^3 are exempted from Class 4.2 if, tested with a 10 cm sample cube at 120 °C, no spontaneous combustion nor a rise in temperature to over 180 °C is observed within 24 hours.*

NOTE 2: *Substances carried in packages with a volume of not more than 450 litres are exempted from Class 4.2 if, tested with a 10 cm sample cube at 100 °C, no spontaneous combustion nor a rise in temperature to over 160 °C is observed within 24 hours.*

NOTE 3: *Since organometallic substances can be classified in Class 4.2 or 4.3 with additional subsidiary hazards, depending on their properties, a specific classification flow chart for these substances is given in 2.3.5.*

2.2.42.1.6 If substances of Class 4.2, as a result of admixtures, come into different categories of hazard from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: *For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.*

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2.2.42.1.7 On the basis of the test procedure in the Manual of Tests and Criteria, Part III, section 33.3 and the criteria set out in 2.2.42.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for this Class.

Assignment of packing groups

2.2.42.1.8 Substances and articles classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, section 33.3, in accordance with the following criteria:

(a) Substances liable to spontaneous combustion (pyrophoric) shall be assigned to packing group I;

(b) Self-heating substances and articles in which, in a 2.5 cm sample cube, at 140 °C test temperature, spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours, shall be assigned to packing group II;

Substances with a temperature of spontaneous combustion higher than 50 °C for a volume of 450 litres are not to be assigned to packing group II;

(c) Slightly self-heating substances in which, in a 2.5 cm sample cube, the phenomena referred to under (b) are not observed, in the given conditions, but in which in a 10 cm sample cube at 140 °C test temperature spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours, shall be assigned to packing group III.

2.2.42.2 *Substances not accepted for carriage*

The following substances shall not be accepted for carriage:

– UN No. 3255 tert-BUTYL HYPOCHLORITE; and

– Self-heating solids, oxidizing, assigned to UN No. 3127 unless they meet the requirements for Class 1 (see 2.1.3.7).

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2.2.42.3 *List of collective entries*

Substances liable to spontaneous combustion	**organic**	**liquid**	**S1**	2845 3183	PYROPHORIC LIQUID, ORGANIC, N.O.S. SELF-HEATING LIQUID, ORGANIC, N.O.S.
Without subsidiary hazard **S**	**organic**	**solid**	**S2**	1373 2006 3313 2846 3088	FIBRES or FABRICS, ANIMAL or VEGETABLE or SYNTHETIC, N.O.S. with oil PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S. ORGANIC PIGMENTS, SELF HEATING PYROPHORIC SOLID, ORGANIC, N.O.S. SELF-HEATING SOLID, ORGANIC, N.O.S.
	inorganic	**liquid**	**S3**	3194 3186	PYROPHORIC LIQUID, INORGANIC, N.O.S. SELF-HEATING LIQUID, INORGANIC, N.O.S.
	inorganic	**solid**	**S4**	1383 1383 1378 2881 3189[a] 3205 3200 3190	PYROPHORIC METAL, N.O.S. or PYROPHORIC ALLOY, N.O.S. METAL CATALYST, WETTED with a visible excess of liquid METAL CATALYST, DRY METAL POWDER, SELF-HEATING, N.O.S. ALKALINE EARTH METAL ALCOHOLATES, N.O.S. PYROPHORIC SOLID, INORGANIC, N.O.S. SELF-HEATING SOLID, INORGANIC, N.O.S.
	organometallic		**S5**	3392 3391 3400	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING
	articles		**S6**	3542	ARTICLES CONTAINING A SUBSTANCE LIABLE TO SPONTANEOUS COMBUSTION, N.O.S.
Water-reactive			**SW**	3394 3393	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC, WATER-REACTIVE
Oxidizing			**SO**	3127	SELF-HEATING SOLID, OXIDIZING, N.O.S. (not allowed, see 2.2.42.2)
Toxic **ST**	**organic**	**liquid**	**ST1**	3184	SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.
		solid	**ST2**	3128	SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.
	inorganic	**liquid**	**ST3**	3187	SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.
		solid	**ST4**	3191	SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.
Corrosive **SC**	**organic**	**liquid**	**SC1**	3185	SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.
		solid	**SC2**	3126	SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.
	inorganic	**liquid**	**SC3**	3188	SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.
		solid	**SC4**	3206 3192	ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S. SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.

[a] *Dust and powder of metals, non toxic in a non-spontaneous combustible form which nevertheless, in contact with water, emit flammable gases, are substances of Class 4.3.*

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2.2.43 Class 4.3 Substances which, in contact with water, emit flammable gases

2.2.43.1 *Criteria*

2.2.43.1.1 The heading of Class 4.3 covers substances which react with water to emit flammable gases liable to form explosive mixtures with air, and articles containing such substances.

2.2.43.1.2 Substances and articles of Class 4.3 are subdivided as follows:

W Substances which, in contact with water, emit flammable gases, without subsidiary hazard, and articles containing such substances:

W1 Liquid;
W2 Solid;
W3 Articles;

WF1 Substances which, in contact with water, emit flammable gases, liquid, flammable;

WF2 Substances which, in contact with water, emit flammable gases, solid, flammable;

WS Substances which, in contact with water, emit flammable gases, solid, self-heating;

WO Substances which, in contact with water, emit flammable gases, oxidizing, solid;

WT Substances which, in contact with water, emit flammable gases, toxic:

WT1 Liquid;
WT2 Solid;

WC Substances which, in contact with water, emit flammable gases, corrosive:

WC1 Liquid;
WC2 Solid;

WFC Substances which, in contact with water, emit flammable gases, flammable, corrosive.

Properties

2.2.43.1.3 Certain substances in contact with water may emit flammable gases that can form explosive mixtures with air. Such mixtures are easily ignited by all ordinary sources of ignition, for example naked lights, sparking handtools or unprotected lamps. The resulting blast wave and flames may endanger people and the environment. The test method referred to in 2.2.43.1.4 below is used to determine whether the reaction of a substance with water leads to the development of a dangerous amount of gases which may be flammable. This test method shall not be applied to pyrophoric substances.

Classification

2.2.43.1.4 Substances and articles classified in Class 4.3 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of 2.2.43.3 in accordance with the provisions of Chapter 2.1 shall be based on the results of the test procedure in accordance with the Manual of Tests and Criteria, Part III, Section 33.4; experience shall also be taken into account when it leads to a more stringent assignment.

2.2.43.1.5 When substances not mentioned by name are assigned to one of the entries listed in 2.2.43.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, Section 33.4, the following criteria shall apply:

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A substance shall be assigned to Class 4.3 if:

(a) spontaneous ignition of the gas emitted takes place in any step of the test procedure; or

(b) there is an evolution of flammable gas at a rate greater than 1 litre per kilogram of the substance to be tested per hour.

NOTE: *Since organometallic substances can be classified in Classes 4.2 or 4.3 with additional subsidiary hazards, depending on their properties, a specific classification flow chart for these substances is given in 2.3.5.*

2.2.43.1.6 If substances of Class 4.3, as a result of admixtures, come into different categories of hazard from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: *For the classification of solutions and mixtures (such as preparations and wastes) see also 2.1.3.*

2.2.43.1.7 On the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, Section 33.4, and the criteria set out in paragraph 2.2.43.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for this Class.

Assignment of packing groups

2.2.43.1.8 Substances and articles classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, section 33.4, in accordance with the following criteria:

(a) Packing group I shall be assigned to any substance which reacts vigorously with water at ambient temperature and generally demonstrates a tendency for the gas produced to ignite spontaneously, or one which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 litres per kilogram of substance over any one minute period;

(b) Packing group II shall be assigned to any substance which reacts readily with water at ambient temperature such that the maximum rate of evolution of flammable gas is equal to or greater than 20 litres per kilogram of substance per hour, and which does not meet the criteria of packing group I;

(c) Packing group III shall be assigned to any substance which reacts slowly with water at ambient temperature such that the maximum rate of evolution of flammable gas is greater than 1 litre per kilogram of substance per hour, and which does not meet the criteria of packing groups I or II.

2.2.43.2 ***Substances not accepted for carriage***

Water-reactive solids, oxidizing, assigned to UN No. 3133, shall not be accepted for carriage unless they meet the requirements for Class 1 (see also 2.1.3.7).

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2.2.43.3 *List of collective entries*

Substances which, in contact with water, emit flammable gases			1389 ALKALI METAL AMALGAM, LIQUID 1391 ALKALI METAL DISPERSION or 1391 ALKALINE EARTH METAL DISPERSION 1392 ALKALINE EARTH METAL AMALGAM, LIQUID 1420 POTASSIUM METAL ALLOYS, LIQUID
W	**liquid**	**W1**	1421 ALKALI METAL ALLOY, LIQUID, N.O.S. 1422 POTASSIUM SODIUM ALLOYS, LIQUID 3398 ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE 3148 WATER-REACTIVE LIQUID, N.O.S.
Without subsidiary hazard	**solid**	**W2**[a]	1390 ALKALI METAL AMIDES 3401 ALKALI METAL AMALGAM, SOLID 3402 ALKALINE EARTH METAL AMALGAM, SOLID 3170 ALUMINIUM SMELTING BY-PRODUCTS or 3170 ALUMINIUM REMELTING BY-PRODUCTS 3403 POTASSIUM METAL ALLOYS, SOLID 3404 POTASSIUM SODIUM ALLOYS, SOLID 1393 ALKALINE EARTH METAL ALLOY, N.O.S. 1409 METAL HYDRIDES, WATER-REACTIVE, N.O.S. 3208 METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. 3395 ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE 2813 WATER-REACTIVE SOLID, N.O.S.
	articles	**W3**	3292 BATTERIES, CONTAINING SODIUM or 3292 CELLS, CONTAINING SODIUM 3543 ARTICLES CONTAINING A SUBSTANCE WHICH IN CONTACT WITH WATER EMITS FLAMMABLE GASES, N.O.S.
Liquid, flammable		**WF1**	3482 ALKALI METAL DISPERSION, FLAMMABLE or 3482 ALKALINE EARTH METAL DISPERSION, FLAMMABLE 3399 ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE
Solid, flammable		**WF2**	3396 ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE 3132 WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.
Solid, self-heating		**WS**[b]	3397 ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, SELF-HEATING 3209 METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S. 3135 WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.
Solid, oxidizing		**WO**	3133 WATER-REACTIVE SOLID, OXIDIZING, N.O.S. (not allowed, see 2.2.43.2)
Toxic **WT**	**liquid**	**WT1**	3130 WATER-REACTIVE LIQUID, TOXIC, N.O.S.
	solid	**WT2**	3134 WATER-REACTIVE SOLID, TOXIC, N.O.S.
Corrosive **WC**	**liquid**	**WC1**	3129 WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.
	solid	**WC2**	3131 WATER-REACTIVE SOLID, CORROSIVE, N.O.S.
Flammable, corrosive		**WFC**[c]	2988 CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, NO.S. (No other collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to the table of precedence of hazards in 2.1.3.10.)

[a] *Metals and metal alloys which, in contact with water, do not emit flammable gases and are not pyrophoric or self-heating, but which are readily flammable, are substances of Class 4.1. Alkaline-earth metals and alkaline-earth metal alloys in pyrophoric form are substances of Class 4.2. Dust and powders of metals in pyrophoric form are substances of Class 4.2. Metals and metal alloys in pyrophoric form are substances of Class 4.2. Compounds of phosphorus with heavy metals such as iron, copper, etc. are not subject to the provisions of ADN.*

[b] *Metals and metal alloys in pyrophoric form are substances of Class 4.2.*

[c] *Chlorosilanes, having a flash-point of less than 23 °C and which, in contact with water, do not emit flammable gases, are substances of Class 3. Chlorosilanes, having a flash-point equal to or greater than 23 °C and which, in contact with water, do not emit flammable gases, are substances of Class 8.*

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2.2.51 Class 5.1 Oxidizing substances

2.2.51.1 *Criteria*

2.2.51.1.1 The heading of Class 5.1 covers substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other materials and articles containing such substances.

2.2.51.1.2 The substances of Class 5.1 and articles containing such substances are subdivided as follows:

O Oxidizing substances without subsidiary hazard or articles containing such substances:

O1 Liquid;
O2 Solid;
O3 Articles;

OF Oxidizing substances, solid, flammable;

OS Oxidizing substances, solid, self-heating;

OW Oxidizing substances, solid which, in contact with water, emit flammable gases;

OT Oxidizing substances, toxic:

OT1 Liquid;
OT2 Solid;

OC Oxidizing substances, corrosive:

OC1 Liquid;
OC2 Solid;

OTC Oxidizing substances, toxic, corrosive.

2.2.51.1.3 Substances and articles classified in Class 5.1 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of 2.2.51.3 in accordance with the provisions of Chapter 2.1 can be based on the tests, methods and criteria in paragraphs 2.2.51.1.6 to 2.2.51.1.10 below and the Manual of Tests and Criteria, Part III, Section 34.4 or, for solid ammonium nitrate based fertilizers, Section 39 subject to the restrictions of 2.2.51.2.2, thirteenth and fourteenth indents. In the event of divergence between test results and known experience, judgement based on known experience shall take precedence over test results.

2.2.51.1.4 If substances of Class 5.1, as a result of admixtures, come into different categories of hazard from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: *For the classification of solutions and mixtures (such as preparations and wastes), see also Section 2.1.3.*

2.2.51.1.5 On the basis of the test procedures in the Manual of Tests and Criteria, Part III, Section 34.4 or, for solid ammonium nitrate based fertilizers, Section 39, and the criteria set out in 2.2.51.1.6 to 2.2.51.1.10 it may also be determined whether the nature of a substance mentioned by name in Table A of Chapter 3.2 is such that the substance is not subject to the provisions for this class.

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Oxidizing solids

Classification

2.2.51.1.6 When oxidizing solid substances not mentioned by name in Table A of Chapter 3.2 are assigned to one of the entries listed in 2.2.51.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, sub-section 34.4.1 (test O.1) or alternatively, sub section 34.4.3 (test O.3), the following criteria shall apply:

(a) In the test O.1, a solid substance shall be assigned to Class 5.1 if, in the 4:1 or the 1:1 sample-to-cellulose ratio (by mass) tested, it ignites or burns or exhibits mean burning times equal to or less than that of a 3:7 mixture (by mass) of potassium bromate and cellulose; or

(b) In the test O.3, a solid substance shall be assigned to Class 5.1 if, in the 4:1 or the 1:1 sample-to-cellulose ratio (by mass) tested, it exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose.

2.2.51.1.7 By exception, solid ammonium nitrate based fertilizers shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39.

Assignment of packing groups

2.2.51.1.8 Oxidizing solids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, sub-section 34.4.1 (test O.1) or sub-section 34.4.3 (test O.3), in accordance with the following criteria:

(a) Test O.1:

(i) Packing group I: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose;

(ii) Packing group II: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for packing group I are not met;

(iii) Packing group III: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for packing groups I and II are not met;

(b) Test O.3:

(i) Packing group I: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose;

(ii) Packing group II: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose, and the criteria for packing group I are not met;

(iii) Packing group III: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose, and the criteria for packing groups I and II are not met.

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Oxidizing liquids

Classification

2.2.51.1.9 When oxidizing liquid substances not mentioned by name in Table A of Chapter 3.2 are assigned to one of the entries listed in sub-section 2.2.51.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, sub-section 34.4.2, the following criteria shall apply:

A liquid substance shall be assigned to Class 5.1 if, in the 1:1 mixture, by mass, of substance and cellulose tested, it exhibits a pressure rise of 2070 kPa gauge or more and a mean pressure rise time equal to or less than the mean pressure rise time of a 1:1 mixture, by mass, of 65% aqueous nitric acid and cellulose.

Assignment of packing groups

2.2.51.1.10 Oxidizing liquids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, section 34.4.2, in accordance with the following criteria:

(a) Packing group I: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is less than that of a 1:1 mixture, by mass, of 50% perchloric acid and cellulose;

(b) Packing group II: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 40% aqueous sodium chlorate solution and cellulose; and the criteria for packing group I are not met;

(c) Packing group III: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65% aqueous nitric acid and cellulose; and the criteria for packing groups I and II are not met.

2.2.51.2 *Substances not accepted for carriage*

2.2.51.2.1 The chemically unstable substances of Class 5.1 shall not be accepted for carriage unless the necessary steps have been taken to prevent their dangerous decomposition or polymerization during carriage. To this end it shall in particular be ensured that receptacles and tanks do not contain any material liable to promote these reactions.

2.2.51.2.2 The following substances and mixtures shall not be accepted for carriage:

– oxidizing solids, self-heating, assigned to UN No. 3100, oxidizing solids, water-reactive, assigned to UN No. 3121 and oxidizing solids, flammable, assigned to UN No. 3137, unless they meet the requirements for Class 1 (see also 2.1.3.7);

– hydrogen peroxide, not stabilized or hydrogen peroxide, aqueous solutions, not stabilized containing more than 60 % hydrogen peroxide;

– tetranitromethane not free from combustible impurities;

– perchloric acid solutions containing more than 72 % (mass) acid, or mixtures of perchloric acid with any liquid other than water;

– chloric acid solution containing more than 10 % chloric acid or mixtures of chloric acid with any liquid other than water;

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– halogenated fluor compounds other than UN Nos. 1745 BROMINE PENTAFLUORIDE; 1746 BROMINE TRIFLUORIDE and 2495 IODINE PENTAFLUORIDE of Class 5.1 as well as UN Nos. 1749 CHLORINE TRIFLUORIDE and 2548 CHLORINE PENTAFLUORIDE of Class 2;

– ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt*;*

– ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt;

– mixtures of a hypochlorite with an ammonium salt;

– ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt;

– ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt;

– ammonium nitrate containing more than 0.2 % combustible substances (including any organic substance calculated as carbon) unless it is a constituent of a substance or article of Class 1;

– ammonium nitrate based fertilizers with compositions that lead to exit boxes 4, 6, 8, 15, 31, or 33 of the flowchart of paragraph 39.5.1 of the Manual of Tests and Criteria, Part III, Section 39, unless they have been assigned a suitable UN number in Class 1;

– ammonium nitrate based fertilizers with compositions that lead to exit boxes 20, 23 or 39 of the flowchart of paragraph 39.5.1 of the Manual of Tests and Criteria, Part III, Section 39, unless they have been assigned a suitable UN number in Class 1 or, provided that the suitability for carriage has been demonstrated and that this has been approved by the competent authority, in Class 5.1 other than UN No. 2067;

NOTE: *The term "competent authority" means the competent authority of the country of origin. If the country of origin is not a Contracting Party to ADR, the classification and conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment.*

– ammonium nitrite and its aqueous solutions and mixtures of an inorganic nitrite with an ammonium salt;

– mixtures of potassium nitrate, sodium nitrite and an ammonium salt.

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2.2.51.3 *List of collective entries*

Oxidizing substances and articles containing such substances **Without subsidiary hazard** **O**	**Liquid**	**O1**	3210 CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3211 PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3213 BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3214 PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3216 PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3218 NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3219 NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3139 OXIDIZING LIQUID, N.O.S.
	Solid	**O2**	1450 BROMATES, INORGANIC, N.O.S 1461 CHLORATES, INORGANIC, N.O.S. 1462 CHLORITES, INORGANIC, N.O.S. 1477 NITRATES, INORGANIC, N.O.S 1481 PERCHLORATES, INORGANIC, N.O.S. 1482 PERMANGANATES, INORGANIC, N.O.S. 1483 PEROXIDES, INORGANIC, N.O.S 2627 NITRITES, INORGANIC, N.O.S. 3212 HYPOCHLORITES, INORGANIC, N.O.S. 3215 PERSULPHATES, INORGANIC, N.O.S. 1479 OXIDIZING SOLID, N.O.S.
	Articles	**O3**	3356 OXYGEN GENERATOR, CHEMICAL 3544 ARTICLES CONTAINING OXIDIZING SUBSTANCE, N.O.S.
Solid, flammable		**OF**	3137 OXIDIZING SOLID, FLAMMABLE, N.O.S. (not allowed, see 2.2.51.2)
Solid, self-heating		**OS**	3100 OXIDIZING SOLID, SELF-HEATING, N.O.S. (not allowed, see 2.2.51.2)
Solid, water reactive		**OW**	3121 OXIDIZING SOLID, WATER REACTIVE, N.O.S. (not allowed, see 2.2.51.2)
Toxic **OT**	**Liquid**	**OT1**	3099 OXIDIZING LIQUID, TOXIC, N.O.S.
	Solid	**OT2**	3087 OXIDIZING SOLID, TOXIC, N.O.S.
Corrosive **OC**	**Liquid**	**OC1**	3098 OXIDIZING LIQUID, CORROSIVE, N.O.S.
	Solid	**OC2**	3085 OXIDIZING SOLID, CORROSIVE, N.O.S.
Toxic, corrosive		**OTC**	(No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to the table of precedence of hazards in 2.1.3.10.)

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2.2.52 Class 5.2 Organic peroxides

2.2.52.1 *Criteria*

2.2.52.1.1 The heading of Class 5.2 covers organic peroxides and formulations of organic peroxides.

2.2.52.1.2 The substances of Class 5.2 are subdivided as follows:

P1 Organic peroxides, not requiring temperature control;
P2 Organic peroxides, requiring temperature control.

Definition

2.2.52.1.3 *Organic peroxides* are organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals.

Properties

2.2.52.1.4 Organic peroxides are liable to exothermic decomposition at normal or elevated temperatures. The decomposition can be initiated by heat, contact with impurities (e.g. acids, heavy-metal compounds, amines), friction or impact. The rate of decomposition increases with temperature and varies with the organic peroxide formulation. Decomposition may result in the evolution of harmful, or flammable, gases or vapours. For certain organic peroxides the temperature shall be controlled during carriage. Some organic peroxides may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Many organic peroxides burn vigorously. Contact of organic peroxides with the eyes is to be avoided. Some organic peroxides will cause serious injury to the cornea, even after brief contact, or will be corrosive to the skin.

***NOTE**: Test methods for determining the flammability of organic peroxides are set out in the Manual of Tests and Criteria, Part III, sub-section 32.4. Because organic peroxides may react vigorously when heated, it is recommended to determine their flash-point using small sample sizes such as described in ISO 3679:1983.*

Classification

2.2.52.1.5 Any organic peroxide shall be considered for classification in Class 5.2 unless the organic peroxide formulation contains:

(a) not more than 1.0 % available oxygen from the organic peroxides when containing not more than 1.0 % hydrogen peroxide;

(b) not more than 0.5 % available oxygen from the organic peroxides when containing more than 1.0 % but not more than 7.0 % hydrogen peroxide.

***NOTE:** The available oxygen content (%) of an organic peroxide formulation is given by the formula*

$$16 \times 3 \left(n_i \times c_i / m_i\right)$$

where:
n_i = *number of peroxygen groups per molecule of organic peroxide i;*
c_i = *concentration (mass %) of organic peroxide i; and*
m_i = *molecular mass of organic peroxide i.*

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2.2.52.1.6 Organic peroxides are classified into seven types according to the degree of danger they present. The types of organic peroxide range from type A, which is not accepted for carriage in the packaging in which it is tested, to type G, which is not subject to the provisions of Class 5.2. The classification of types B to F is directly related to the maximum quantity allowed in one package. The principles to be applied to the classification of substances not listed in 2.2.52.4 are set out in the Manual of Tests and Criteria, Part II.

2.2.52.1.7 Organic peroxides which have already been classified and are already permitted for carriage in packagings are listed in 2.2.52.4, those already permitted for carriage in IBCs are listed in 4.1.4.2 of ADR, packing instruction IBC520 and those already permitted for carriage in tanks in accordance with Chapters 4.2 and 4.3 of ADR are listed in 4.2.5.2 of ADR, portable tank instruction T23. Each permitted substance listed is assigned to a generic entry of Table A of Chapter 3.2 (UN Nos. 3101 to 3120) and appropriate subsidiary hazards and remarks providing relevant transport information are given.

These generic entries specify:

– the type (B to F) of organic peroxide (see 2.2.52.1.6 above);

– physical state (liquid/solid); and

– temperature control (when required), see 2.2.52.1.15 and 2.2.52.1.16.

Mixtures of these formulations may be classified as the same type of organic peroxide as that of the most dangerous component and be carried under the conditions of carriage given for this type. However, as two stable components can form a thermally less stable mixture, the self-accelerating decomposition temperature (SADT) of the mixture shall be determined and, if necessary, the control and emergency temperatures derived from the SADT in accordance with paragraph 7.1.7.3.6.

2.2.52.1.8 Classification of organic peroxides not listed in 2.2.52.4, 4.1.4.2 of ADR, packing instruction IBC520 or 4.2.5.2 of ADR, portable tank instruction T23, and assignment to a collective entry shall be made by the competent authority of the country of origin. The statement of approval shall contain the classification and the relevant conditions of carriage. If the country of origin is not a Contracting Party to ADN, the classification and conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADN reached by the consignment.

2.2.52.1.9 Samples of organic peroxides or formulations of organic peroxides not listed in 2.2.52.4, for which a complete set of test results is not available and which are to be carried for further testing or evaluation, shall be assigned to one of the appropriate entries for organic peroxides of type C provided the following conditions are met:

– the available data indicate that the sample would be no more dangerous than organic peroxides of type B;

– the sample is packaged in accordance with packing method OP2 of 4.1.4.1 of ADR and the quantity per cargo transport unit is limited to 10 kg;

– the available data indicate that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation.

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Desensitization of organic peroxides

2.2.52.1.10 In order to ensure safety during carriage, organic peroxides are in many cases desensitized by organic liquids or solids, inorganic solids or water. Where a percentage of a substance is stipulated, this refers to the percentage by mass, rounded to the nearest whole number. In general, desensitization shall be such that, in case of spillage, the organic peroxide will not concentrate to a dangerous extent.

2.2.52.1.11 Unless otherwise stated for the individual organic peroxide formulation, the following definition(s) shall apply to diluents used for desensitization:

– diluents of type A are organic liquids which are compatible with the organic peroxide and which have a boiling point of not less than 150 °C. Type A diluents may be used for desensitizing all organic peroxides.

– diluents of type B are organic liquids which are compatible with the organic peroxide and which have a boiling point of less than 150 °C but not less than 60 °C and a flash-point of not less than 5 °C.

Type B diluents may be used for desensitization of all organic peroxides provided that the boiling point of the liquid is at least 60 °C higher than the SADT in a 50 kg package.

2.1.52.1.12 Diluents, other than type A or type B, may be added to organic peroxide formulations as listed in 2.2.52.4 provided that they are compatible. However, replacement of all or part of a type A or type B diluent by another diluent with differing properties requires that the organic peroxide formulation be re-assessed in accordance with the normal acceptance procedure for Class 5.2.

2.2.52.1.13 Water may only be used for the desensitization of organic peroxides which are listed in 2.2.52.4 or in the competent authority decision according to 2.2.52.1.8 as being "with water" or "as a stable dispersion in water". Samples of organic peroxides or formulations of organic peroxides not listed in 2.2.52.4 may also be desensitized with water provided the requirements of 2.2.52.1.9 are met.

2.2.52.1.14 Organic and inorganic solids may be used for desensitization of organic peroxides provided that they are compatible. Compatible liquids and solids are those which have no detrimental influence on the thermal stability and hazard type of the organic peroxide formulation.

Temperature control requirements

2.2.52.1.15 The following organic peroxides shall be subject to temperature control during carriage:

– organic peroxides of types B and C with an SADT ≤ 50 °C;

– organic peroxides of type D showing a medium effect when heated under confinement with an SADT ≤ 50 °C or showing a low or no effect when heated under confinement with an SADT ≤ 45 °C; and

– organic peroxides of types E and F with an SADT ≤ 45 °C.

***NOTE**: Provisions for the determination of the effects of heating under confinement are given in the Manual of Tests and Criteria, Part II, Section 20 and test series E in Section 25.*

See 7.1.7.

2.2.52.1.16 Where applicable, control and emergency temperatures are listed in 2.2.52.4. The actual temperature during carriage may be lower than the control temperature but shall be selected so as to avoid dangerous separation of phases.

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2.2.52.2 *Substances not accepted for carriage*

Organic peroxides of type A shall not be accepted for carriage under the provisions of Class 5.2 (see Manual of Tests and Criteria, Part II, paragraph 20.4.3 (a)).

2.2.52.3 *List of collective entries*

Organic peroxides			ORGANIC PEROXIDE TYPE A, LIQUID ORGANIC PEROXIDE TYPE A, SOLID	} Not accepted for carriage, see 2.2.52.2
		3101	ORGANIC PEROXIDE TYPE B, LIQUID	
		3102	ORGANIC PEROXIDE TYPE B, SOLID	
		3103	ORGANIC PEROXIDE TYPE C, LIQUID	
		3104	ORGANIC PEROXIDE TYPE C, SOLID	
Not requiring temperature control	**P1**	3105	ORGANIC PEROXIDE TYPE D, LIQUID	
		3106	ORGANIC PEROXIDE TYPE D, SOLID	
		3107	ORGANIC PEROXIDE TYPE E, LIQUID	
		3108	ORGANIC PEROXIDE TYPE E, SOLID	
		3109	ORGANIC PEROXIDE TYPE F, LIQUID	
		3110	ORGANIC PEROXIDE TYPE F, SOLID	
			ORGANIC PEROXIDE TYPE G, LIQUID ORGANIC PEROXIDE TYPE G, SOLID	} Not subject to the provisions applicable to Class 5.2, see 2.2.52.1.6
		3545	ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.	
Requiring temperature control	**P2**	3111	ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED	
		3112	ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED	
		3113	ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED	
		3114	ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED	
		3115	ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED	
		3116	ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED	
		3117	ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED	
		3118	ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED	
		3119	ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED	
		3120	ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED	
		3545	ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.	

2.2.52.4 *List of currently assigned organic peroxides in packagings*

In the column "Packing Method", codes "OP1" to "OP8" refer to packing methods in 4.1.4.1 of ADR, packing instruction P520 (see also 4.1.7.1 of ADR). Organic peroxides to be carried shall fulfil the classification and the control and emergency temperatures (derived from the SADT) as listed. For substances permitted in IBCs, see 4.1.4.2 of ADR, packing instruction IBC520 and, for those permitted in tanks according to Chapters 4.2 and 4.3 of ADR, see 4.2.5.2.6 of ADR, portable tank instruction T23. The formulations listed in packing instruction IBC520 of 4.1.4.2 of ADR and in portable tank instruction T23 of 4.2.5.2.6 of ADR may also be carried packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1 of ADR, with the same control and emergency temperatures, if applicable.

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
ACETYL ACETONE PEROXIDE	≤ 42	≥ 48			≥8	OP7			3105	2)
"	≤ 32 as a paste					OP7			3106	20)
ACETYL CYCLOHEXANESULPHONYL PEROXIDE	≤ 82				≥ 12	OP4	-10	0	3112	3)
"	≤ 32		≥ 68			OP7	-10	0	3115	
tert-AMYL HYDROPEROXIDE	≤ 88	≥ 6			≥ 6	OP8			3107	
tert-AMYL PEROXYACETATE	≤ 62	≥ 38				OP7			3105	
tert-AMYL PEROXYBENZOATE	≤ 100					OP5			3103	
tert-AMYL PEROXY-2-ETHYLHEXANOATE	≤ 100					OP7	+20	+25	3115	
tert-AMYL PEROXY-2-ETHYLHEXYL CARBONATE	≤ 100					OP7			3105	
tert-AMYL PEROXY ISOPROPYL CARBONATE	≤ 77	≥ 23				OP5			3103	
tert-AMYL PEROXYNEODECANOATE	≤ 77		≥ 23			OP7	0	+10	3115	
"	≤ 47	≥ 53				OP8	0	+ 10	3119	
tert-AMYL PEROXYPIVALATE	≤ 77		≥ 23			OP5	+10	+15	3113	
tert-AMYLPEROXY-3,5,5-TRIMETHYLHEXANOATE	≤ 100					OP7			3105	
tert-BUTYL CUMYL PEROXIDE	> 42 – 100					OP8			3109	
"	≤ 52			≥ 48		OP8			3108	
n-BUTYL-4,4-DI-(tert-BUTYLPEROXY)VALERATE	> 52 – 100					OP5			3103	
"	≤ 52			≥ 48		OP8			3108	
tert-BUTYL HYDROPEROXIDE	>79 – 90				≥ 10	OP5			3103	13)
"	≤ 80	≥ 20				OP7			3105	4) 13)
"	≤ 79				> 14	OP8			3107	13) 23)
"	≤ 72				≥ 28	OP8			3109	13)
tert-BUTYL HYDROPEROXIDE + DI-tert-BUTYLPEROXIDE	< 82 + >9				≥ 7	OP5			3103	13)
tert-BUTYL MONOPEROXYMALEATE	> 52 – 100					OP5			3102	3)
"	≤ 52	≥ 48				OP6			3103	
"	≤ 52			≥ 48		OP8			3108	
"	≤ 52 as a paste					OP8			3108	
tert-BUTYL PEROXYACETATE	> 52 – 77	≥ 23				OP5			3101	3)
"	> 32 – 52	≥ 48				OP6			3103	
"	≤ 32		≥ 68			OP8			3109	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
tert-BUTYL PEROXYBENZOATE	> 77 – 100					OP5			3103	
"	> 52 - 77	≥23				OP7			3105	
"	≤ 52			≥ 48		OP7			3106	
tert-BUTYL PEROXYBUTYL FUMARATE	≤ 52	≥ 48				OP7			3105	
tert-BUTYL PEROXYCROTONATE	≤ 77	≥ 23				OP7			3105	
tert-BUTYL PEROXYDIETHYLACETATE	≤ 100					OP5	+20	+25	3113	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE	> 52 – 100					OP6	+20	+25	3113	
"	> 32 – 52		≥ 48			OP8	+30	+35	3117	
"	≤ 52			≥ 48		OP8	+20	+25	3118	
"	≤ 32		≥ 68			OP8	+40	+45	3119	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE + 2,2-DI-(tert-BUTYLPEROXY)BUTANE	≤ 12 + ≤ 14	≥ 14		≥ 60		OP7			3106	
"	≤ 31 + ≤ 36		≥ 33			OP7	+35	+40	3115	
tert-BUTYL PEROXY-2-ETHYLHEXYLCARBONATE	≤ 100					OP7			3105	
tert-BUTYL PEROXYISOBUTYRATE	> 52 – 77		≥ 23			OP5	+15	+20	3111	3)
"	≤ 52		≥ 48			OP7	+15	+20	3115	
tert-BUTYLPEROXY ISOPROPYLCARBONATE	≤ 77	≥ 23				OP5			3103	
1-(2-tert-BUTYLPEROXY ISOPROPYL)-3-ISOPROPENYLBENZENE	≤ 77	≥ 23				OP7			3105	
"	≤ 42			≥ 58		OP8			3108	
tert-BUTYL PEROXY-2-METHYLBENZOATE	≤ 100					OP5			3103	
tert-BUTYL PEROXYNEODECANOATE	> 77 – 100					OP7	-5	+5	3115	
"	≤ 77		≥ 23			OP7	0	+10	3115	
"	≤ 52 as a stable dispersion in water					OP8	0	+10	3119	
"	≤ 42 as a stable dispersion in water (frozen)					OP8	0	+10	3118	
"	≤ 32	≥ 68				OP8	0	+10	3119	
tert-BUTYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23				OP7	0	+10	3115	
"	≤ 42 as a stable dispersion in water					OP8	0	+10	3117	
tert-BUTYL PEROXYPIVALATE	> 67 - 77	≥ 23				OP5	0	+10	3113	
"	> 27 – 67		≥ 33			OP7	0	+10	3115	
"	≤ 27		≥ 73			OP8	+30	+35	3119	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
tert-BUTYLPEROXY STEARYLCARBONATE	≤ 100					OP7			3106	
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	> 37 – 100					OP7			3105	
"	≤ 42			≥ 58		OP7			3106	
"	≤ 37		≥ 63			OP8			3109	
3-CHLOROPEROXYBENZOIC ACID	> 57 – 86			≥ 14		OP1			3102	3)
"	≤ 57			≥ 3	≥ 40	OP7			3106	
"	≤ 77			≥ 6	≥ 17	OP7			3106	
CUMYL HYDROPEROXIDE	> 90 – 98	≤10				OP8			3107	13)
"	≤ 90	≥ 10				OP8			3109	13) 18)
CUMYL PEROXYNEODECANOATE	≤ 87	≥ 13				OP7	- 10	0	3115	
"	≤ 77		≥ 23			OP7	-10	0	3115	
"	≤ 52 as a stable dispersion in water					OP8	-10	0	3119	
CUMYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23				OP7	-10	0	3115	
CUMYL PEROXYPIVALATE	≤ 77		≥ 23			OP7	-5	+5	3115	
CYCLOHEXANONE PEROXIDE(S)	≤ 91				≥ 9	OP6			3104	13)
"	≤ 72	≥ 28				OP7			3105	5)
"	≤ 72 as a paste					OP7			3106	5) 20)
"	≤ 32			≥ 68					Exempt	29)
([3R-(3R,5aS,6S,8aS,9R,10R,12S,12aR**)]-DECAHYDRO-10-METHOXY-3,6,9-TRIMETHYL-3,12-EPOXY-12H-PYRANO[4,3-j]-1,2-BENZODIOXEPIN	≤ 100					OP7			3106	
DIACETONE ALCOHOL PEROXIDES	≤ 57		≥ 26		≥ 8	OP7	+40	+45	3115	6)
DIACETYL PEROXIDE	≤ 27		≥ 73			OP7	+20	+25	3115	7) 13)
DI-tert-AMYL PEROXIDE	≤ 100					OP8			3107	
2,2-DI-(tert-AMYLPEROXY)BUTANE	≤ 57	≥ 43				OP7			3105	
1,1-DI-(tert-AMYLPEROXY)CYCLOHEXANE	≤ 82	≥ 18				OP6			3103	
DIBENZOYL PEROXIDE	> 52 - 100			≤ 48		OP2			3102	3)
"	> 77 - 94				≥ 6	OP4			3102	3)
"	≤ 77				≥ 23	OP6			3104	
"	≤ 62			≥ 28	≥ 10	OP7			3106	
"	> 52 – 62 as a paste					OP7			3106	20)
"	> 35 – 52			≥ 48		OP7			3106	
"	> 36 – 42	≥ 18			≤ 40	OP8			3107	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
"	≤ 56.5 as a paste				≥ 15	OP8			3108	
"	≤ 52 as a paste					OP8			3108	20)
"	≤ 42 as a stable dispersion in water					OP8			3109	
"	≤ 35			≥ 65					Exempt	29)
DI-(4-tert-BUTYLCYCLOHEXYL) PEROXYDICARBONATE	≤ 100					OP6	+30	+35	3114	
"	≤ 42 as a stable dispersion in water					OP8	+30	+35	3119	
"	≤ 42 (as a paste)					OP7	+35	+40	3116	
DI-tert-BUTYL PEROXIDE	> 52 – 100					OP8			3107	
"	≤ 52		≥ 48			OP8			3109	25)
DI-tert-BUTYL PEROXYAZELATE	≤ 52	≥ 48				OP7			3105	
2,2-DI-(tert-BUTYLPEROXY)BUTANE	≤ 52	≥ 48				OP6			3103	
1,6-Di-(tert-BUTYLPEROXYCARBONYLOXY) HEXANE	≤ 72	≥ 28				OP5			3103	
1,1-DI-(tert-BUTYLPEROXY) CYCLOHEXANE	> 80 - 100					OP5			3101	3)
"	≤ 72		≥ 28			OP5			3103	30)
"	> 52 - 80	≥ 20				OP5			3103	
"	> 42 – 52	≥ 48				OP7			3105	
"	≤ 42	≥ 13		≥ 45		OP7			3106	
"	≤ 42	≥ 58				OP8			3109	
"	≤ 27	≥ 25				OP8			3107	21)
"	≤ 13	≥ 13	≥ 74			OP8			3109	
1,1-DI-(tert-BUTYLPEROXY) CYCLOHEXANE + tert-BUTYL PEROXY-2-ETHYLHEXANOATE	≤ 43 + ≤ 16	≥ 41				OP 7			3105	
DI-n-BUTYL PEROXYDICARBONATE	> 27 - 52		≥ 48			OP7	-15	-5	3115	
"	≤ 27		≥ 73			OP8	-10	0	3117	
"	≤ 42 as a stable dispersion in water (frozen)					OP8	-15	-5	3118	
DI-sec-BUTYL PEROXYDICARBONATE	> 52 - 100					OP4	-20	-10	3113	
"	≤ 52		≥ 48			OP7	-15	-5	3115	
DI-(tert-BUTYLPEROXYISOPROPYL) BENZENE(S)	> 42 - 100			≤ 57		OP7			3106	
"	≤ 42			≥ 58					Exempt	29)
DI-(tert-BUTYLPEROXY) PHTHALATE	> 42 - 52	≥ 48				OP7			3105	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
"	≤ 52 as a paste					OP7			3106	20)
"	≤ 42	≥ 58				OP8			3107	
2,2-DI-(tert-BUTYLPEROXY)PROPANE	≤ 52	≥ 48				OP7			3105	
"	≤ 42	≥ 13		≥ 45		OP7			3106	
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	> 90 - 100					OP5			3101	3)
"	≤ 90		≥ 10			OP5			3103	30)
"	> 57 – 90	≥ 10				OP5			3103	
"	≤ 77		≥ 23			OP5			3103	
"	≤ 57			≥ 43		OP8			3110	
"	≤ 57	≥ 43				OP8			3107	
"	≤ 32	≥ 26	≥ 42			OP8			3107	
DICETYL PEROXYDICARBONATE	≤ 100					OP8	+30	+35	3120	
"	≤ 42 as a stable dispersion in water					OP8	+30	+35	3119	
DI-4-CHLOROBENZOYL PEROXIDE	≤ 77				≥ 23	OP5			3102	3)
"	≤ 52 as a paste					OP7			3106	20)
"	≤ 32			≥ 68					Exempt	29)
DICUMYL PEROXIDE	> 52 - 100					OP8			3110	12)
"	≤ 52			≥ 48					Exempt	29)
DICYCLOHEXYL PEROXYDICARBONATE	> 91 - 100					OP3	+10	+15	3112	3)
"	≤ 91				≥ 9	OP5	+10	+15	3114	
"	≤ 42 as a stable dispersion in water					OP8	+15	+20	3119	
DIDECANOYL PEROXIDE	≤ 100					OP6	+30	+35	3114	
2,2-DI-(4,4-DI (tert-BUTYLPEROXY) CYCLOHEXYL) PROPANE	≤ 42			≥ 58		OP7			3106	
"	≤ 22		≥ 78			OP8			3107	
DI-2,4-DICHLOROBENZOYL PEROXIDE	≤ 77				≥ 23	OP5			3102	3)
"	≤ 52 as a paste					OP8	+ 20	+ 25	3118	
"	≤ 52 as a paste with silicon oil					OP7			3106	
DI-(2-ETHOXYETHYL) PEROXYDICARBONATE	≤ 52		≥ 48			OP7	-10	0	3115	
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	> 77 – 100					OP5	-20	-10	3113	
"	≤ 77		≥ 23			OP7	-15	-5	3115	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
"	≤ 62 as a stable dispersion in water					OP8	-15	-5	3119	
"	≤ 52 as a stable dispersion in water (frozen)					OP8	-15	-5	3120	
2,2-DIHYDROPEROXYPROPANE	≤ 27			≥ 73		OP5			3102	3)
DI-(1-HYDROXYCYCLOHEXYL) PEROXIDE	≤ 100					OP7			3106	
DIISOBUTYRYL PEROXIDE	> 32 – 52		≥ 48			OP5	-20	-10	3111	3)
"	≤ 32		≥ 68			OP7	-20	-10	3115	
"	≤ 42 (as a stable dispersion in water)					OP8	-20	-10	3119	
DIISOPROPYLBENZENE DIHYDROPEROXIDE	≤ 82	≥ 5			≥ 5	OP7			3106	24)
DIISOPROPYL PEROXYDICARBONATE	> 52-100					OP2	-15	-5	3112	3)
"	≤ 52		≥ 48			OP7	-20	-10	3115	
"	≤ 32	≥ 68				OP7	-15	-5	3115	
DILAUROYL PEROXIDE	≤ 100					OP7			3106	
"	≤ 42 as a stable dispersion in water					OP8			3109	
DI-(3-METHOXYBUTYL) PEROXYDICARBONATE	≤ 52		≥ 48			OP7	-5	+5	3115	
DI-(2-METHYLBENZOYL) PEROXIDE	≤ 87				≥ 13	OP5	+30	+35	3112	3)
DI-(3-METHYLBENZOYL) PEROXIDE + BENZOYL (3-METHYLBENZOYL) PEROXIDE + DIBENZOYL PEROXIDE	≤ 20 + ≤ 18 + ≤ 4		≥ 58			OP7	+35	+40	3115	
DI-(4-METHYLBENZOYL) PEROXIDE□	≤ 52 as a paste with silicon oil					OP7			3106	
2,5-DIMETHYL-2,5-DI-(BENZOYLPEROXY)HEXANE	> 82-100					OP5			3102	3)
"	≤ 82			≥ 18		OP7			3106	
"	≤ 82				≥ 18	OP5			3104	
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXANE	> 90 – 100					OP5			3103	
"	>52-90	≥ 10				OP7			3105	
"	≤ 77			≥ 23		OP8			3108	
"	≤ 52	≥ 48				OP8			3109	
"	≤ 47 as a paste					OP8			3108	
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXYNE-3	> 86-100					OP5			3101	3)
"	>52-86	≥ 14				OP5			3103	26)
"	≤ 52			≥ 48		OP7			3106	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
2,5-DIMETHYL-2,5-DI-(2-ETHYLHEXANOYLPEROXY)HEXANE	≤ 100					OP5	+20	+25	3113	
2,5-DIMETHYL-2,5-DIHYDROPEROXYHEXANE	≤ 82				≥ 18	OP6			3104	
2,5-DIMETHYL-2,5-DI-(3,5,5-TRIMETHYLHEXANOYLPEROXY)HEXANE	≤ 77	≥ 23				OP7			3105	
1,1-DIMETHYL-3-HYDROXYBUTYL PEROXYNEOHEPTANOATE	≤ 52	≥ 48				OP8	0	+10	3117	
DIMYRISTYL PEROXYDICARBONATE	≤ 100					OP7	+20	+25	3116	
"	≤ 42 as a stable dispersion in water					OP8	+20	+25	3119	
DI-(2-NEODECANOYLPEROXYISOPROPYL) BENZENE	≤ 52	≥ 48				OP7	-10	0	3115	
DI-n-NONANOYL PEROXIDE	≤ 100					OP7	0	+10	3116	
DI-n-OCTANOYL PEROXIDE	≤ 100					OP5	+10	+15	3114	
DI-(2-PHENOXYETHYL) PEROXYDICARBONATE	>85 − 100					OP5			3102	3)
"	≤ 85				≥ 15	OP7			3106	
DIPROPIONYL PEROXIDE	≤ 27		≥ 73			OP8	+15	+20	3117	
DI-n-PROPYL PEROXYDICARBONATE	≤ 100					OP3	-25	-15	3113	
"	≤ 77		≥ 23			OP5	-20	-10	3113	
DISUCCINIC ACID PEROXIDE	> 72 − 100					OP4			3102	3) 17)
"	≤ 72				≥ 28	OP7	+10	+15	3116	
DI-(3,5,5-TRIMETHYLHEXANOYL) PEROXIDE	> 38-52	≥ 48				OP8	+10	+15	3119	
"	> 52-82	≥ 18				OP7	0	+10	3115	
"	≤ 52 as a stable dispersion in water					OP8	+10	+15	3119	
"	≤ 38	≥ 62				OP8	+20	+25	3119	
ETHYL 3,3-DI-(tert-AMYLPEROXY)BUTYRATE	≤ 67	≥ 33				OP7			3105	
ETHYL 3,3-DI-(tert-BUTYLPEROXY)BUTYRATE	> 77 - 100					OP5			3103	
"	≤ 77	≥ 23				OP7			3105	
"	≤ 52			≥ 48		OP7			3106	
1-(2-ETHYLHEXANOYLPEROXY)-1,3-DIMETHYLBUTYL PEROXYPIVALATE	≤ 52	≥ 45	≥ 10			OP7	-20	-10	3115	
tert-HEXYL PEROXYNEODECANOATE	≤ 71	≥ 29				OP7	0	+10	3115	
tert-HEXYL PEROXYPIVALATE	≤ 72		≥ 28			OP7	+10	+15	3115	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 77	≥ 23				OP 7	- 5	+ 5	3115	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
"	≤ 52	≥ 48				OP 8	- 5	+ 5	3117	
"	≤ 52 as a stable dispersion in water					OP 8	- 5	+ 5	3119	
ISOPROPYL sec-BUTYL PEROXYDICARBONATE +DI-sec-BUTYL PEROXYDICARBONATE +DI-ISOPROPYL PEROXYDICARBONATE	≤ 32 + ≤ 15 – 18 ≤ 12 – 15	≥ 38				OP7	-20	-10	3115	
"	≤ 52 + ≤ 28 + ≤ 22					OP5	-20	-10	3111	3)
ISOPROPYLCUMYL HYDROPEROXIDE	≤ 72	≥ 28				OP8			3109	13)
p-MENTHYL HYDROPEROXIDE	> 72 - 100					OP7			3105	13)
"	≤ 72	≥ 28				OP8			3109	27)
METHYLCYCLOHEXANONE PEROXIDE(S)	≤ 67		≥ 33			OP7	+35	+40	3115	
METHYL ETHYL KETONE PEROXIDE(S)	see remark 8)	≥ 48				OP5			3101	3) 8) 13)
"	see remark 9)	≥ 55				OP7			3105	9)
"	see remark 10)	≥ 60				OP8			3107	10)
METHYL ISOBUTYL KETONE PEROXIDE(S)	≤ 62	≥ 19				OP7			3105	22)
METHYL ISOPROPYL KETONE PEROXIDE(S)	See remark 31)	≥ 70				OP8			3109	31)
ORGANIC PEROXIDE, LIQUID, SAMPLE						OP2			3103	11)
ORGANIC PEROXIDE, LIQUID, SAMPLE, TEMPERATURE CONTROLLED						OP2			3113	11)
ORGANIC PEROXIDE, SOLID, SAMPLE						OP2			3104	11)
ORGANIC PEROXIDE, SOLID, SAMPLE, TEMPERATURE CONTROLLED						OP2			3114	11)
3,3,5,7,7-PENTAMETHYL-1,2,4-TRIOXEPANE	≤ 100					OP8			3107	
PEROXYACETIC ACID, TYPE D, stabilized	≤ 43					OP7			3105	13) 14) 19)
PEROXYACETIC ACID, TYPE E, stabilized	≤ 43					OP8			3107	13) 15) 19)
PEROXYACETIC ACID, TYPE F, stabilized	≤ 43					OP8			3109	13) 16) 19)
PEROXYLAURIC ACID	≤ 100					OP8	+35	+40	3118	
1-PHENYLETHYL HYDROPEROXIDE	≤ 38		≥ 62			OP8			3109	
PINANYL HYDROPEROXIDE	> 56 – 100					OP7			3105	13)
"	≤ 56	≥ 44				OP8			3109	
POLYETHER POLY-tert-BUTYLPEROXY-CARBONATE	≤ 52		≥ 48			OP8			3107	
1,1,3,3-TETRAMETHYLBUTYL HYDROPEROXIDE	≤ 100					OP7			3105	
1,1,3,3-TETRAMETHYLBUTYL PEROXY-2-ETHYLHEXANOATE	≤ 100					OP7	+15	+20	3115	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
1,1,3,3- TETRAMETHYLBUTYL PEROXYNEODECANOATE	≤ 72		≥ 28			OP7	-5	+5	3115	
"	≤ 52 as a stable dispersion in water					OP8	-5	+5	3119	
1,1,3,3-TETRAMETHYLBUTYL PEROXYPIVALATE	≤ 77	≥ 23				OP7	0	+10	3115	
3,6,9-TRIETHYL-3,6,9-TRIMETHYL -1,4,7 TRIPEROXONANE	≤ 17	≥ 18		≥ 65		OP8			3110	
"	≤ 42	≥ 58				OP7			3105	28)

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Remarks (refer to the last column of the Table in 2.2.52.4):

1) *Diluent type B may always be replaced by diluent type A. The boiling point of diluent type B shall be at least 60°C higher than the SADT of the organic peroxide.*
2) *Available oxygen ≤ 4.7%.*
3) *"EXPLOSIVE" subsidiary hazard label required (Model No.1, see 5.2.2.2.2).*
4) *Diluent may be replaced by di-tert-butyl peroxide.*
5) *Available oxygen ≤ 9%.*
6) *With ≤ 9% hydrogen peroxide; available oxygen ≤ 10%.*
7) *Only non-metallic packagings allowed.*
8) *Available oxygen > 10% and ≤ 10.7%, with or without water.*
9) *Available oxygen ≤ 10%, with or without water.*
10) *Available oxygen ≤ 8.2%, with or without water.*
11) *See 2.2.52.1.9.*
12) *Up to 2000 kg per receptacle assigned to ORGANIC PEROXIDE TYPE F on the basis of largescale trials.*
13) *"CORROSIVE" subsidiary hazard label required (Model No.8, see 5.2.2.2.2).*
14) *Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (d).*
15) *Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (e).*
16) *Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (f).*
17) *Addition of water to this organic peroxide will decrease its thermal stability.*
18) *No "CORROSIVE" subsidiary hazard label (Model No.8, see 5.2.2.2.2) required for concentrations below 80%.*
19) *Mixtures with hydrogen peroxide, water and acid(s).*
20) *With diluent type A, with or without water.*
21) *With ≥ 25% diluent type A by mass, and in addition ethylbenzene.*
22) *With ≥ 19% diluent type A by mass, and in addition methyl isobutyl ketone.*
23) *With < 6% di-tert-butyl peroxide.*
24) *With ≤ 8% 1-isopropylhydroperoxy-4-isopropylhydroxybenzene.*
25) *Diluent type B with boiling point > 110 °C.*
26) *With < 0.5% hydroperoxides content.*
27) *For concentrations more than 56%, "CORROSIVE" subsidiary hazard label required (Model No.8, see 5.2.2.2.2).*
28) *Available active oxygen ≤ 7.6% in diluent type A having a 95% boil-off point in the range of 200 - 260 °C.*
29) *Not subject to the requirements of ADN for Class 5.2.*
30) *Diluent type B with boiling point > 130 °C.*
31) *Active oxygen ≤ 6.7%.*

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2.2.61 Class 6.1 Toxic substances

2.2.61.1 *Criteria*

2.2.61.1.1 The heading of Class 6.1 covers substances of which it is known by experience or regarding which it is presumed from experiments on animals that in relatively small quantities they are able by a single action or by action of short duration to cause damage to human health, or death, by inhalation, by cutaneous absorption or by ingestion.

***NOTE**: Genetically modified microorganisms and organisms shall be assigned to this Class if they meet the conditions for this Class.*

2.2.61.1.2 Substances of Class 6.1 are subdivided as follows:

T Toxic substances without subsidiary hazard:

- T1 Organic, liquid;
- T2 Organic, solid;
- T3 Organometallic substances;
- T4 Inorganic, liquid;
- T5 Inorganic, solid;
- T6 Liquid, used as pesticides;
- T7 Solid, used as pesticides;
- T8 Samples;
- T9 Other toxic substances;
- T10 Articles;

TF Toxic substances, flammable:

- TF1 Liquid;
- TF2 Liquid, used as pesticides;
- TF3 Solid;

TS Toxic substances, self-heating, solid;

TW Toxic substances, which, in contact with water, emit flammable gases:

- TW1 Liquid;
- TW2 Solid;

TO Toxic substances, oxidizing:

- TO1 Liquid;
- TO2 Solid;

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TC Toxic substances, corrosive:

TC1 Organic, liquid;

TC2 Organic, solid;

TC3 Inorganic, liquid;

TC4 Inorganic, solid;

TFC Toxic substances, flammable, corrosive.

TFW Toxic flammable substances, which, in contact with water, emit flammable gases.

Definitions

2.2.61.1.3 For the purposes of ADN:

LD_{50} (median lethal dose) for acute oral toxicity is the statistically derived single dose of a substance that can be expected to cause death within 14 days in 50 per cent of young adult albino rats when administered by the oral route. The LD_{50} value is expressed in terms of mass of test substance per mass of test animal (mg/kg);

LD_{50} for acute dermal toxicity is that dose of the substance which, administered by continuous contact for 24 hours with the bare skin of albino rabbits, is most likely to cause death within 14 days in one half of the animals tested. The number of animals tested shall be sufficient to give a statistically significant result and be in conformity with good pharmacological practice. The result is expressed in milligrams per kg body mass;

LC_{50} for acute toxicity on inhalation is that concentration of vapour, mist or dust which, administered by continuous inhalation to both male and female young adult albino rats for one hour, is most likely to cause death within 14 days in one half of the animals tested. A solid substance shall be tested if at least 10% (by mass) of its total mass is likely to be dust in a respirable range, e.g. the aerodynamic diameter of that particle-fraction is 10 µm or less. A liquid substance shall be tested if a mist is likely to be generated in a leakage of the transport containment. Both for solid and liquid substances more than 90% (by mass) of a specimen prepared for inhalation toxicity shall be in the respirable range as defined above. The result is expressed in milligrams per litre of air for dusts and mists or in millilitres per cubic metre of air (parts per million) for vapours.

Classification and assignment of packing groups

2.2.61.1.4 Substances of Class 6.1 shall be classified in three packing groups according to the degree of danger they present for carriage, as follows:

Packing group I:	highly toxic substances
Packing group II:	toxic substances
Packing group III:	slightly toxic substances.

2.2.61.1.5 Substances, mixtures, solutions and articles classified in Class 6.1 are listed in Table A of Chapter 3.2. The assignment of substances, mixtures and solutions not mentioned by name in Table A of Chapter 3.2 to the relevant entry of sub-section 2.2.61.3 and to the relevant packing group in accordance with the provisions of Chapter 2.1, shall be made according to the following criteria in 2.2.61.1.6 to 2.2.61.1.11.

2.2.61.1.6 To assess the degree of toxicity, account shall be taken of human experience of instances of accidental poisoning, as well as special properties possessed by any individual substances:

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liquid state, high volatility, any special likelihood of cutaneous absorption, and special biological effects.

2.2.61.1.7 In the absence of observations on humans, the degree of toxicity shall be assessed using the available data from animal experiments in accordance with the table below:

	Packing group	Oral toxicity LD_{50} (mg/kg)	Dermal toxicity LD_{50} (mg/kg)	Inhalation toxicity by dusts and mists LC_{50} (mg/l)
Highly toxic	I	≤ 5.0	≤ 50	≤ 0.2
Toxic	II	> 5.0 and ≤ 50	> 50 and ≤ 200	> 0.2 and ≤ 2.0
Slightly toxic	III [a]	> 50 and ≤ 300	> 200 and ≤ 1 000	> 2.0 and ≤ 4.0

[a] *Tear gas substances shall be included in packing group II even if data concerning their toxicity correspond to packing group III criteria.*

2.2.61.1.7.1 Where a substance exhibits different degrees of toxicity for two or more kinds of exposure, it shall be classified under the highest such degree of toxicity.

2.2.61.1.7.2 Substances meeting the criteria of Class 8 and with an inhalation toxicity of dusts and mists (LC_{50}) leading to packing group I shall only be accepted for an allocation to Class 6.1 if the toxicity through oral ingestion or dermal contact is at least in the range of packing groups I or II. Otherwise an assignment to Class 8 shall be made if appropriate (see 2.2.8.1.4.5).

2.2.61.1.7.3 The criteria for inhalation toxicity of dusts and mists are based on LC_{50} data relating to 1-hour exposure, and where such information is available it shall be used. However, where only LC_{50} data relating to 4-hour exposure are available, such figures can be multiplied by four and the product substituted in the above criteria, i.e. LC_{50} value multiplied by four (4 hour) is considered the equivalent of LC_{50} (1 hour).

Inhalation toxicity of vapours

2.2.61.1.8 Liquids giving off toxic vapours shall be classified into the following groups where "V" is the saturated vapour concentration (in ml/m^3 of air) (volatility) at 20 °C and standard atmospheric pressure:

	Packing group	
Highly toxic	I	Where V ≥ 10 LC_{50} and LC_{50} ≤ 1 000 ml/m^3
Toxic	II	Where V ≥ LC_{50} and LC_{50} ≤ 3 000 ml/m^3 and the criteria for packing group I are not met
Slightly toxic	III[a]	Where V ≥ 1/5 LC_{50} and LC_{50} ≤ 5 000 ml/m^3 and the criteria for packing groups I and II are not met

[a] *Tear gas substances shall be included in packing group II even if data concerning their toxicity correspond to packing group III criteria.*

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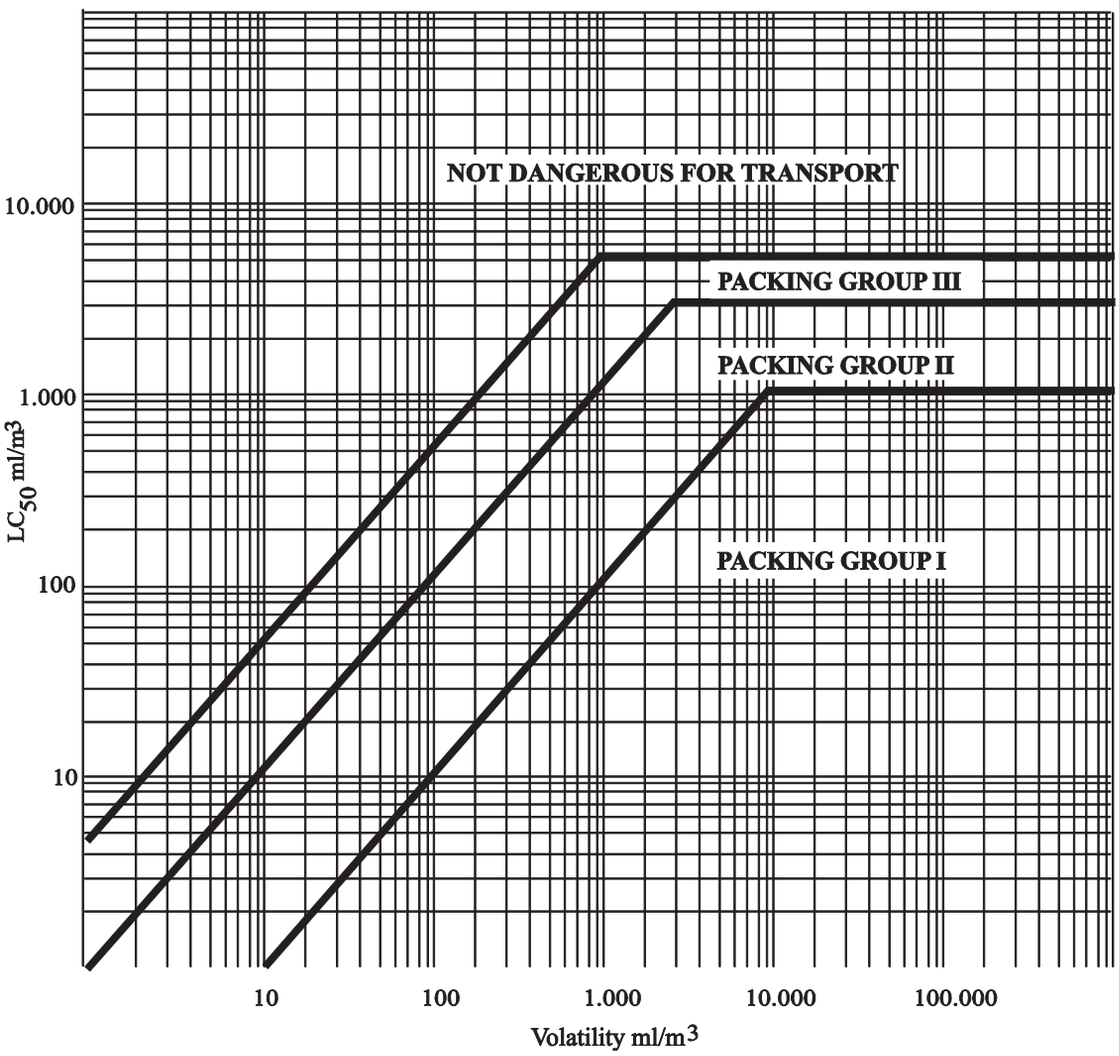
These criteria for inhalation toxicity of vapours are based on LC_{50} data relating to 1-hour exposure, and where such information is available, it shall be used.

However, where only LC_{50} data relating to 4-hour exposure to the vapours are available, such figures can be multiplied by two and the product substituted in the above criteria, i.e. LC_{50} (4 hour) × 2 is considered the equivalent of LC_{50} (1 hour).

GROUP BORDERLINES INHALATION TOXICITY OF VAPOURS



In this figure, the criteria are expressed in graphical form, as an aid to easy classification. However, due to approximations inherent in the use of graphs, substances falling on or near group borderlines shall be checked using numerical criteria.

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Mixtures of liquids

2.2.61.1.9 Mixtures of liquids which are toxic on inhalation shall be assigned to packing groups according to the following criteria:

2.2.61.1.9.1 If LC_{50} is known for each of the toxic substances constituting the mixture, the packing group may be determined as follows:

(a) calculation of the LC_{50} of the mixture:

$$LC_{50}\ (\text{mixture}) = \frac{1}{\sum_{i=1}^{1} \frac{f_i}{LC_{50i}}}$$

where f_i = molar fraction of constituent i of the mixture;

LC_{50i} = average lethal concentration of constituent i in ml/m^3.

(b) calculation of volatility of each mixture constituent:

$$V_i = P_i \times \frac{10^6}{101.3}\ (\text{ml/m}^3)$$

where P_i = partial pressure of constituent i in kPa at 20 °C and at standard atmospheric pressure.

(c) calculation of the ratio of volatility to LC_{50}:

$$R = \sum_{i=1}^{n} \frac{V_i}{LC_{50i}}$$

(d) the values calculated for LC_{50} (mixture) and R are then used to determine the packing group of the mixture:

Packing group I $R \geq 10$ and LC_{50} (mixture) $\leq$ 1 000 ml/m^3;

Packing group II $R \geq 1$ and LC_{50} (mixture) $\leq$ 3 000 ml/m^3, if the mixture does not meet the criteria for packing group I;

Packing group III $R \geq 1/5$ and LC_{50} (mixture) $\leq$ 5 000 ml/m^3, if the mixture does not meet the criteria of packing groups I or II.

2.2.61.1.9.2 In the absence of LC_{50} data on the toxic constituent substances, the mixture may be assigned to a group based on the following simplified threshold toxicity tests. When these threshold tests are used, the most restrictive group shall be determined and used for carrying the mixture.

2.2.61.1.9.3 A mixture is assigned to packing group I only if it meets both of the following criteria:

(a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 1000 ml/m^3 vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than 1000 ml/m^3;

(b) A sample of vapour in equilibrium with the liquid mixture is diluted with 9 equal volumes of air to form a test atmosphere. Ten albino rats (5 male and 5 female) are

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exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have a volatility equal to or greater than 10 times the mixture LC_{50}.

2.2.61.1.9.4 A mixture is assigned to packing group II only if it meets both of the following criteria, and does not meet the criteria for packing group I:

(a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 3000 ml/m^3 vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than 3000 ml/m^3;

(b) A sample of the vapour in equilibrium with the liquid mixture is used to form a test atmosphere. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have a volatility equal to or greater than the mixture LC_{50}.

2.2.61.1.9.5 A mixture is assigned to packing group III only if it meets both of the following criteria, and does not meet the criteria for packing groups I or II:

(a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 5000 ml/m^3 vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than 5000 ml/m^3;

(b) The vapour concentration (volatility) of the liquid mixture is measured and if the vapour concentration is equal to or greater than 1000 ml/m^3, the mixture is presumed to have a volatility equal to or greater than 1/5 the mixture LC_{50}.

Methods for determining oral and dermal toxicity of mixtures

2.2.61.1.10 When classifying and assigning the appropriate packing group to mixtures in Class 6.1 in accordance with the oral and dermal toxicity criteria (see 2.2.61.1.3), it is necessary to determine the acute LD_{50} of the mixture.

If a mixture contains only one active substance, and the LD_{50} of that constituent is known, in the absence of reliable acute oral and dermal toxicity data on the actual mixture to be carried, the oral or dermal LD_{50} may be obtained by the following method:

$$\text{LD}_{50}\text{ value of preparation} = \frac{\text{LD}_{50}\text{ value of active substance} \times 100}{\text{percentage of active substance by mass}}$$

2.2.61.1.10.2 If a mixture contains more than one active constituent, there are three possible approaches that may be used to determine the oral or dermal LD_{50} of the mixture. The preferred method is to obtain reliable acute oral and dermal toxicity data on the actual mixture to be carried. If reliable, accurate data are not available, then either of the following methods may be performed:

(a) Classify the formulation according to the most hazardous constituent of the mixture as if that constituent were present in the same concentration as the total concentration of all active constituents; or

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(b) Apply the formula:

$$\frac{C_A}{T_A} + \frac{C_B}{T_B} + \ldots + \frac{C_Z}{T_Z} = \frac{100}{T_M}$$

where:

C = the percentage concentration of constituent A, B, ... Z in the mixture;

T = the oral LD_{50} values of constituent A, B, ... Z;

T_M = the oral LD_{50} value of the mixture.

NOTE: *This formula can also be used for dermal toxicities provided that this information is available on the same species for all constituents. The use of this formula does not take into account any potentiation or protective phenomena.*

Classification of pesticides

2.2.61.1.11 All active pesticide substances and their preparations for which the LC_{50} and/or LD_{50} values are known and which are classified in Class 6.1 shall be classified under appropriate packing groups in accordance with the criteria given in 2.2.61.1.6 to 2.2.61.1.9. Substances and preparations which are characterized by subsidiary hazards shall be classified according to the precedence of hazards Table in 2.1.3.10 with the assignment of appropriate packing groups.

2.2.61.1.11.1 If the oral or dermal LD_{50} value for a pesticide preparation is not known, but the LD_{50} value of its active substance(s) is known, the LD_{50} value for the preparation may be obtained by applying the procedures in 2.2.61.1.10.

NOTE: *LD_{50} toxicity data for a number of common pesticides may be obtained from the most current edition of the document "The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification" available from the International Programme on Chemical Safety, World Health Organization (WHO), 1211 Geneva 27, Switzerland. While that document may be used as a source of LD50 data for pesticides, its classification system shall not be used for purposes of transport classification of, or assignment of packing groups to, pesticides, which shall be in accordance with the requirements of ADN.*

2.2.61.1.11.2 The proper shipping name used in the carriage of the pesticide shall be selected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary hazards it may exhibit (see 3.1.2).

2.2.61.1.12 If substances of Class 6.1, as a result of admixtures, come into categories of hazard different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: *For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.*

2.2.61.1.13 On the basis of the criteria of 2.2.61.1.6 to 2.2.61.1.11, it may also be determined whether the nature of a solution or mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the requirements for this Class.

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2.2.61.1.14 Substances, solutions and mixtures, with the exception of substances and preparations used as pesticides, which are not classified as acute toxic category 1, 2 or 3 according to Regulation (EC) No 1272/2008[3], may be considered as substances not belonging to class 6.1.

2.2.61.2 ***Substances not accepted for carriage***

2.2.61.2.1 Chemically unstable substances of Class 6.1 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions.

2.2.61.2.2 The following substances and mixtures shall not be accepted for carriage:

– Hydrogen cyanide, anhydrous or in solution, which do not meet the descriptions of UN Nos. 1051, 1613, 1614 and 3294;

– Metal carbonyls, having a flash-point below 23 °C, other than UN Nos. 1259 NICKEL CARBONYL and 1994 IRON PENTACARBONYL;

– 2,3,7,8-TETRACHLORODIBENZO-p-DIOXINE (TCDD) in concentrations considered highly toxic in accordance with the criteria in 2.2.61.1.7;

– UN No. 2249 DICHLORODIMETHYL ETHER, SYMMETRICAL;

– Preparations of phosphides without additives inhibiting the emission of toxic flammable gases.

[3] *Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directive 67/548/EEC and 1999/45/EC; and amending Regulation (EC) No 1907/2006, published in the Official Journal of the European Union, L 353, 31 December 2008, p 1-1355.*

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2.2.61.3 *List of collective entries*

Toxic substances without subsidiary hazard(s)

Organic

liquid [a] — **T1**

1583	CHLOROPICRIN MIXTURE, N.O.S.
1602	DYE, LIQUID, TOXIC, N.O.S., or
1602	DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.
1693	TEAR GAS SUBSTANCE, LIQUID, N.O.S.
1851	MEDICINE, LIQUID, TOXIC, N.O.S.
2206	ISOCYANATES, TOXIC, N.O.S. or
2206	ISOCYANATE SOLUTION, TOXIC, N.O.S.
3140	ALKALOIDS, LIQUID, N.O.S. or
3140	ALKALOID SALTS, LIQUID, N.O.S.
3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or
3144	NICOTINE PREPARATION, LIQUID, N.O.S.
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.
3276	NITRILES, LIQUID, TOXIC, N.O.S
3278	ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.
3381	TOXIC BY INHALATION LIQUID, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
3382	TOXIC BY INHALATION LIQUID, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
2810	TOXIC LIQUID, ORGANIC, N.O.S.

solid [a, b] — **T2**

1544	ALKALOIDS, SOLID, N.O.S. or
1544	ALKALOID SALTS, SOLID, N.O.S.
1601	DISINFECTANT, SOLID, TOXIC, N.O.S.
1655	NICOTINE COMPOUND, SOLID, N.O.S., or
1655	NICOTINE PREPARATION, SOLID, N.O.S.
3448	TEAR GAS SUBSTANCE, SOLID, N.O.S.
3143	DYE, SOLID, TOXIC, N.O.S. or
3143	DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.
3462	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.
3249	MEDICINE, SOLID, TOXIC, N.O.S.
3464	ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.
3439	NITRILES, SOLID, TOXIC, N.O.S.
2811	TOXIC SOLID, ORGANIC, N.O.S.

Organometallic [c, d] — **T3**

2026	PHENYLMERCURIC COMPOUND, N.O.S.
2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.
3146	ORGANOTIN COMPOUND, SOLID, N.O.S.
3280	ORGANOARSENIC COMPOUND, LIQUID, N.O.S.
3465	ORGANOARSENIC COMPOUND, SOLID, N.O.S.
3281	METAL CARBONYLS, LIQUID, N.O.S.
3466	METAL CARBONYLS, SOLID, N.O.S.
3282	ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.
3467	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.

(cont'd on next page)

[a] *Substances and preparations containing alkaloids or nicotine used as pesticides shall be classified under UN No. 2588 PESTICIDES, SOLID, TOXIC, N.O.S., UN No. 2902 PESTICIDES, LIQUID, TOXIC, N.O.S. or UN No. 2903 PESTICIDES, LIQUID, TOXIC, FLAMMABLE, N.O.S.*

[b] *Active substances and triturations or mixtures of substances intended for laboratories and experiments and for the manufacture of pharmaceutical products with other substances shall be classified according to their toxicity (see 2.2.61.1.7 to 2.2.61.1.11).*

[c] *Self-heating substances, slightly toxic and spontaneously combustible organometallic compounds, are substances of Class 4.2.*

[d] *Water-reactive substances, slightly toxic, and water-reactive organometallic compounds, are substances of Class 4.3.*

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2.2.61.3 *List of collective entries (cont'd)*

Toxic substances without subsidiary hazard(s) *(cont'd)*

Inorganic	**liquid** [e]	**T4**	1556 ARSENIC COMPOUND, LIQUID, N.O.S., inorganic including: Arsenates, n.o.s., Arsenites, n.o.s.; and Arsenic sulphides, n.o.s. 1935 CYANIDE SOLUTION, N.O.S. 2024 MERCURY COMPOUND, LIQUID, N.O.S. 3141 ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S. 3440 SELENIUM COMPOUND, LIQUID, N.O.S. 3381 TOXIC BY INHALATION LIQUID, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50} 3382 TOXIC BY INHALATION LIQUID, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50} 3287 TOXIC LIQUID, INORGANIC, N.O.S.
	solids [f, g]	**T5**	1549 ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S 1557 ARSENIC COMPOUND, SOLID, N.O.S., including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s. 1564 BARIUM COMPOUND, N.O.S. 1566 BERYLLIUM COMPOUND, N.O.S. 1588 CYANIDES, INORGANIC, SOLID, N.O.S. 1707 THALLIUM COMPOUND, N.O.S. 2025 MERCURY COMPOUND, SOLID, N.O.S. 2291 LEAD COMPOUND, SOLUBLE, N.O.S. 2570 CADMIUM COMPOUND 2630 SELENATES or 2630 SELENITES 2856 FLUOROSILICATES, N.O.S. 3283 SELENIUM COMPOUND, SOLID, N.O.S. 3284 TELLURIUM COMPOUND, N.O.S. 3285 VANADIUM COMPOUND, N.O.S. 3288 TOXIC SOLID, INORGANIC, N.O.S.
Pesticides	**liquid**[h]	**T6**	2992 CARBAMATE PESTICIDE, LIQUID, TOXIC 2994 ARSENICAL PESTICIDE, LIQUID, TOXIC 2996 ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC 2998 TRIAZINE PESTICIDE, LIQUID, TOXIC 3006 THIOCARBAMATE PESTICIDE, LIQUID, TOXIC 3010 COPPER BASED PESTICIDE, LIQUID, TOXIC 3012 MERCURY BASED PESTICIDE, LIQUID, TOXIC 3014 SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC 3016 BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC 3018 ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC 3020 ORGANOTIN PESTICIDE, LIQUID, TOXIC 3026 COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC 3348 PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC 3352 PYRETHROID PESTICIDE, LIQUID, TOXIC 2902 PESTICIDE, LIQUID, TOXIC, N.O.S

(cont'd on next page)

[e] *Mercury fulminate, wetted with not less than 20% water, or mixture of alcohol and water by mass is a substance of Class 1, UN No. 0135.*

[f] *Ferricyanides, ferrocyanides, alkaline thiocyanates and ammonium thiocyanates are not subject to the provisions of ADN.*

[g] *Lead salts and lead pigments which, when mixed in a ratio of 1:1,000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23 °C ± 2 °C, exhibit a solubility of 5% or less, are not subject to the provisions of ADN.*

[h] *Articles impregnated with this pesticide, such as fibreboard plates, paper strips, cotton-wool balls, sheets of plastics material, in hermetically closed wrappings, are not subject to the provisions of ADN.*

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2.2.61.3 *List of collective entries (cont'd)*

Toxic substances <u>without</u> subsidiary hazard(s) *(cont'd)*

Pesticides *(cont'd)*	**Solid[h]**	**T7**	2757 CARBAMATE PESTICIDE, SOLID, TOXIC 2759 ARSENICAL PESTICIDE, SOLID, TOXIC 2761 ORGANOCHLORINE PESTICIDE, SOLID, TOXIC 2763 TRIAZINE PESTICIDE, SOLID, TOXIC 2771 THIOCARBAMATE PESTICIDE, SOLID, TOXIC 2775 COPPER BASED PESTICIDE, SOLID, TOXIC 2777 MERCURY BASED PESTICIDE, SOLID, TOXIC 2779 SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC 2781 BIPYRIDILIUM PESTICIDE, SOLID, TOXIC 2783 ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC 2786 ORGANOTIN PESTICIDE, SOLID, TOXIC 3027 COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC 3048 ALUMINIUM PHOSPHIDE PESTICIDE 3345 PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC 3349 PYRETHROID PESTICIDE, SOLID, TOXIC 2588 PESTICIDE, SOLID, TOXIC, N.O.S.
Samples		**T8**	3315 CHEMICAL SAMPLE, TOXIC
Other toxic substances [i]		**T9**	3243 SOLIDS CONTAINING TOXIC LIQUID, N.O.S.
Articles		**T10**	3546 ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.

Toxic substances <u>with</u> subsidiary hazard(s)

Flammable TF	**Liquid [j, k]**	**TF1**	3071 MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S. or 3071 MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S. 3080 ISOCYANATES, TOXIC, FLAMMABLE, N.O.S. or 3080 ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S. 3275 NITRILES, TOXIC, FLAMMABLE, N.O.S. 3279 ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S. 3383 TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50} 3384 TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50} 2929 TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.

(cont'd on next page)

[h] *Articles impregnated with this pesticide, such as fibreboard plates, paper strips, cotton-wool balls, sheets of plastics material, in hermetically closed wrappings, are not subject to the provisions of ADN.*

[i] *Mixtures of solids which are not subject to the provisions of ADN and of toxic liquids may be carried under UN No. 3243 without first applying the classification criteria of Class 6.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. Each packaging shall correspond to a design type that has passed a leakproofness test at the packing group II level. This entry shall not be used for solids containing a packing group I liquid.*

[j] *Highly toxic and toxic flammable liquids having a flash-point below 23 °C are substances of Class 3 except those which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9. Liquids which are highly toxic by inhalation are indicated as "toxic by inhalation" in their proper shipping name in Column (2) or by special provision 354 in Column (6) of Table A of Chapter 3.2.*

[k] *Flammable liquids, slightly toxic, with the exception of substances and preparations used as pesticides, having a flash-point between 23 °C and 60 °C inclusive, are substances of Class 3.*

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2.2.61.3 *List of collective entries (cont'd)*

Toxic substances <u>with</u> subsidiary hazard(s) (cont'd)

Flammable TF *(cont'd)*	**pesticides, liquid (flash-point not less than 23 °C)**	**TF2**	2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S.
	solid	**TF3**	1700	TEAR GAS CANDLES
			2930	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.
			3535	TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.
Solid, self-heating [c] TS			3124	TOXIC SOLID, SELF-HEATING, N.O.S.
Water-reactive [d] TW	**liquid**	**TW1**	3385	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
			3386	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
			3123	TOXIC LIQUID, WATER-REACTIVE, N.O.S.
	solid [n]	**TW2**	3125	TOXIC SOLID, WATER-REACTIVE, N.O.S.
Oxidizing [l] TO	**liquid**	**TO1**	3387	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
			3388	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
			3122	TOXIC LIQUID, OXIDIZING, N.O.S.
	solid	**TO2**	3086	TOXIC SOLID, OXIDIZING, N.O.S.
Corro-sive [m] TC **organic**	**liquid**	**TC1**	3277	CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.
			3361	CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.
			3389	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
			3390	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
			2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.
	solid	**TC2**	2928	TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.

(cont'd on next page)

[c] *Self-heating substances, slightly toxic and spontaneously combustible organometallic compounds, are substances of Class 4.2.*

[d] *Water-reactive substances, slightly toxic, and water-reactive organometallic compounds, are substances of Class 4.3.*

[l] *Oxidizing substances, slightly toxic, are substances of Class 5.1.*

[m] *Substances slightly toxic and slightly corrosive, are substances of Class 8.*

[n] *Metal phosphides assigned to UN Nos. 1360, 1397, 1432, 1714, 2011 and 2013 are substances of Class 4.3.*

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2.2.61.3 *List of collective entries (cont'd)*

Toxic substances <u>with</u> subsidiary hazard(s) (cont'd)

Corrosive [m] TC *(cont'd)*	**inorganic**	**liquid**	**TC3**	3389	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}
				3390	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}
				3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.
		solid	**TC4**	3290	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.
Flammable, corrosive **TFC**				2742	CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.
				3362	CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.
				3488	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}
				3489	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}
Flammable, water-reactive **TFW**				3490	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}
				3491	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}

[m] *Substances slightly toxic and slightly corrosive, are substances of Class 8.*

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2.2.62 Class 6.2 Infectious substances

2.2.62.1 *Criteria*

2.2.62.1.1 The heading of Class 6.2 covers infectious substances. For the purposes of ADN, infectious substances are substances which are known or are reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsiae, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

NOTE 1: *Genetically modified microorganisms and organisms, biological products, diagnostic specimens and intentionally infected live animals shall be assigned to this Class if they meet the conditions for this Class.*

The carriage of unintentionally or naturally infected live animals is subject only to the relevant rules and regulations of the respective countries of origin, transit and destination.

NOTE 2: *Toxins from plant, animal or bacterial sources which do not contain any infectious substances or organisms or which are not contained in them are substances of Class 6.1, UN No. 3172 or 3462.*

2.2.62.1.2 Substances of Class 6.2 are subdivided as follows:

I1 Infectious substances affecting humans;

I2 Infectious substances affecting animals only;

I3 Clinical waste;

I4 Biological substances, category B.

Definitions

2.2.62.1.3 For the purposes of ADN,

"Biological products" are those products derived from living organisms which are manufactured and distributed in accordance with the requirements of appropriate national authorities, which may have special licensing requirements, and are used either for prevention, treatment, or diagnosis of disease in humans or animals, or for development, experimental or investigational purposes related thereto. They include, but are not limited to, finished or unfinished products such as vaccines;

"Cultures" are the result of a process by which pathogens are intentionally propagated. This definition does not include human or animal patient specimens as defined in this paragraph;

"Medical or clinical wastes" are wastes derived from the medical treatment of animals or humans or from bio-research;

"Patient specimens" are those, collected directly from humans or animals, including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluid swabs, and body parts being carried for purposes such as research, diagnosis, investigational activities, disease treatment and prevention.

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Classification

2.2.62.1.4 Infectious substances shall be classified in Class 6.2 and assigned to UN Nos 2814, 2900, 3291 or 3373, as appropriate.

Infectious substances are divided into the following categories:

2.2.62.1.4.1 Category A: An infectious substance which is carried in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. Indicative examples of substances that meet these criteria are given in the table in this paragraph.

NOTE : *An exposure occurs when an infectious substance is released outside of the protective packaging, resulting in physical contact with humans or animals.*

(a) Infectious substances meeting these criteria which cause disease in humans or both in humans and animals shall be assigned to UN No. 2814. Infectious substances which cause disease only in animals shall be assigned to UN No. 2900;

(b) Assignment to UN No. 2814 or UN No. 2900 shall be based on the known medical history and symptoms of the source human or animal, endemic local conditions, or professional judgement concerning individual circumstances of the source human or animal.

NOTE 1: *The proper shipping name for UN No. 2814 is "INFECTIOUS SUBSTANCE, AFFECTING HUMANS". The proper shipping name for UN No. 2900 is "INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only".*

NOTE 2**:** *The following table is not exhaustive. Infectious substances, including new or emerging pathogens, which do not appear in the table but which meet the same criteria shall be assigned to Category A. In addition, if there is doubt as to whether or not a substance meets the criteria it shall be included in Category A.*

NOTE 3: *In the following table, the micro-organisms written in italics are bacteria, mycoplasmas, rickettsia or fungi.*

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INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED (2.2.62.1.4.1)	
UN Number and name	**Microorganism**
UN No. 2814 Infectious substances affecting humans	*Bacillus anthracis (cultures only)* *Brucella abortus (cultures only)* *Brucella melitensis (cultures only)* *Brucella suis (cultures only)* *Burkholderia mallei - Pseudomonas mallei* – Glanders *(cultures only)* *Burkholderia pseudomallei – Pseudomonas pseudomallei (cultures only)* *Chlamydia psittaci* - avian strains (cultures only) *Clostridium botulinum (cultures only)* *Coccidioides immitis (cultures only)* *Coxiella burnetii (cultures only)* Crimean-Congo haemorrhagic fever virus Dengue virus (cultures only) Eastern equine encephalitis virus (cultures only) *Escherichia coli*, verotoxigenic (cultures only) [a] Ebola virus Flexal virus *Francisella tularensis (cultures only)* Guanarito virus Hantaan virus Hantavirus causing haemorrhagic fever with renal syndrome Hendra virus Hepatitis B virus (cultures only) Herpes B virus (cultures only) Human immunodeficiency virus (cultures only) Highly pathogenic avian influenza virus (cultures only) Japanese Encephalitis virus (cultures only) Junin virus Kyasanur Forest disease virus Lassa virus Machupo virus Marburg virus Monkeypox virus *Mycobacterium tuberculosis (cultures only)* [a] Nipah virus Omsk haemorrhagic fever virus Poliovirus (cultures only) Rabies virus (cultures only) *Rickettsia prowazekii (cultures only)* *Rickettsia rickettsii* (cultures only) Rift Valley fever virus (cultures only) Russian spring-summer encephalitis virus (cultures only) Sabia virus *Shigella dysenteriae type 1 (cultures only)* [a] Tick-borne encephalitis virus (cultures only) Variola virus Venezuelan equine encephalitis virus (cultures only) West Nile virus (cultures only) Yellow fever virus (cultures only) *Yersinia pestis* (cultures only)

[a] *Nevertheless, when the cultures are intended for diagnostic or clinical purposes, they may be classified as infectious substances of Category B.*

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INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED (2.2.62.1.4.1)	
UN Number and name	**Microorganism**
UN No. 2900 Infectious substances affecting animals only	African swine fever virus (cultures only) Avian paramyxovirus Type 1 - Velogenic Newcastle disease virus (cultures only) Classical swine fever virus (cultures only) Foot and mouth disease virus (cultures only) Lumpy skin disease virus (cultures only) *Mycoplasma mycoides* - Contagious bovine pleuropneumonia (cultures only) Peste des petits ruminants virus (cultures only) Rinderpest virus (cultures only) Sheep-pox virus (cultures only) Goatpox virus (cultures only) Swine vesicular disease virus (cultures only) Vesicular stomatitis virus (cultures only)

2.2.62.1.4.2 Category B: An infectious substance which does not meet the criteria for inclusion in Category A. Infectious substances in Category B shall be assigned to UN No. 3373.

NOTE: *The proper shipping name of UN No. 3373 is "BIOLOGICAL SUBSTANCE, CATEGORY B".*

2.2.62.1.5 *Exemptions*

2.2.62.1.5.1 Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals are not subject to the provisions of ADN unless they meet the criteria for inclusion in another class.

2.2.62.1.5.2 Substances containing microorganisms which are non-pathogenic to humans or animals are not subject to ADN unless they meet the criteria for inclusion in another class.

2.2.62.1.5.3 Substances in a form that any present pathogens have been neutralized or inactivated such that they no longer pose a health risk are not subject to ADN unless they meet the criteria for inclusion in another class.

NOTE: *Medical equipment which has been drained of free liquid is deemed to meet the requirements of this paragraph and is not subject to the provisions of ADN.*

2.2.62.1.5.4 Substances where the concentration of pathogens is at a level naturally encountered (including foodstuff and water samples) and which are not considered to pose a significant risk of infection are not subject to ADN unless they meet the criteria for inclusion in another class.

2.2.62.1.5.5 Dried blood spots, collected by applying a drop of blood onto absorbent material, are not subject to ADN.

2.2.62.1.5.6 Faecal occult blood screening samples are not subject to ADN.

2.2.62.1.5.7 Blood or blood components which have been collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation and any tissues or organs intended for use in transplantation as well as samples drawn in connection with such purposes are not subject to ADN.

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2.2.62.1.5.8 Human or animal specimens for which there is minimal likelihood that pathogens are present are not subject to ADN if the specimen is carried in a packaging which will prevent any leakage and which is marked with the words "Exempt human specimen" or "Exempt animal specimen", as appropriate.

The packaging is deemed to comply with the above requirements if it meets the following conditions:

(a) The packaging consists of three components:

(i) a leak-proof primary receptacle(s);

(ii) a leak-proof secondary packaging; and

(iii) an outer packaging of adequate strength for its capacity, mass and intended use, and with at least one surface having minimum dimensions of 100 mm × 100 mm;

(b) For liquids, absorbent material in sufficient quantity to absorb the entire contents is placed between the primary receptacle(s) and the secondary packaging so that, during carriage, any release or leak of a liquid substance will not reach the outer packaging and will not compromise the integrity of the cushioning material;

(c) When multiple fragile primary receptacles are placed in a single secondary packaging, they are either individually wrapped or separated to prevent contact between them.

NOTE 1: *An element of professional judgement is required to determine if a substance is exempt under this paragraph. That judgement should be based on the known medical history, symptoms and individual circumstances of the source, human or animal, and endemic local conditions. Examples of specimens which may be carried under this paragraph include blood or urine tests to monitor cholesterol levels, blood glucose levels, hormone levels, or prostate specific antibodies (PSA); those required to monitor organ function such as heart, liver or kidney function for humans or animals with non-infectious diseases, or for therapeutic drug monitoring; those conducted for insurance or employment purposes and intended to determine the presence of drugs or alcohol; pregnancy tests; biopsies to detect cancer; and antibody detection in humans or animals in the absence of any concern for infection (e.g. evaluation of vaccine induced immunity, diagnosis of autoimmune disease, etc.).*

NOTE 2: *For air transport, packagings for specimens exempted under this paragraph shall meet the conditions in (a) to (c).*

2.2.62.1.5.9 Except for:

(a) Medical waste (UN No. 3291);

(b) Medical devices or equipment contaminated with or containing infectious substances in Category A (UN No. 2814 or UN No. 2900); and

(c) Medical devices or equipment contaminated with or containing other dangerous goods that meet the definition of another class, medical devices or equipment potentially contaminated with or containing infectious substances which are being carried for disinfection, cleaning, sterilization, repair, or equipment evaluation are not subject to provisions of ADN other than those of this paragraph if packed in packagings designed and constructed in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents. Packagings shall be designed to meet the construction requirements listed in 6.1.4 or 6.6.4 of ADR.

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These packagings shall meet the general packing requirements of 4.1.1.1 and 4.1.1.2 of ADR and be capable of retaining the medical devices and equipment when dropped from a height of 1.2 m.

The packagings shall be marked "USED MEDICAL DEVICE" or "USED MEDICAL EQUIPMENT". When using overpacks, these shall be marked in the same way, except when the inscription remains visible.

2.2.62.1.6 to 2.2.62.1.8 *(Reserved)*

2.2.62.1.9 *Biological products*

For the purposes of ADN, biological products are divided into the following groups:

(a) those which are manufactured and packaged in accordance with the requirements of appropriate national authorities and carried for the purposes of final packaging or distribution, and use for personal health care by medical professionals or individuals. Substances in this group are not subject to the provisions of ADN;

(b) those which do not fall under paragraph (a) and are known or reasonably believed to contain infectious substances and which meet the criteria for inclusion in Category A or Category B. Substances in this group shall be assigned to UN No. 2814, UN No. 2900 or UN No. 3373, as appropriate.

NOTE: *Some licensed biological products may present a biohazard only in certain parts of the world. In that case, competent authorities may require these biological products to be in compliance with local requirements for infectious substances or may impose other restrictions.*

2.2.62.1.10 *Genetically modified micro-organisms and organisms*

Genetically modified micro-organisms not meeting the definition of infectious substance shall be classified according to section 2.2.9.

2.2.62.1.11 *Medical or clinical wastes*

2.2.62.1.11.1 Medical or clinical wastes containing Category A infectious substances shall be assigned to UN No. 2814 or UN No. 2900 as appropriate. Medical or clinical wastes containing infectious substances in Category B shall be assigned to UN No. 3291.

NOTE: *Medical or clinical wastes assigned to number 18 01 03 (Wastes from human or animal health care and/or related research – wastes from natal care, diagnosis, treatment or prevention of disease in humans – wastes whose collection and disposal is subject to special requirement in order to prevent infection) or 18 02 02 (Wastes from human or animal health care and/or related research – wastes from research, diagnosis, treatment or prevention of disease involving animals – wastes whose collection and disposal is subject to special requirements in order to prevent infection) according to the list of wastes annexed to the Commission Decision 2000/532/EC[4] as amended, shall be classified according to the provisions set out in this paragraph, based on the medical or veterinary diagnosis concerning the patient or the animal.*

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[4] *Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste (replaced by Directive 2006/12/EC of the European Parliament and of the Council (Official Journal of the European Communities No. L 114 of 27 April 2006, page 9)) and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (Official Journal of the European Communities No. L 226 of 6 September 2000, page 3).*

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2.2.62.1.11.2 Medical or clinical wastes which are reasonably believed to have a low probability of containing infectious substances shall be assigned to UN No. 3291. For the assignment, international, regional or national waste catalogues may be taken into account.

NOTE 1: *The proper shipping name for UN No. 3291 is "CLINICAL WASTE, UNSPECIFIED, N.O.S." or "(BIO) MEDICAL WASTE, N.O.S". or "REGULATED MEDICAL WASTE, N.O.S.".*

NOTE 2*: Notwithstanding the classification criteria set out above, medical or clinical wastes assigned to number 18 01 04 (Wastes from human or animal health care and/or related research – wastes from natal care, diagnosis, treatment or prevention of disease in humans – wastes whose collection and disposal is not subject to special requirements in order to prevent infection) or 18 02 03 (Wastes from human or animal health care and/or related research – wastes from research, diagnosis, treatment or prevention of disease involving animals – wastes whose collection and disposal is not subject to special requirements in order to prevent infection) according to the list of wastes annexed to the Commission Decision 2000/532/EC [4] as amended, are not subject to the provisions of ADN.*

2.2.62.1.11.3 Decontaminated medical or clinical wastes which previously contained infectious substances are not subject to the provisions of ADN unless they meet the criteria for inclusion in another class.

2.2.62.1.11.4 Medical or clinical wastes assigned to UN No. 3291 are assigned to packing group II.

2.2.62.1.12 *Infected animals*

2.2.62.1.12.1 Unless an infectious substance cannot be consigned by any other means, live animals shall not be used to consign such a substance. A live animal which has been intentionally infected and is known or suspected to contain an infectious substance shall only be carried under terms and conditions approved by the competent authority.

NOTE: *The approval of the competent authorities shall be issued on the basis of the relevant rules for the carriage of live animals, taking into consideration dangerous goods aspects. The authorities that are competent to lay down these conditions and rules for approval shall be regulated at national level.*

If there is no approval by a competent authority of a Contracting Party to ADN, the competent authority of a Contracting Party to ADN may recognize an approval issued by the competent authority of a country that is not a Contracting Party to ADN.

Rules for the carriage of livestock are, for example, contained in Council Regulation (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport (Official Journal of the European Community No L 3 of 5 January 2005) as amended.

2.2.62.1.12.2 *(Deleted)*

2.2.62.2 *Substances not accepted for carriage*

Live vertebrate or invertebrate animals shall not be used to carry an infectious agent unless the agent cannot be carried by other means or unless this carriage has been approved by the competent authority (see 2.2.62.1.12.1).

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[4] *Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste (replaced by Directive 2006/12/EC of the European Parliament and of the Council (Official Journal of the European Communities No. L 114 of 27 April 2006, page 9)) and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (Official Journal of the European Communities No. L 226 of 6 September 2000, page 3).*

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2.2.62.3 *List of collective entries*

Effects on humans	**I1**	2814 INFECTIOUS SUBSTANCE, AFFECTING HUMANS
Effects on animals only	**I2**	2900 INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only
Clinical waste	**I3**	3291 CLINICAL WASTE, UNSPECIFIED, N.O.S. or 3291 (BIO)MEDICAL WASTE, N.O.S. or 3291 REGULATED MEDICAL WASTE, N.O.S.
Biological substances	**I4**	3373 BIOLOGICAL SUBSTANCE, CATEGORY B

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2.2.7 Class 7 Radioactive material

2.2.7.1 *Definitions*

2.2.7.1.1 *Radioactive material* means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.2.7.2.2.1 to 2.2.7.2.2.6.

2.2.7.1.2 *Contamination*

Contamination means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm^2 for all other alpha emitters.

Non-fixed contamination means contamination that can be removed from a surface during routine conditions of carriage.

Fixed contamination means contamination other than non-fixed contamination.

2.2.7.1.3 *Definitions of specific terms*

A_1 and A_2

A_1 means the activity value of special form radioactive material which is listed in the Table in 2.2.7.2.2.1 or derived in 2.2.7.2.2.2 and is used to determine the activity limits for the requirements of ADN.

A_2 means the activity value of radioactive material, other than special form radioactive material, which is listed in the Table in 2.2.7.2.2.1 or derived in 2.2.7.2.2.2 and is used to determine the activity limits for the requirements of ADN.

Fissile nuclides means uranium-233, uranium-235, plutonium-239 and plutonium-241. Fissile material means a material containing any of the fissile nuclides. Excluded from the definition of fissile material are the following:

(a) Natural uranium or depleted uranium which is unirradiated;

(b) Natural uranium or depleted uranium which has been irradiated in thermal reactors only;

(c) Material with fissile nuclides less than a total of 0.25 g;

(d) Any combination of (a), (b) and/or (c).

These exclusions are only valid if there is no other material with fissile nuclides in the package or in the consignment if shipped unpackaged.

Low dispersible radioactive material means either a solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form.

Low specific activity (LSA) material means radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. External shielding materials surrounding the LSA material shall not be considered in determining the estimated average specific activity.

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Low toxicity alpha emitters are: natural uranium; depleted uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

Specific activity of a radionuclide means the activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.

Special form radioactive material means either:

(a) An indispersible solid radioactive material; or

(b) A sealed capsule containing radioactive material.

Surface contaminated object (SCO) means a solid object which is not itself radioactive but which has radioactive material distributed on its surface.

Unirradiated thorium means thorium containing not more than 10^{-7} g of uranium-233 per gram of thorium-232.

Unirradiated uranium means uranium containing not more than 2×10^{3} Bq of plutonium per gram of uranium-235, not more than 9×10^{6} Bq of fission products per gram of uranium-235 and not more than 5×10^{-3} g of uranium-236 per gram of uranium-235.

Uranium - natural, depleted, enriched means the following:

Natural uranium means uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass).

Depleted uranium means uranium containing a lesser mass percentage of uranium-235 than in natural uranium.

Enriched uranium means uranium containing a greater mass percentage of uranium-235 than 0.72%.

In all cases, a very small mass percentage of uranium-234 is present.

2.2.7.2 *Classification*

2.2.7.2.1 *General provisions*

2.2.7.2.1.1 Radioactive material shall be assigned to one of the UN numbers specified in Table 2.2.7.2.1.1, in accordance with 2.2.7.2.4 and 2.2.7.2.5, taking into account the material characteristics determined in 2.2.7.2.3.

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Table 2.2.7.2.1.1 Assignment of UN numbers

UN Nos.	Proper shipping name and description [a]
Excepted packages (1.7.1.5)	
UN 2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING
UN 2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM
UN 2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL
UN 2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES
UN 3507	URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE less than 0.1 kg per package, non-fissile or fissile-excepted [b, c]
Low specific activity radioactive material (2.2.7.2.3.1)	
UN 2912	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile-excepted [b]
UN 3321	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted [b]
UN 3322	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted [b]
UN 3324	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE
UN 3325	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), FISSILE
Surface contaminated objects (2.2.7.2.3.2)	
UN 2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), non-fissile or fissile-excepted [b]
UN 3326	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE
Type A packages (2.2.7.2.4.4)	
UN 2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non-fissile or fissile-excepted [b]
UN 3327	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form
UN 3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted [b]
UN 3333	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE
Type B(U) packages (2.2.7.2.4.6)	
UN 2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non-fissile or fissile-excepted [b]
UN 3328	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE
Type B(M) packages (2.2.7.2.4.6)	
UN 2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non-fissile or fissile-excepted [b]
UN 3329	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE
Type C packages (2.2.7.2.4.6)	
UN 3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted [b]
UN 3330	RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE

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Special arrangement (2.2.7.2.5)	
UN 2919	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non-fissile or fissile-excepted [b]
UN 3331	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE
Uranium hexafluoride (2.2.7.2.4.5)	
UN 2977	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE
UN 2978	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted [b]
UN 3507	URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE less than 0.1 kg per package, non-fissile or fissile-excepted [b, c]

[a] *The proper shipping name is found in the column "proper shipping name and description" and is restricted to that part shown in capital letters. In the cases of UN Nos. 2909, 2911, 2913 and 3326, where alternative proper shipping names are separated by the word "or" only the relevant proper shipping name shall be used.*

[b] *The term "fissile-excepted" refers only to material excepted under 2.2.7.2.3.5.*

[c] *For UN No. 3507, see also special provision 369 in Chapter 3.3.*

2.2.7.2.2 *Determination of radionuclide values*

2.2.7.2.2.1 The following basic values for individual radionuclides are given in Table 2.2.7.2.2.1:

(a) A_1 and A_2 in TBq;

(b) Activity concentration limits for exempt material in Bq/g; and

(c) Activity limits for exempt consignments in Bq.

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Table 2.2.7.2.2.1: Basic radionuclides values for individual radionuclides

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Actinium (89)				
Ac-225 (a)	8×10^{-1}	6×10^{-3}	1×10^{1}	1×10^{4}
Ac-227 (a)	9×10^{-1}	9×10^{-5}	1×10^{-1}	1×10^{3}
Ac-228	6×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Silver (47)				
Ag-105	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Ag-108m (a)	7×10^{-1}	7×10^{-1}	1×10^{1} (b)	1×10^{6} (b)
Ag-110m (a)	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Ag-111	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Aluminium (13)				
Al-26	1×10^{-1}	1×10^{-1}	1×10^{1}	1×10^{5}
Americium (95)				
Am-241	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Am-242m (a)	1×10^{1}	1×10^{-3}	1×10^{0} (b)	1×10^{4} (b)
Am-243 (a)	5×10^{0}	1×10^{-3}	1×10^{0} (b)	1×10^{3} (b)
Argon (18)				
Ar-37	4×10^{1}	4×10^{1}	1×10^{6}	1×10^{8}
Ar-39	4×10^{1}	2×10^{1}	1×10^{7}	1×10^{4}
Ar-41	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{9}
Arsenic (33)				
As-72	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
As-73	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{7}
As-74	1×10^{0}	9×10^{-1}	1×10^{1}	1×10^{6}
As-76	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
As-77	2×10^{1}	7×10^{-1}	1×10^{3}	1×10^{6}
Astatine (85)				
At-211 (a)	2×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
Gold (79)				
Au-193	7×10^{0}	2×10^{0}	1×10^{2}	1×10^{7}
Au-194	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Au-195	1×10^{1}	6×10^{0}	1×10^{2}	1×10^{7}
Au-198	1×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Au-199	1×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
Barium (56)				
Ba-131 (a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Ba-133	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Ba-133m	2×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
Ba-140 (a)	5×10^{-1}	3×10^{-1}	1×10^{1} (b)	1×10^{5} (b)
Beryllium (4)				
Be-7	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
Be-10	4×10^{1}	6×10^{-1}	1×10^{4}	1×10^{6}
Bismuth (83)				
Bi-205	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Bi-206	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Bi-207	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Bi-210	1×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Bi-210m (a)	6×10^{-1}	2×10^{-2}	1×10^{1}	1×10^{5}
Bi-212 (a)	7×10^{-1}	6×10^{-1}	1×10^{1} (b)	1×10^{5} (b)
Berkelium (97)				
Bk-247	8×10^{0}	8×10^{-4}	1×10^{0}	1×10^{4}
Bk-249 (a)	4×10^{1}	3×10^{-1}	1×10^{3}	1×10^{6}
Bromine (35)				
Br-76	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Br-77	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Br-82	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Carbon (6)				
C-11	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
C-14	4×10^{1}	3×10^{0}	1×10^{4}	1×10^{7}
Calcium (20)				
Ca-41	Unlimited	Unlimited	1×10^{5}	1×10^{7}
Ca-45	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Ca-47 (a)	3×10^{0}	3×10^{-1}	1×10^{1}	1×10^{6}
Cadmium (48)				
Cd-109	3×10^{1}	2×10^{0}	1×10^{4}	1×10^{6}
Cd-113m	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{6}
Cd-115 (a)	3×10^{0}	4×10^{-1}	1×10^{2}	1×10^{6}
Cd-115m	5×10^{-1}	5×10^{-1}	1×10^{3}	1×10^{6}
Cerium (58)				
Ce-139	7×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Ce-141	2×10^{1}	6×10^{-1}	1×10^{2}	1×10^{7}
Ce-143	9×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{6}
Ce-144 (a)	2×10^{-1}	2×10^{-1}	1×10^{2} (b)	1×10^{5} (b)
Californium (98)				
Cf-248	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{4}
Cf-249	3×10^{0}	8×10^{-4}	1×10^{0}	1×10^{3}
Cf-250	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}
Cf-251	7×10^{0}	7×10^{-4}	1×10^{0}	1×10^{3}
Cf-252	1×10^{-1}	3×10^{-3}	1×10^{1}	1×10^{4}
Cf-253 (a)	4×10^{1}	4×10^{-2}	1×10^{2}	1×10^{5}
Cf-254	1×10^{-3}	1×10^{-3}	1×10^{0}	1×10^{3}
Chlorine (17)				
Cl-36	1×10^{1}	6×10^{-1}	1×10^{4}	1×10^{6}
Cl-38	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
Curium (96)				
Cm-240	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
Cm-241	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
Cm-242	4×10^{1}	1×10^{-2}	1×10^{2}	1×10^{5}
Cm-243	9×10^{0}	1×10^{-3}	1×10^{0}	1×10^{4}
Cm-244	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}
Cm-245	9×10^{0}	9×10^{-4}	1×10^{0}	1×10^{3}
Cm-246	9×10^{0}	9×10^{-4}	1×10^{0}	1×10^{3}
Cm-247 (a)	3×10^{0}	1×10^{-3}	1×10^{0}	1×10^{4}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Cm-248	2×10^{-2}	3×10^{-4}	1×10^{0}	1×10^{3}
Cobalt (27)				
Co-55	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Co-56	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Co-57	1×10^{1}	1×10^{1}	1×10^{2}	1×10^{6}
Co-58	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Co-58m	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Co-60	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Chromium (24)				
Cr-51	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
Caesium (55)				
Cs-129	4×10^{0}	4×10^{0}	1×10^{2}	1×10^{5}
Cs-131	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{6}
Cs-132	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{5}
Cs-134	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{4}
Cs-134m	4×10^{1}	6×10^{-1}	1×10^{3}	1×10^{5}
Cs-135	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}
Cs-136	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
Cs-137 (a)	2×10^{0}	6×10^{-1}	1×10^{1} (b)	1×10^{4} (b)
Copper (29)				
Cu-64	6×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
Cu-67	1×10^{1}	7×10^{-1}	1×10^{2}	1×10^{6}
Dysprosium (66)				
Dy-159	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
Dy-165	9×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Dy-166 (a)	9×10^{-1}	3×10^{-1}	1×10^{3}	1×10^{6}
Erbium (68)				
Er-169	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}
Er-171	8×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{6}
Europium (63)				
Eu-147	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Eu-148	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Eu-149	2×10^{1}	2×10^{1}	1×10^{2}	1×10^{7}
Eu-150 (short lived)	2×10^{0}	7×10^{-1}	1×10^{3}	1×10^{6}
Eu-150 (long lived)	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Eu-152	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Eu-152m	8×10^{-1}	8×10^{-1}	1×10^{2}	1×10^{6}
Eu-154	9×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Eu-155	2×10^{1}	3×10^{0}	1×10^{2}	1×10^{7}
Eu-156	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Fluorine (9)				
F-18	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
Iron (26)				
Fe-52 (a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{6}
Fe-55	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{6}
Fe-59	9×10^{-1}	9×10^{-1}	1×10^{1}	1×10^{6}
Fe-60 (a)	4×10^{1}	2×10^{-1}	1×10^{2}	1×10^{5}
Gallium (31)				
Ga-67	7×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Ga-68	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
Ga-72	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Gadolinium (64)				
Gd-146 (a)	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Gd-148	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}
Gd-153	1×10^{1}	9×10^{0}	1×10^{2}	1×10^{7}
Gd-159	3×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Germanium (32)				
Ge-68 (a)	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
Ge-71	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
Ge-77	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Hafnium (72)				
Hf-172 (a)	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Hf-175	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Hf-181	2×10^{0}	5×10^{-1}	1×10^{1}	1×10^{6}
Hf-182	Unlimited	Unlimited	1×10^{2}	1×10^{6}
Mercury (80)				
Hg-194 (a)	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Hg-195m (a)	3×10^{0}	7×10^{-1}	1×10^{2}	1×10^{6}
Hg-197	2×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
Hg-197m	1×10^{1}	4×10^{-1}	1×10^{2}	1×10^{6}
Hg-203	5×10^{0}	1×10^{0}	1×10^{2}	1×10^{5}
Holmium (67)				
Ho-166	4×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{5}
Ho-166m	6×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Iodine (53)				
I-123	6×10^{0}	3×10^{0}	1×10^{2}	1×10^{7}
I-124	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
I-125	2×10^{1}	3×10^{0}	1×10^{3}	1×10^{6}
I-126	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
I-129	Unlimited	Unlimited	1×10^{2}	1×10^{5}
I-131	3×10^{0}	7×10^{-1}	1×10^{2}	1×10^{6}
I-132	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
I-133	7×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
I-134	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
I-135 (a)	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Indium (49)				
In-111	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
In-113m	4×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
In-114m (a)	1×10^{1}	5×10^{-1}	1×10^{2}	1×10^{6}
In-115m	7×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
Iridium (77)				
Ir-189 (a)	1×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
Ir-190	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Ir-192	1×10^{0}(c)	6×10^{-1}	1×10^{1}	1×10^{4}
Ir-194	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
Potassium (19)				
K-40	9×10^{-1}	9×10^{-1}	1×10^{2}	1×10^{6}
K-42	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{6}
K-43	7×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Krypton (36)				
Kr-79	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{5}
Kr-81	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Kr-85	1×10^{1}	1×10^{1}	1×10^{5}	1×10^{4}
Kr-85m	8×10^{0}	3×10^{0}	1×10^{3}	1×10^{10}
Kr-87	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{9}
Lanthanum (57)				
La-137	3×10^{1}	6×10^{0}	1×10^{3}	1×10^{7}
La-140	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Lutetium (71)				
Lu-172	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Lu-173	8×10^{0}	8×10^{0}	1×10^{2}	1×10^{7}
Lu-174	9×10^{0}	9×10^{0}	1×10^{2}	1×10^{7}
Lu-174m	2×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
Lu-177	3×10^{1}	7×10^{-1}	1×10^{3}	1×10^{7}
Magnesium (12)				
Mg-28 (a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Manganese (25)				
Mn-52	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Mn-53	Unlimited	Unlimited	1×10^{4}	1×10^{9}
Mn-54	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Mn-56	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Molybdenum (42)				
Mo-93	4×10^{1}	2×10^{1}	1×10^{3}	1×10^{8}
Mo-99 (a)	1×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Nitrogen (7)				
N-13	9×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{9}
Sodium (11)				
Na-22	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Na-24	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
Niobium (41)				
Nb-93m	4×10^{1}	3×10^{1}	1×10^{4}	1×10^{7}
Nb-94	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Nb-95	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Nb-97	9×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Neodymium (60)				
Nd-147	6×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Nd-149	6×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{6}
Nickel (28)				
Ni-59	Unlimited	Unlimited	1×10^{4}	1×10^{8}
Ni-63	4×10^{1}	3×10^{1}	1×10^{5}	1×10^{8}
Ni-65	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Neptunium (93)				
Np-235	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{7}
Np-236 (short-lived)	2×10^{1}	2×10^{0}	1×10^{3}	1×10^{7}
Np-236 (long-lived)	9×10^{0}	2×10^{-2}	1×10^{2}	1×10^{5}
Np-237	2×10^{1}	2×10^{-3}	1×10^{0} (b)	1×10^{3} (b)
Np-239	7×10^{0}	4×10^{-1}	1×10^{2}	1×10^{7}
Osmium (76)				
Os-185	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Os-191	1×10^{1}	2×10^{0}	1×10^{2}	1×10^{7}
Os-191m	4×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
Os-193	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Os-194 (a)	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
Phosphorus (15)				
P-32	5×10^{-1}	5×10^{-1}	1×10^{3}	1×10^{5}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
P-33	4×10^{1}	1×10^{0}	1×10^{5}	1×10^{8}
Protactinium (91)				
Pa-230 (a)	2×10^{0}	7×10^{-2}	1×10^{1}	1×10^{6}
Pa-231	4×10^{0}	4×10^{-4}	1×10^{0}	1×10^{3}
Pa-233	5×10^{0}	7×10^{-1}	1×10^{2}	1×10^{7}
Lead (82)				
Pb-201	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Pb-202	4×10^{1}	2×10^{1}	1×10^{3}	1×10^{6}
Pb-203	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Pb-205	Unlimited	Unlimited	1×10^{4}	1×10^{7}
Pb-210 (a)	1×10^{0}	5×10^{-2}	1×10^{1} (b)	1×10^{4} (b)
Pb-212 (a)	7×10^{-1}	2×10^{-1}	1×10^{1} (b)	1×10^{5} (b)
Palladium (46)				
Pd-103 (a)	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{8}
Pd-107	Unlimited	Unlimited	1×10^{5}	1×10^{8}
Pd-109	2×10^{0}	5×10^{-1}	1×10^{3}	1×10^{6}
Promethium (61)				
Pm-143	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Pm-144	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Pm-145	3×10^{1}	1×10^{1}	1×10^{3}	1×10^{7}
Pm-147	4×10^{1}	2×10^{0}	1×10^{4}	1×10^{7}
Pm-148m (a)	8×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Pm-149	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Pm-151	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Polonium (84)				
Po-210	4×10^{1}	2×10^{-2}	1×10^{1}	1×10^{4}
Praseodymium (59)				
Pr-142	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}
Pr-143	3×10^{0}	6×10^{-1}	1×10^{4}	1×10^{6}
Platinum (78)				
Pt-188 (a)	1×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Pt-191	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Pt-193	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Pt-193m	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
Pt-195m	1×10^{1}	5×10^{-1}	1×10^{2}	1×10^{6}
Pt-197	2×10^{1}	6×10^{-1}	1×10^{3}	1×10^{6}
Pt-197m	1×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
Plutonium (94)				
Pu-236	3×10^{1}	3×10^{-3}	1×10^{1}	1×10^{4}
Pu-237	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
Pu-238	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Pu-239	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Pu-240	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{3}
Pu-241 (a)	4×10^{1}	6×10^{-2}	1×10^{2}	1×10^{5}
Pu-242	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Pu-244 (a)	4×10^{-1}	1×10^{-3}	1×10^{0}	1×10^{4}
Radium (88)				
Ra-223 (a)	4×10^{-1}	7×10^{-3}	1×10^{2} (b)	1×10^{5} (b)
Ra-224 (a)	4×10^{-1}	2×10^{-2}	1×10^{1} (b)	1×10^{5} (b)
Ra-225 (a)	2×10^{-1}	4×10^{-3}	1×10^{2}	1×10^{5}
Ra-226 (a)	2×10^{-1}	3×10^{-3}	1×10^{1} (b)	1×10^{4} (b)
Ra-228 (a)	6×10^{-1}	2×10^{-2}	1×10^{1} (b)	1×10^{5} (b)
Rubidium (37)				
Rb-81	2×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
Rb-83 (a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Rb-84	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Rb-86	5×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{5}
Rb-87	Unlimited	Unlimited	1×10^{4}	1×10^{7}
Rb(nat)	Unlimited	Unlimited	1×10^{4}	1×10^{7}
Rhenium (75)				
Re-184	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Re-184m	3×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Re-186	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Re-187	Unlimited	Unlimited	1×10^{6}	1×10^{9}
Re-188	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}
Re-189 (a)	3×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Re(nat)	Unlimited	Unlimited	1×10^{6}	1×10^{9}
Rhodium (45)				
Rh-99	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
Rh-101	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{7}
Rh-102	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Rh-102m	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Rh-103m	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
Rh-105	1×10^{1}	8×10^{-1}	1×10^{2}	1×10^{7}
Radon (86)				
Rn-222 (a)	3×10^{-1}	4×10^{-3}	1×10^{1} (b)	1×10^{8} (b)
Ruthenium (44)				
Ru-97	5×10^{0}	5×10^{0}	1×10^{2}	1×10^{7}
Ru-103 (a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Ru-105	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
Ru-106 (a)	2×10^{-1}	2×10^{-1}	1×10^{2} (b)	1×10^{5} (b)
Sulphur (16)				
S-35	4×10^{1}	3×10^{0}	1×10^{5}	1×10^{8}
Antimony (51)				
Sb-122	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{4}
Sb-124	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Sb-125	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
Sb-126	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Scandium (21)				
Sc-44	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
Sc-46	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Sc-47	1×10^{1}	7×10^{-1}	1×10^{2}	1×10^{6}
Sc-48	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Selenium (34)				
Se-75	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Se-79	4×10^{1}	2×10^{0}	1×10^{4}	1×10^{7}
Silicon (14)				
Si-31	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Si-32	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{6}
Samarium (62)				
Sm-145	1×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
Sm-147	Unlimited	Unlimited	1×10^{1}	1×10^{4}
Sm-151	4×10^{1}	1×10^{1}	1×10^{4}	1×10^{8}
Sm-153	9×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Tin (50)				
Sn-113 (a)	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{7}
Sn-117m	7×10^{0}	4×10^{-1}	1×10^{2}	1×10^{6}
Sn-119m	4×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
Sn-121m (a)	4×10^{1}	9×10^{-1}	1×10^{3}	1×10^{7}
Sn-123	8×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Sn-125	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}
Sn-126 (a)	6×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Strontium (38)				
Sr-82 (a)	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
Sr-85	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Sr-85m	5×10^{0}	5×10^{0}	1×10^{2}	1×10^{7}
Sr-87m	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Sr-89	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Sr-90 (a)	3×10^{-1}	3×10^{-1}	1×10^{2} (b)	1×10^{4} (b)
Sr-91 (a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Sr-92 (a)	1×10^{0}	3×10^{-1}	1×10^{1}	1×10^{6}
Tritium (1)				
T(H-3)	4×10^{1}	4×10^{1}	1×10^{6}	1×10^{9}
Tantalum (73)				

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Ta-178 (long-lived)	1×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
Ta-179	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
Ta-182	9×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{4}
Terbium (65)				
Tb-157	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Tb-158	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Tb-160	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
Technetium (43)				
Tc-95m (a)	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
Tc-96	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Tc-96m (a)	4×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{7}
Tc-97	Unlimited	Unlimited	1×10^{3}	1×10^{8}
Tc-97m	4×10^{1}	1×10^{0}	1×10^{3}	1×10^{7}
Tc-98	8×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Tc-99	4×10^{1}	9×10^{-1}	1×10^{4}	1×10^{7}
Tc-99m	1×10^{1}	4×10^{0}	1×10^{2}	1×10^{7}
Tellurium (52)				
Te-121	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
Te-121m	5×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Te-123m	8×10^{0}	1×10^{0}	1×10^{2}	1×10^{7}
Te-125m	2×10^{1}	9×10^{-1}	1×10^{3}	1×10^{7}
Te-127	2×10^{1}	7×10^{-1}	1×10^{3}	1×10^{6}
Te-127m (a)	2×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
Te-129	7×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{6}
Te-129m (a)	8×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{6}
Te-131m (a)	7×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Te-132 (a)	5×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{7}
Thorium (90)				
Th-227	1×10^{1}	5×10^{-3}	1×10^{1}	1×10^{4}
Th-228 (a)	5×10^{-1}	1×10^{-3}	1×10^{0} (b)	1×10^{4} (b)
Th-229	5×10^{0}	5×10^{-4}	1×10^{0} (b)	1×10^{3} (b)

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Th-230	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Th-231	4×10^{1}	2×10^{-2}	1×10^{3}	1×10^{7}
Th-232	Unlimited	Unlimited	1×10^{1}	1×10^{4}
Th-234 (a)	3×10^{-1}	3×10^{-1}	1×10^{3} (b)	1×10^{5} (b)
Th(nat)	Unlimited	Unlimited	1×10^{0} (b)	1×10^{3} (b)
Titanium (22)				
Ti-44 (a)	5×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Thallium (81)				
Tl-200	9×10^{-1}	9×10^{-1}	1×10^{1}	1×10^{6}
Tl-201	1×10^{1}	4×10^{0}	1×10^{2}	1×10^{6}
Tl-202	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Tl-204	1×10^{1}	7×10^{-1}	1×10^{4}	1×10^{4}
Thulium (69)				
Tm-167	7×10^{0}	8×10^{-1}	1×10^{2}	1×10^{6}
Tm-170	3×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Tm-171	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
Uranium (92)				
U-230 (fast lung absorption) (a)(d)	4×10^{1}	1×10^{-1}	1×10^{1} (b)	1×10^{5} (b)
U-230 (medium lung absorption) (a)(e)	4×10^{1}	4×10^{-3}	1×10^{1}	1×10^{4}
U-230 (slow lung absorption) (a)(f)	3×10^{1}	3×10^{-3}	1×10^{1}	1×10^{4}
U-232 (fast lung absorption) (d)	4×10^{1}	1×10^{-2}	1×10^{0} (b)	1×10^{3} (b)
U-232 (medium lung absorption) (e)	4×10^{1}	7×10^{-3}	1×10^{1}	1×10^{4}
U-232 (slow lung absorption) (f)	1×10^{1}	1×10^{-3}	1×10^{1}	1×10^{4}
U-233 (fast lung absorption) (d)	4×10^{1}	9×10^{-2}	1×10^{1}	1×10^{4}
U-233 (medium lung absorption) (e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
U-233 (slow lung absorption) (f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{5}
U-234 (fast lung absorption) (d)	4×10^{1}	9×10^{-2}	1×10^{1}	1×10^{4}
U-234 (medium lung absorption) (e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
U-234 (slow lung absorption) (f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{5}
U-235 (all lung absorption types) (a)(d)(e)(f)	Unlimited	Unlimited	1×10^{1} (b)	1×10^{4} (b)
U-236 (fast lung absorption) (d)	Unlimited	Unlimited	1×10^{1}	1×10^{4}

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
U-236 (medium lung absorption) (e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
U-236 (slow lung absorption) (f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{4}
U-238 (all lung absorption types) (d)(e)(f)	Unlimited	Unlimited	1×10^{1} (b)	1×10^{4} (b)
U (nat)	Unlimited	Unlimited	1×10^{0} (b)	1×10^{3} (b)
U (enriched to 20% or less) (g)	Unlimited	Unlimited	1×10^{0}	1×10^{3}
U (dep)	Unlimited	Unlimited	1×10^{0}	1×10^{3}
Vanadium (23)				
V-48	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
V-49	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Tungsten (74)				
W-178 (a)	9×10^{0}	5×10^{0}	1×10^{1}	1×10^{6}
W-181	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
W-185	4×10^{1}	8×10^{-1}	1×10^{4}	1×10^{7}
W-187	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
W-188 (a)	4×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
Xenon (54)				
Xe-122 (a)	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{9}
Xe-123	2×10^{0}	7×10^{-1}	1×10^{2}	1×10^{9}
Xe-127	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{5}
Xe-131m	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{4}
Xe-133	2×10^{1}	1×10^{1}	1×10^{3}	1×10^{4}
Xe-135	3×10^{0}	2×10^{0}	1×10^{3}	1×10^{10}
Yttrium (39)				
Y-87 (a)	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Y-88	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Y-90	3×10^{-1}	3×10^{-1}	1×10^{3}	1×10^{5}
Y-91	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Y-91m	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Y-92	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{5}
Y-93	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
Ytterbium (70)				

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Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Yb-169	4×10^0	1×10^0	1×10^2	1×10^7
Yb-175	3×10^1	9×10^{-1}	1×10^3	1×10^7
Zinc (30)				
Zn-65	2×10^0	2×10^0	1×10^1	1×10^6
Zn-69	3×10^0	6×10^{-1}	1×10^4	1×10^6
Zn-69m (a)	3×10^0	6×10^{-1}	1×10^2	1×10^6
Zirconium (40)				
Zr-88	3×10^0	3×10^0	1×10^2	1×10^6
Zr-93	Unlimited	Unlimited	1×10^3 (b)	1×10^7 (b)
Zr-95 (a)	2×10^0	8×10^{-1}	1×10^1	1×10^6
Zr-97 (a)	4×10^{-1}	4×10^{-1}	1×10^1 (b)	1×10^5 (b)

(a) A_1 and/or A_2 values for these parent radionuclides include contributions from their progeny with half-lives less than 10 days, as listed in the following:

Mg-28	Al-28
Ar-42	K-42
Ca-47	Sc-47
Ti-44	Sc-44
Fe-52	Mn-52m
Fe-60	Co-60m
Zn-69m	Zn-69
Ge-68	Ga-68
Rb-83	Kr-83m
Sr-82	Rb-82
Sr-90	Y-90
Sr-91	Y-91m
Sr-92	Y-92
Y-87	Sr-87m
Zr-95	Nb-95m
Zr-97	Nb-97m, Nb-97
Mo-99	Tc-99m
Tc-95m	Tc-95
Tc-96m	Tc-96
Ru-103	Rh-103m
Ru-106	Rh-106
Pd-103	Rh-103m
Ag-108m	Ag-108
Ag-110m	Ag-110
Cd-115	In-115m
In-114m	In-114
Sn-113	In-113m
Sn-121m	Sn-121
Sn-126	Sb-126m
Te-118	Sb-118

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Te-127m	Te-127
Te-129m	Te-129
Te-131m	Te-131
Te-132	I-132
I-135	Xe-135m
Xe-122	I-122
Cs-137	Ba-137m
Ba-131	Cs-131
Ba-140	La-140
Ce-144	Pr-144m, Pr-144
Pm-148m	Pm-148
Gd-146	Eu-146
Dy-166	Ho-166
Hf-172	Lu-172
W-178	Ta-178
W-188	Re-188
Re-189	Os-189m
Os-194	Ir-194
Ir-189	Os-189m
Pt-188	Ir-188
Hg-194	Au-194
Hg-195m	Hg-195
Pb-210	Bi-210
Pb-212	Bi-212, Tl-208, Po-212
Bi-210m	Tl-206
Bi-212	Tl-208, Po-212
At-211	Po-211
Rn-222	Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Po-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Ra-225	Ac-225, Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ra-226	Rn-222, Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-228	Ac-228
Ac-225	Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ac-227	Fr-223
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Th-234	Pa-234m, Pa-234
Pa-230	Ac-226, Th-226, Fr-222, Ra-222, Rn-218, Po-214
U-230	Th-226, Ra-222, Rn-218, Po-214
U-235	Th-231
Pu-241	U-237
Pu-244	U-240, Np-240m
Am-242m	Am-242, Np-238
Am-243	Np-239
Cm-247	Pu-243
Bk-249	Am-245
Cf-253	Cm-249

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(b) Parent nuclides and their progeny included in secular equilibrium are listed in the following:

Sr-90	Y-90
Zr-93	Nb-93m
Zr-97	Nb-97
Ru-106	Rh-106
Ag-108m	Ag-108
Cs-137	Ba-137m
Ce-144	Pr-144
Ba-140	La-140
Bi-212	Tl-208 (0.36), Po-212 (0.64)
Pb-210	Bi-210, Po-210
Pb-212	Bi-212, Tl-208 (0.36), Po-212 (0.64)
Rn-222	Po-218, Pb-214, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb212, Bi-212, Tl208 (0.36), Po-212 (0.64)
Th-229	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209
Th-nat	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, l208(0.36), Po-212 (0.64)
Th-234	Pa-234m
U-230	Th-226, Ra-222, Rn-218, Po-214
U-232	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
U-235	Th-231
U-238	Th-234, Pa-234m
U-nat	Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
	Np-237 Pa-233
Am-242m	Am-242
Am-243	Np-239

(c) The quantity may be determined from a measurement of the rate of decay or a measurement of the radiation level at a prescribed distance from the source.

(d) These values apply only to compounds of uranium that take the chemical form of UF_6, UO_2F_2 and $UO_2(NO_3)_2$ in both normal and accident conditions of carriage.

(e) These values apply only to compounds of uranium that take the chemical form of UO_3, UF_4, UCl_4 and hexavalent compounds in both normal and accident conditions of carriage.

(f) These values apply to all compounds of uranium other than those specified in (d) and (e) above.

(g) These values apply to unirradiated uranium only.

2.2.7.2.2.2 For individual radionuclides:

(a) Which are not listed in Table 2.2.7.2.2.1 the determination of the basic radionuclide values referred to in 2.2.7.2.2.1 shall require multilateral approval. For these radionuclides, activity concentration limits for exempt material and activity limits for exempt consignments shall be calculated in accordance with the principles established in the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No.115, IAEA, Vienna (1996). It is

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permissible to use an A_2 value calculated using a dose coefficient for the appropriate lung absorption type as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of carriage are taken into consideration. Alternatively, the radionuclide values in Table 2.2.7.2.2.2 may be used without obtaining competent authority approval;

(b) In instruments or articles in which the radioactive material is enclosed or is included as a component part of the instrument or other manufactured article and which meet 2.2.7.2.4.1.3 (c), alternative basic radionuclide values to those in Table 2.2.7.2.2.1 for the activity limit for an exempt consignment are permitted and shall require multilateral approval. Such alternative activity limits for an exempt consignment shall be calculated in accordance with the principles set out in the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No.115, IAEA, Vienna (1996).

Table 2.2.7.2.2.2: Basic radionuclide values for unknown radionuclides or mixtures

Radioactive contents	A_1 (TBq)	A_2 (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for exempt consignments (Bq)
Only beta or gamma emitting nuclides are known to be present	0.1	0.02	1×10^1	1×10^4
Alpha emitting nuclides but no neutron emitters are known to be present	0.2	9×10^{-5}	1×10^{-1}	1×10^3
Neutron emitting nuclides are known to be present or no relevant data are available	0.001	9×10^{-5}	1×10^{-1}	1×10^3

2.2.7.2.2.3 In the calculations of A_1 and A_2 for a radionuclide not in Table 2.2.7.2.2.1, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, shall be considered as a single radionuclide; and the activity to be taken into account and the A_1 or A_2 value to be applied shall be those corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and such daughter nuclides shall be considered as mixtures of different nuclides.

2.2.7.2.2.4 For mixtures of radionuclides, the basic radionuclide values referred to in 2.2.7.2.2.1 may be determined as follows:

$$X_m = \frac{1}{\Sigma_i \frac{f(i)}{X(i)}}$$

where,

f(i) is the fraction of activity or activity concentration of radionuclide i in the mixture;

X(i) is the appropriate value of A_1 or A_2, or the activity concentration limit for exempt material or the activity limit for an exempt consignment as appropriate for the radionuclide i; and

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X_m is the derived value of A_1 or A_2, or the activity concentration limit for exempt material or the activity limit for an exempt consignment in the case of a mixture.

2.2.7.2.2.5 When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest radionuclide value, as appropriate, for the radionuclides in each group may be used in applying the formulas in 2.2.7.2.2.4 and 2.2.7.2.4.4. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.

2.2.7.2.2.6 For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 2.2.7.2.2.2 shall be used.

2.2.7.2.3 *Determination of other material characteristics*

2.2.7.2.3.1 Low specific activity (LSA) material

2.2.7.2.3.1.1 (*Reserved*)

2.2.7.2.3.1.2 LSA material shall be in one of three groups:

(a) LSA-I

(i) uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides;

(ii) natural uranium, depleted uranium, natural thorium or their compounds or mixtures, that are unirradiated and in solid or liquid form;

(iii) radioactive material for which the A_2 value is unlimited. Fissile material may be included only if excepted under 2.2.7.2.3.5;

(iv) other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in 2.2.7.2.2.1 to 2.2.7.2.2.6. Fissile material may be included only if excepted under 2.2.7.2.3.5;

(b) LSA-II

(i) water with tritium concentration up to 0.8 TBq/l;

(ii) other material in which the activity is distributed throughout and the estimated average specific activity does not exceed 10^{-4} A_2/g for solids and gases, and 10^{-5} A_2/g for liquids;

(c) LSA-III - Solids (e.g. consolidated wastes, activated materials), excluding powders that meet the requirements of 2.2.7.2.3.1.3, in which:

(i) the radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen and ceramic);

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(ii) the radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for seven days would not exceed 0.1 A_2; and

(iii) the estimated average specific activity of the solid, excluding any shielding material, does not exceed 2×10^{-3} A_2/g.

2.2.7.2.3.1.3 LSA-III material shall be a solid of such a nature that if the entire contents of a package were subjected to the test specified in 2.2.7.2.3.1.4 the activity in the water would not exceed 0.1 A_2.

2.2.7.2.3.1.4 LSA-III material shall be tested as follows:

A solid material sample representing the entire contents of the package shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6-8 and a maximum conductivity of 1 mS/m at 20 °C. The total activity of the free volume of water shall be measured following the 7 day immersion of the test sample.

2.2.7.2.3.1.5 Demonstration of compliance with the performance standards in 2.2.7.2.3.1.4 shall be in accordance with 6.4.12.1 and 6.4.12.2 of ADR.

2.2.7.2.3.2 Surface contaminated object (SCO)

SCO is classified in one of two groups:

(a) SCO-I: A solid object on which:

(i) the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.4 Bq/cm^2 for all other alpha emitters; and

(ii) the fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4×10^4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 4×10^3 Bq/cm^2 for all other alpha emitters; and

(iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4×10^4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 4×10^3 Bq/cm^2 for all other alpha emitters;

(b) SCO-II: A solid object on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified for SCO-I in (a) above and on which:

(i) the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 400 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 40 Bq/cm^2 for all other alpha emitters; and

(ii) the fixed contamination on the accessible surface, averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 8×10^5 Bq/cm^2 for beta

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and gamma emitters and low toxicity alpha emitters, or 8×10^4 Bq/cm^2 for all other alpha emitters; and

(iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 8×10^5 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 8×10^4 Bq/cm^2 for all other alpha emitters.

2.2.7.2.3.3 Special form radioactive material

2.2.7.2.3.3.1 Special form radioactive material shall have at least one dimension not less than 5 mm. When a sealed capsule constitutes part of the special form radioactive material, the capsule shall be so manufactured that it can be opened only by destroying it. The design for special form radioactive material requires unilateral approval.

2.2.7.2.3.3.2 Special form radioactive material shall be of such a nature or shall be so designed that if it is subjected to the tests specified in 2.2.7.2.3.3.4 to 2.2.7.2.3.3.8, it shall meet the following requirements:

(a) It would not break or shatter under the impact, percussion and bending tests 2.2.7.2.3.3.5 (a), (b), (c), 2.2.7.2.3.3.6 (a) as applicable;

(b) It would not melt or disperse in the applicable heat test 2.2.7.2.3.3.5 (d) or 2.2.7.2.3.3.6 (b) as applicable; and

(c) The activity in the water from the leaching tests specified in 2.2.7.2.3.3.7 and 2.2.7.2.3.3.8 would not exceed 2 kBq; or alternatively for sealed sources, the leakage rate for the volumetric leakage assessment test specified in ISO 9978:1992 “Radiation Protection - Sealed Radioactive Sources - Leakage Test Methods”, would not exceed the applicable acceptance threshold acceptable to the competent authority.

2.2.7.2.3.3.3 Demonstration of compliance with the performance standards in 2.2.7.2.3.3.2 shall be in accordance with 6.4.12.1 and 6.4.12.2 of ADR.

2.2.7.2.3.3.4 Specimens that comprise or simulate special form radioactive material shall be subjected to the impact test, the percussion test, the bending test, and the heat test specified in 2.2.7.2.3.3.5 or alternative tests as authorized in 2.2.7.2.3.3.6. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test shall be performed on the specimen by a method no less sensitive than the methods given in 2.2.7.2.3.3.7 for indispersible solid material or 2.2.7.2.3.3.8 for encapsulated material.

2.2.7.2.3.3.5 The relevant test methods are:

(a) Impact test: The specimen shall drop onto the target from a height of 9 m. The target shall be as defined in 6.4.14 of ADR;

(b) Percussion test: The specimen shall be placed on a sheet of lead which is supported by a smooth solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm. The lead, of hardness number 3.5 to 4.5 on the Vickers scale and not more than 25 mm thick, shall cover an area greater than that covered by the specimen. A fresh surface of lead shall be used for each impact. The bar shall strike the specimen so as to cause maximum damage;

(c) Bending test: The test shall apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen

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shall be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp. The orientation of the specimen shall be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The bar shall strike the specimen so as to cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm;

(d) Heat test: The specimen shall be heated in air to a temperature of 800 °C and held at that temperature for a period of 10 minutes and shall then be allowed to cool.

2.2.7.2.3.3.6 Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:

(a) The tests prescribed in 2.2.7.2.3.3.5 (a) and (b) provided that the specimens are alternatively subjected to the impact test prescribed in ISO 2919:2012: “Radiation Protection - Sealed Radioactive Sources - General requirements and classification”:

(i) The Class 4 impact test if the mass of the special form radioactive material is equal to or less than 200 g;

(ii) The Class 5 impact test if the mass of the special form radioactive material is more than 200 g but less than 500 g;

(b) The test prescribed in 2.2.7.2.3.3.5 (d) provided they are alternatively subjected to the Class 6 temperature test specified in ISO 2919:2012 “Radiation protection - Sealed radioactive sources - General requirements and classification”.

2.2.7.2.3.3.7 For specimens which comprise or simulate indispersible solid material, a leaching assessment shall be performed as follows:

(a) The specimen shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6-8 and a maximum conductivity of 1 mS/m at 20 °C;

(b) The water with specimen shall then be heated to a temperature of (50 ± 5) °C and maintained at this temperature for 4 hours;

(c) The activity of the water shall then be determined;

(d) The specimen shall then be kept for at least 7 days in still air at not less than 30 °C and relative humidity not less than 90%;

(e) The specimen shall then be immersed in water of the same specification as in (a) above and the water with the specimen heated to (50 ± 5) °C and maintained at this temperature for 4 hours;

(f) The activity of the water shall then be determined.

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2.2.7.2.3.3.8 For specimens which comprise or simulate radioactive material enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment shall be performed as follows:

(a) The leaching assessment shall consist of the following steps:

(i) the specimen shall be immersed in water at ambient temperature. The water shall have an initial pH of 6-8 with a maximum conductivity of 1 mS/m at 20 °C;

(ii) the water and specimen shall be heated to a temperature of (50 ± 5) °C and maintained at this temperature for 4 hours;

(iii) the activity of the water shall then be determined;

(iv) the specimen shall then be kept for at least 7 days in still air at not less than 30°C and relative humidity of not less than 90%;

(v) the process in (i), (ii) and (iii) shall be repeated;

(b) The alternative volumetric leakage assessment shall comprise any of the tests prescribed in ISO 9978:1992 “Radiation Protection - Sealed radioactive sources - Leakage test methods”, provided that they are acceptable to the competent authority.

2.2.7.2.3.4 Low dispersible radioactive material

2.2.7.2.3.4.1 The design for low dispersible radioactive material shall require multilateral approval. Low dispersible radioactive material shall be such that the total amount of this radioactive material in a package, taking into account the provisions of 6.4.8.14 of ADR, shall meet the following requirements:

(a) The radiation level at 3 m from the unshielded radioactive material does not exceed 10 mSv/h;

(b) If subjected to the tests specified in 6.4.20.3 and 6.4.20.4 of ADR, the airborne release in gaseous and particulate forms of up to 100 μm aerodynamic equivalent diameter would not exceed 100 A_2. A separate specimen may be used for each test; and

(c) If subjected to the test specified in 2.2.7.2.3.1.4 the activity in the water would not exceed 100 A_2. In the application of this test, the damaging effects of the tests specified in (b) above shall be taken into account.

2.2.7.2.3.4.2 Low dispersible radioactive material shall be tested as follows:

A specimen that comprises or simulates low dispersible radioactive material shall be subjected to the enhanced thermal test specified in 6.4.20.3 of ADR and the impact test specified in 6.4.20.4 of ADR. A different specimen may be used for each of the tests. Following each test, the specimen shall be subjected to the leach test specified in 2.2.7.2.3.1.4. After each test it shall be determined if the applicable requirements of 2.2.7.2.3.4.1 have been met.

2.2.7.2.3.4.3 Demonstration of compliance with the performance standards in 2.2.7.2.3.4.1 and 2.2.7.2.3.4.2 shall be in accordance with 6.4.12.1 and 6.4.12.2 of ADR.

2.2.7.2.3.5 Fissile material

Fissile material and packages containing fissile material shall be classified under the relevant entry as “FISSILE” in accordance with Table 2.2.7.2.1.1 unless excepted by one of the provisions of sub-paragraphs (a) to (f) below and carried subject to the requirements of

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7.1.4.14.7.4.3. All provisions apply only to material in packages that meets the requirements of 6.4.7.2 of ADR unless unpackaged material is specifically allowed in the provision.

(a) Uranium enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the fissile nuclides are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement;

(b) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2;

(c) Uranium with a maximum uranium enrichment of 5% by mass uranium-235 provided:

(i) There is no more than 3.5 g of uranium-235 per package;

(ii) The total plutonium and uranium-233 content does not exceed 1% of the mass of uranium-235 per package;

(iii) Carriage of the package is subject to the consignment limit provided in 7.1.4.14.7.4.3 (c);

(d) Fissile nuclides with a total mass not greater than 2.0 g per package provided the package is carried subject to the consignment limit provided in 7.1.4.14.7.4.3 (d);

(e) Fissile nuclides with a total mass not greater than 45 g either packaged or unpackaged subject to limits provided in 7.1.4.14.7.4.3 (e);

(f) A fissile material that meets the requirements of 7.1.4.14.7.4.3 (b), 2.2.7.2.3.6 and 5.1.5.2.1.

2.2.7.2.3.6 A fissile material excepted from classification as “FISSILE” under 2.2.7.2.3.5 (f) shall be subcritical without the need for accumulation control under the following conditions:

(a) The conditions of 6.4.11.1 (a) of ADR;

(b) The conditions consistent with the assessment provisions stated in 6.4.11.12 (b) and 6.4.11.13 (b) of ADR for packages.

2.2.7.2.4 *Classification of packages or unpacked material*

The quantity of radioactive material in a package shall not exceed the relevant limits for the package type as specified below.

2.2.7.2.4.1 Classification as excepted package

2.2.7.2.4.1.1 A package may be classified as an excepted package if it meets one of the following conditions:

(a) It is an empty package having contained radioactive material;

(b) It contains instruments or articles not exceeding the activity limits specified in columns (2) and (3) of Table 2.2.7.2.4.1.2;

(c) It contains articles manufactured of natural uranium, depleted uranium or natural thorium;

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(d) It contains radioactive material not exceeding the activity limits specified in column (4) of Table 2.2.7.2.4.1.2; or

(e) It contains less than 0.1 kg of uranium hexafluoride not exceeding the activity limits specified in column (4) of Table 2.2.7.2.4.1.2.

2.2.7.2.4.1.2 A package containing radioactive material may be classified as an excepted package provided that the radiation level at any point on its external surface does not exceed 5 μSv/h.

Table 2.2.7.2.4.1.2: Activity limits for excepted packages

Physical state of contents	Instruments or article		Materials
	Item limits [a]	Package limits [a]	Package limits [a]
(1)	(2)	(3)	(4)
Solids			
special form	10^{-2} A_1	A_1	10^{-3} A_1
other form	10^{-2} A_2	A_2	10^{-3} A_2
Liquids	10^{-3} A_2	10^{-1} A_2	10^{-4} A_2
Gases			
Tritium	2×10^{-2} A_2	2×10^{-1} A_2	2×10^{-2} A_2
special form	10^{-3} A_1	10^{-2} A_1	10^{-3} A_1
other forms	10^{-3} A_2	10^{-2} A_2	10^{-3} A_2

[a] *For mixtures of radionuclides, see 2.2.7.2.2.4 to 2.2.7.2.2.6.*

2.2.7.2.4.1.3 Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article may be classified under UN No. 2911 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES provided that:

(a) The radiation level at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h;

(b) Each instrument or manufactured article bears the mark “RADIOACTIVE” on its external surface except for the following:

(i) radioluminescent time-pieces or devices;

(ii) consumer products that have either received regulatory approval in accordance with 1.7.1.4 (e) or do not individually exceed the activity limit for an exempt consignment in Table 2.2.7.2.2.1 (column 5), provided such products are transported in a package that bears the mark “RADIOACTIVE” on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; and

(iii) other instruments or articles too small to bear the mark “RADIOACTIVE”, provided that they are transported in a package that bears the mark “RADIOACTIVE” on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package;

(c) The active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article); and

(d) The limits specified in columns 2 and 3 of Table 2.2.7.2.4.1.2 are met for each individual item and each package, respectively.

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2.2.7.2.4.1.4 Radioactive material in forms other than as specified in 2.2.7.2.4.1.3 and with an activity not exceeding the limits specified in column 4 of Table 2.2.7.2.4.1.2, may be classified under UN No. 2910 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL provided that:

(a) The package retains its radioactive contents under routine conditions of carriage; and

(b) The package bears the mark “RADIOACTIVE” on either:

(i) An internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; or

(ii) The outside of the package, where it is impractical to mark an internal surface.

2.2.7.2.4.1.5 Uranium hexafluoride not exceeding the limits specified in Column 4 of Table 2.2.7.2.4.1.2 may be classified under UN 3507 URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, less than 0.1 kg per package, non-fissile or fissile-excepted provided that:

(a) The mass of uranium hexafluoride in the package is less than 0.1 kg;

(b) The conditions of 2.2.7.2.4.5.2 and 2.2.7.2.4.1.4 (a) and (b) are met.

2.2.7.2.4.1.6 Articles manufactured of natural uranium, depleted uranium or natural thorium and articles in which the sole radioactive material is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be classified under UN No. 2909 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM, provided that the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.

2.2.7.2.4.1.7 An empty packaging which had previously contained radioactive material may be classified under UN No. 2908 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING, provided that:

(a) It is in a well-maintained condition and securely closed;

(b) The outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material;

(c) The level of internal non-fixed contamination, when averaged over any 300 cm^2, does not exceed:

(i) 400 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters; and

(ii) 40 Bq/cm^2 for all other alpha emitters; and

(d) Any labels which may have been displayed on it in conformity with 5.2.2.1.11.1 are no longer visible.

2.2.7.2.4.2 Classification as Low specific activity (LSA) material

Radioactive material may only be classified as LSA material if the definition of LSA in 2.2.7.1.3 and the conditions of 2.2.7.2.3.1, 4.1.9.2 and 7.5.11 CV33 (2) of ADR are met.

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2.2.7.2.4.3 Classification as Surface contaminated object (SCO)

Radioactive material may be classified as SCO if the definition of SCO in 2.2.7.1.3 and the conditions of 2.2.7.2.3.2, 4.1.9.2 and 7.5.11 CV33 (2) of ADR are met.

2.2.7.2.4.4 Classification as Type A package

Packages containing radioactive material may be classified as Type A packages provided that the following conditions are met:

Type A packages shall not contain activities greater than either of the following:

(a) For special form radioactive material - A_1;

(b) For all other radioactive material - A_2.

For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the radioactive contents of a Type A package:

$$\Sigma_i \frac{B(i)}{A_1(i)} + \Sigma_j \frac{C(j)}{A_2(j)} \leq 1$$

where B(i) is the activity of radionuclide i as special form radioactive material;

$A_1(i)$ is the A_1 value for radionuclide i;

C (j) is the activity of radionuclide j as other than special form radioactive material;

A_2 (j) is the A_2 value for radionuclide j.

2.2.7.2.4.5 *Classification of uranium hexafluoride*

2.2.7.2.4.5.1 Uranium hexafluoride shall only be assigned to:

(a) UN No. 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE;

(b) UN No. 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted; or

(c) UN No. 3507, URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE less than 0.1 kg per package, non-fissile or fissile-excepted.

2.2.7.2.4.5.2 The contents of a package containing uranium hexafluoride shall comply with the following requirements:

(a) For UN Nos. 2977 and 2978, the mass of uranium hexafluoride shall not be different from that allowed for the package design, and for UN No. 3507, the mass of uranium hexafluoride shall be less than 0.1 kg;

(b) The mass of uranium hexafluoride shall not be greater than a value that would lead to an ullage smaller than 5% at the maximum temperature of the package as specified for the plant systems where the package shall be used; and

(c) The uranium hexafluoride shall be in solid form and the internal pressure shall not be above atmospheric pressure when presented for carriage.

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2.2.7.2.4.6 Classification as Type B(U), Type B(M) or Type C packages

2.2.7.2.4.6.1 Packages not otherwise classified in 2.2.7.2.4 (2.2.7.2.4.1 to 2.2.7.2.4.5) shall be classified in accordance with the competent authority certificate of approval for the package issued by the country of origin of design.

2.2.7.2.4.6.2 The contents of a Type B(U), Type B(M) or Type C package shall be as specified in the certificate of approval.

2.2.7.2.5 *Special arrangements*

Radioactive material shall be classified as transported under special arrangement when it is intended to be carried in accordance with 1.7.4.

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2.2.8 Class 8 Corrosive substances

2.2.8.1 *Definition, general provisions and criteria*

2.2.8.1.1 Corrosive substances are substances which, by chemical action, will cause irreversible damage to the skin, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport. The heading of this class also covers other substances which form a corrosive liquid only in the presence of water, or which produce corrosive vapour or mist in the presence of natural moisture of the air.

2.2.8.1.2 For substances and mixtures that are corrosive to skin, general classification provisions are provided in 2.2.8.1.4. Skin corrosion refers to the production of irreversible damage to the skin, namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.

2.2.8.1.3 Liquids and solids which may become liquid during carriage, which are judged not to be skin corrosive shall still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 2.2.8.1.5.3 (c) (ii).

2.2.8.1.4 *General classification provisions*

2.2.8.1.4.1 Substances and articles of Class 8 are subdivided as follows:

C1-C11 Corrosive substances without subsidiary hazard and articles containing such substances:

C1-C4 Acid substances:
- C1 Inorganic, liquid;
- C2 Inorganic, solid;
- C3 Organic, liquid;
- C4 Organic, solid;

C5-C8 Basic substances:
- C5 Inorganic, liquid;
- C6 Inorganic, solid;
- C7 Organic, liquid;
- C8 Organic, solid;

C9-C10 Other corrosive substances:
- C9 Liquid;
- C10 Solid;

C11 Articles.

CF Corrosive substances, flammable:
- CF1 Liquid;
- CF2 Solid;

CS Corrosive substances, self-heating:
- CS1 Liquid;
- CS2 Solid;

CW Corrosive substances which, in contact with water, emit flammable gases:
- CW1 Liquid;
- CW2 Solid;

CO Corrosive substances, oxidizing:
- CO1 Liquid;

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CO2 Solid;

CT Corrosive substances, toxic and articles containing such substances:
CT1 Liquid;
CT2 Solid;
CT3 Articles;

CFT Corrosive substances, flammable, liquid, toxic;
COT Corrosive substances, oxidizing, toxic.

Classification and assignment of packing groups

2.2.8.1.4.2 Substances and mixtures of Class 8 are divided among the three packing groups according to their degree of danger in carriage:

(a) Packing group I: very dangerous substances and mixtures;

(b) Packing group II: substances and mixtures presenting medium danger;

(c) Packing group III: substances and mixtures that present minor danger.

2.2.8.1.4.3 Allocation of substances listed in Table A of Chapter 3.2 to the packing groups in Class 8 has been made on the basis of experience taking into account such additional factors as inhalation risk (see 2.2.8.1.4.5) and reactivity with water (including the formation of dangerous decomposition products).

2.2.8.1.4.4 New substances and mixtures can be assigned to packing groups on the basis of the length of time of contact necessary to produce irreversible damage of intact skin tissue in accordance with the criteria in 2.2.8.1.5. Alternatively, for mixtures, the criteria in 2.2.8.1.6 can be used.

2.2.8.1.4.5 A substance or mixture meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC_{50}) in the range of packing group I, but toxicity through oral ingestion or dermal contact only in the range of packing group III or less, shall be allocated to Class 8 (see 2.2.61.1.7.2).

2.2.8.1.5 *Packing group assignment for substances and mixtures*

2.2.8.1.5.1 Existing human and animal data including information from single or repeated exposure shall be the first line of evaluation, as they give information directly relevant to effects on the skin.

2.2.8.1.5.2 In assigning the packing group in accordance with 2.2.8.1.4.4, account shall be taken of human experience in instances of accidental exposure. In the absence of human experience the assignment shall be based on data obtained from experiments in accordance with OECD Test Guideline 404[5] or 435[6]. A substance or mixture which is determined not to be corrosive in accordance with OECD Test Guideline 430[7] or 431[8] may be considered not to be corrosive to skin for the purposes of ADN without further testing.

2.2.8.1.5.3 Packing groups are assigned to corrosive substances in accordance with the following criteria (see table 2.2.8.1.5.3):

---

[5] *OECD Guideline for the testing of chemicals No. 404 "Acute Dermal Irritation/Corrosion" 2015*

[6] *OECD Guideline for the testing of chemicals No. 435 "In Vitro Membrane Barrier Test Method for Skin Corrosion" 2015*

[7] *OECD Guideline for the testing of chemicals No. 430 "In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test (TER)" 2015*

[8] *OECD Guideline for the testing of chemicals No. 431 "In Vitro Skin Corrosion: Human Skin Model Test" 2015*

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(a) Packing group I is assigned to substances that cause irreversible damage of intact skin tissue within an observation period up to 60 minutes starting after the exposure time of three minutes or less;

(b) Packing group II is assigned to substances that cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than three minutes but not more than 60 minutes;

(c) Packing group III is assigned to substances that:

(i) Cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than 60 minutes but not more than 4 hours; or

(ii) Are judged not to cause irreversible damage of intact skin tissue but which exhibit a corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55 °C when tested on both materials. For the purposes of testing steel, type S235JR+CR (1.0037 resp. St 37-2), S275J2G3+CR (1.0144 resp. St 44-3), ISO 3574 or Unified Numbering System (UNS) G10200 or a similar type or SAE 1020, and for testing aluminium, non-clad, types 7075–T6 or AZ5GU-T6 shall be used. An acceptable test is prescribed in the Manual of Tests and Criteria, Part III, Section 37.

NOTE: *Where an initial test on either steel or aluminium indicates the substance being tested is corrosive the follow up test on the other metal is not required.*

Table 2.2.8.1.5.3: Table summarizing the criteria in 2.2.8.1.5.3

Packing Group	Exposure Time	Observation Period	Effect
I	≤ 3 min	≤ 60 min	Irreversible damage of intact skin
II	> 3 min ≤ 1 h	≤ 14 d	Irreversible damage of intact skin
III	> 1 h ≤ 4 h	≤ 14 d	Irreversible damage of intact skin
III	-	-	Corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55 ºC when tested on both materials

2.2.8.1.6 *Alternative packing group assignment methods for mixtures: Step-wise approach*

2.2.8.1.6.1 General provisions

For mixtures it is necessary to obtain or derive information that allows the criteria to be applied to the mixture for the purpose of classification and assignment of packing groups. The approach to classification and assignment of packing groups is tiered, and is dependent upon the amount of information available for the mixture itself, for similar mixtures and/or for its ingredients. The flow chart of Figure 2.2.8.1.6.1 below outlines the process to be followed:

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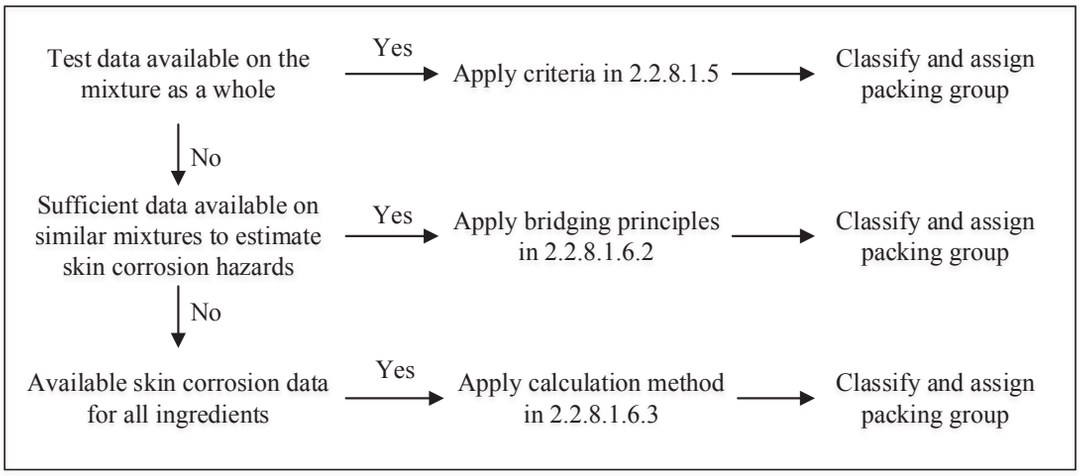
Figure 2.2.8.1.6.1: Step-wise approach to classify and assign packing group of corrosive mixtures



2.2.8.1.6.2 Bridging principles

Where a mixture has not been tested to determine its skin corrosion potential, but there are sufficient data on both the individual ingredients and similar tested mixtures to adequately classify and assign a packing group for the mixture, these data will be used in accordance with the following bridging principles. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture.

(a) Dilution: If a tested mixture is diluted with a diluent which does not meet the criteria for Class 8 and does not affect the packing group of other ingredients, then the new diluted mixture may be assigned to the same packing group as the original tested mixture.

NOTE: *In certain cases, diluting a mixture or substance may lead to an increase in the corrosive properties. If this is the case, this bridging principle cannot be used.*

(b) Batching: The skin corrosion potential of a tested production batch of a mixture can be assumed to be substantially equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the skin corrosion potential of the untested batch has changed. If the latter occurs, a new classification is necessary.

(c) Concentration of mixtures of packing group I: If a tested mixture meeting the criteria for inclusion in packing group I is concentrated, the more concentrated untested mixture may be assigned to packing group I without additional testing.

(d) Interpolation within one packing group: For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same skin corrosion packing group, and where untested mixture C has the same Class 8 ingredients as mixtures A and B but has concentrations of Class 8 ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same skin corrosion packing group as A and B.

(e) Substantially similar mixtures: Given the following:

(i) Two mixtures: (A+B) and (C+B);

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(ii) The concentration of ingredient B is the same in both mixtures;

(iii) The concentration of ingredient A in mixture (A+B) equals the concentration of ingredient C in mixture (C+B);

(iv) Data on skin corrosion for ingredients A and C are available and substantially equivalent, i.e. they are the same skin corrosion packing group and do not affect the skin corrosion potential of B.

If mixture (A+B) or (C+B) is already classified based on test data, then the other mixture may be assigned to the same packing group.

2.2.8.1.6.3 Calculation method based on the classification of the substances

2.2.8.1.6.3.1 Where a mixture has not been tested to determine its skin corrosion potential, nor is sufficient data available on similar mixtures, the corrosive properties of the substances in the mixture shall be considered to classify and assign a packing group.

Applying the calculation method is only allowed if there are no synergistic effects that make the mixture more corrosive than the sum of its substances. This restriction applies only if packing group II or III would be assigned to the mixture.

2.2.8.1.6.3.2 When using the calculation method, all Class 8 ingredients present at a concentration of ≥ 1% shall be taken into account, or < 1% if these ingredients are still relevant for classifying the mixture to be corrosive to skin.

2.2.8.1.6.3.3 To determine whether a mixture containing corrosive substances shall be considered a corrosive mixture and to assign a packing group, the calculation method in the flow chart in Figure 2.2.8.1.6.3 shall be applied.

2.2.8.1.6.3.4 When a specific concentration limit (SCL) is assigned to a substance following its entry in Table A of Chapter 3.2 or in a special provision, this limit shall be used instead of the generic concentration limits (GCL). This appears where 1% is used in the first step for the assessment of the packing group I substances, and where 5% is used for the other steps respectively in Figure 2.2.8.1.6.3.

2.2.8.1.6.3.5 For this purpose, the summation formula for each step of the calculation method shall be adapted. This means that, where applicable, the generic concentration limit shall be substituted by the specific concentration limit assigned to the substance(s) (SCL_i), and the adapted formula is a weighted average of the different concentration limits assigned to the different substances in the mixture:

$$\frac{PGx_1}{GCL} + \frac{PGx_2}{SCL_2} + \cdots + \frac{PGx_i}{SCL_i} \geq 1$$

Where:

PG x_i = concentration of substance 1, 2 …i in the mixture, assigned to packing group x (I, II or III)

GCL = generic concentration limit

SCL_i = specific concentration limit assigned to substance i

The criterion for a packing group is fulfilled when the result of the calculation is ≥ 1. The generic concentration limits to be used for the evaluation in each step of the calculation method are those found in Figure 2.2.8.1.6.3.

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Examples for the application of the above formula can be found in the note below.

NOTE: *Examples for the application of the above formula*

Example 1: A mixture contains one corrosive substance in a concentration of 5% assigned to packing group I without a specific concentration limit:

Calculation for packing group I: $\frac{5}{5\ (GCL)} = 1$ ➔ *assign to Class 8, packing group I.*

Example 2: A mixture contains three substances corrosive to skin; two of them (A and B) have specific concentration limits; for the third one (C) the generic concentration limit applies. The rest of the mixture needs not to be taken into consideration:

Substance X in the mixture and its packing group assignment within Class 8	Concentration (conc) in the mixture in %	Specific concentration limit (SCL) for packing group I	Specific concentration limit (SCL) for packing group II	Specific concentration limit (SCL) for packing group III
A, assigned to packing group I	3	30%	none	none
B, assigned to packing group I	2	20%	10%	none
C, assigned to packing group III	10	none	none	none

Calculation for packing group I: $\frac{3\ (conc\ A)}{30\ (SCL\ PGI)} + \frac{2\ (conc\ B)}{20\ (SCL\ PGI)} = 0{,}2 < 1$

The criterion for packing group I is not fulfilled.

Calculation for packing group II: $\frac{3\ (conc\ A)}{5\ (GCL\ PG\ II)} + \frac{2\ (conc\ B)}{10\ (SCL\ PG\ II)} = 0{,}8 < 1$

The criterion for packing group II is not fulfilled.

Calculation for packing group III: $\frac{3\ (conc\ A)}{5\ (GCL\ PGIII)} + \frac{2\ (conc\ B)}{5\ (GCL\ PG\ III)} + \frac{10\ (conc\ C)}{5\ GCL\ PG\ III)} = 3 \geq 1$

The criterion for packing group III is fulfilled, the mixture shall be assigned to Class 8, packing group III.

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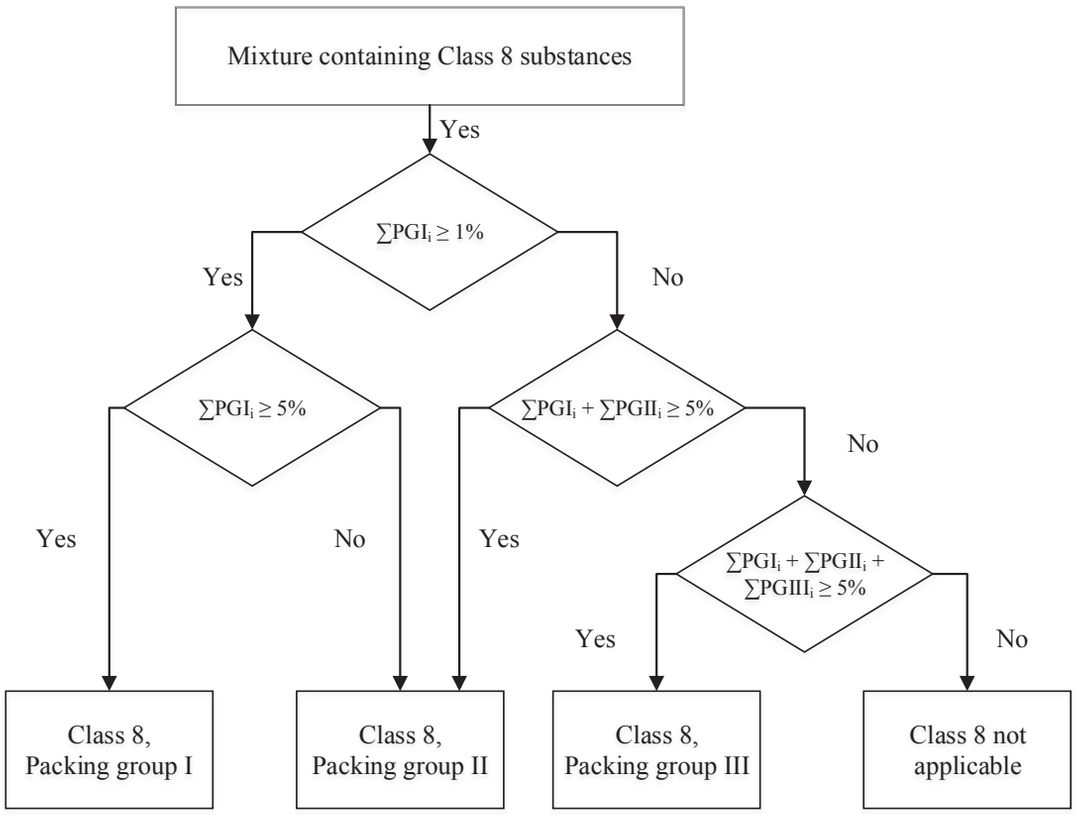
Figure 2.2.8.1.6.3: Calculation method



2.2.8.1.7 If substances of Class 8, as a result of admixtures, come into categories of risk different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong, on the basis of their actual degree of danger.

NOTE: *For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.*

2.2.8.1.8 On the basis of the criteria set out in paragraph 2.2.8.1.6, it may also be determined whether the nature of a solution or mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the provisions for this class.

2.2.8.1.9 *(Deleted)*

NOTE*: UN No. 1910 calcium oxide and UN No. 2812 sodium aluminate, listed in the UN Model Regulations, are not subject to the provisions of ADN.*

2.2.8.2 *Substances not accepted for carriage*

2.2.8.2.1 Chemically unstable substances of Class 8 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions.

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2.2.8.2.2 The following substances shall not be accepted for carriage:

– UN No. 1798 NITROHYDROCHLORIC ACID;

– chemically unstable mixtures of spent sulphuric acid;

– chemically unstable mixtures of nitrating acid or mixtures of residual sulphuric and nitric acids, not denitrated;

– perchloric acid aqueous solution with more than 72 % pure acid, by mass, or mixtures of perchloric acid with any liquid other than water.

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2.2.8.3 *List of collective entries*

Corrosive substances without subsidiary hazard and articles containing such substances

Acid	**inorganic**	**liquid**	**C1**	2584 ALKYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid or 2584 ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid 2693 BISULPHITES, AQUEOUS SOLUTION, N.O.S. 2837 BISULPHATES, AQUEOUS SOLUTION 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
		solid	**C2**	1740 HYDROGENDIFLUORIDES, SOLID, N.O.S. 2583 ALKYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid or 2583 ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid 3260 CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
C1-C4	**organic**	**liquid**	**C3**	2586 ALKYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid or 2586 ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid 2987 CHLOROSILANES, CORROSIVE, N.O.S. 3145 ALKYLPHENOLS, LIQUID, N.O.S. (including C_2-C_{12} homologues) 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S
		solid	**C4**	2430 ALKYLPHENOLS, SOLID, N.O.S. (including C_2-C_{12} homologues) 2585 ALKYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid or 2585 ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid 3261 CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
Basic	**inorganic**	**liquid**	**C5**	1719 CAUSTIC ALKALI LIQUID, N.O.S. 2797 BATTERY FLUID, ALKALI 3266 CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
		solid	**C6**	3262 CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.
C5-C8	**organic**	**liquid**	**C7**	2735 AMINES, LIQUID, CORROSIVE, N.O.S. or 2735 POLYAMINES, LIQUID, CORROSIVE, N.O.S. 3267 CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.
		solid	**C8**	3259 AMINES, SOLID, CORROSIVE, N.O.S., or 3259 POLYAMINES, SOLID, CORROSIVE, N.O.S. 3263 CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.
Other corrosive substances		**liquid**	**C9**	1903 DISINFECTANT, LIQUID, CORROSIVE, N.O.S 2801 DYE, LIQUID, CORROSIVE, N.O.S. or 2801 DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S. 3066 PAINT (including paint, enamel, stain, shellac, varnish, polish, liquid filler and lacquer base) or 3066 PAINT RELATED MATERIAL (including paint thinning or reducing compound) 1760 CORROSIVE LIQUID, N.O.S.
C9-C10		**solid** [a]	**C10**	3147 DYE, SOLID, CORROSIVE, N.O.S. or 3147 DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S. 3244 SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S. 1759 CORROSIVE SOLID, N.O.S.
Articles			**C11**	1774 FIRE EXTINGUISHER CHARGES, corrosive liquid 2028 BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device 2794 BATTERIES, WET, FILLED WITH ACID, electric storage 2795 BATTERIES, WET, FILLED WITH ALKALI, electric storage 2800 BATTERIES, WET, NON-SPILLABLE, electric storage 3028 BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage 3477 FUEL CELL CARTRIDGES containing corrosive substances, or 3477 FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing corrosive substances, or 3477 FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances 3547 ARTICLES CONTAINING CORROSIVE SUBSTANCE, N.O.S.

(cont'd on next page)

[a] *Mixtures of solids which are not subject to the provisions of ADN and of corrosive liquids may be carried under UN No. 3244 without being subject to the classification criteria of Class 8, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. Each packaging shall correspond to a design type which has passed the leakproofness test for Packing group II level.*

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Corrosive substances with subsidiary hazard(s) and articles containing such substances

(cont'd)	**liquid**	**CF1**	3470 PAINT, CORROSIVE, FLAMMABLE (including paint, enamel, stain, shellac, varnish, polish, liquid filler and lacquer base) or 3470 PAINT RELATED MATERIAL, CORROSIVE, FLAMMABLE (including paint thinning or reducing compound) 2734 AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or 2734 POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. 2986 CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S. 2920 CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Flammable [b] **CF**	**solid**	**CF2**	2921 CORROSIVE SOLID, FLAMMABLE, N.O.S.
Self-heating CS	**liquid**	**CS1**	3301 CORROSIVE LIQUID, SELF-HEATING, N.O.S.
	solid	**CS2**	3095 CORROSIVE SOLID, SELF-HEATING, N.O.S.
Water-reactive CW	**liquid** [b]	**CW1**	3094 CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.
	solid	**CW2**	3096 CORROSIVE SOLID, WATER-REACTIVE, N.O.S.
Oxidizing CO	**liquid**	**CO1**	3093 CORROSIVE LIQUID, OXIDIZING, N.O.S.
	solid	**CO2**	3084 CORROSIVE SOLID, OXIDIZING, N.O.S.
Toxic [d] **CT**	**liquid** [c]	**CT1**	3471 HYDROGENDIFLUORIDES SOLUTION, N.O.S. 2922 CORROSIVE LIQUID, TOXIC, N.O.S.
	solid [e]	**CT2**	2923 CORROSIVE SOLID, TOXIC, N.O.S.
	articles	**CT3**	3506 MERCURY CONTAINED IN MANUFACTURED ARTICLES
Flammable, liquid, toxic [d]		**CFT**	No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to table of precedence of hazards in 2.1.3.10.
Oxidizing, toxic [d, e]		**COT**	No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to table of precedence of hazards in 2.1.3.10.

[b] *Chlorosilanes which, in contact with water or moist air, emit flammable gases, are substances of Class 4.3.*

[c] *Chloroformates having predominantly toxic properties are substances of Class 6.1.*

[d] *Corrosive substances which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9 are substances of Class 6.1.*

[e] *UN No. 2505 AMMONIUM FLUORIDE, UN No. 1812 POTASSIUM FLUORIDE, UN No. 1690 SODIUM FLUORIDE, SOLD, UN No. 2674 SODIUM FLUOROSILICATE, UN No. 2856 FLUOROSILICATES, N.O.S. , UN No. 3415 SODIUM FLUORIDE SOLUTION and UN No. 3422 POTASSIUM FLUORIDE SOLUTION are substances of Class 6.1.*

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2.2.9 Class 9 Miscellaneous dangerous substances and articles

2.2.9.1 *Criteria*

2.2.9.1.1 The heading of Class 9 covers substances and articles which, during carriage, present a danger not covered by the heading of other classes.

2.2.9.1.2 The substances and articles of Class 9 are subdivided as follows:

M1 Substances which, on inhalation as fine dust, may endanger health;

M2 Substances and articles which, in the event of fire, may form dioxins;

M3 Substances evolving flammable vapour;

M4 Lithium batteries;

M5 Life-saving appliances;

M6-M8 Environmentally hazardous substances:

M6 Pollutant to the aquatic environment, liquid;
M7 Pollutant to the aquatic environment, solid;
M8 Genetically modified micro-organisms and organisms;

M9-M10 Elevated temperature substances:

M9 Liquid;
M10 Solid;

M11 Other substances and articles presenting a danger during carriage, but not meeting the definitions of another class.

Definitions and classification

2.2.9.1.3 Substances and articles classified in Class 9 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of that Table or of sub-section 2.2.9.3 shall be done in accordance with 2.2.9.1.4 to 2.2.9.1.8, 2.2.9.1.10, 2.2.9.1.11, 2.2.9.1.13 and 2.2.9.1.14 below.

Substances which, on inhalation as fine dust, may endanger health

2.2.9.1.4 Substances which, on inhalation as fine dust, may endanger health include asbestos and mixtures containing asbestos.

Substances and articles which, in the event of fire, may form dioxins

2.2.9.1.5 Substances and articles which, in the event of fire, may form dioxins include polychlorinated biphenyls (PCBs) and terphenyls (PCTs) and polyhalogenated biphenyls and terphenyls and mixtures containing these substances, as well as articles such as transformers, condensers and articles containing those substances or mixtures.

NOTE: *Mixtures with a PCB or PCT content of not more than 50 mg/kg are not subject to the provisions of ADN.*

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Substances evolving flammable vapour

2.2.9.1.6 Substances evolving flammable vapour include polymers containing flammable liquids with a flash-point not exceeding 55 °C.

Lithium batteries

2.2.9.1.7 Lithium batteries shall meet the following requirements, except when otherwise provided for in ADN (e.g. for prototype batteries and small production runs under special provision 310 or damaged batteries under special provision 376).

NOTE: *For UN 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT, see special provision 389 in Chapter 3.3.*

Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment, containing lithium in any form shall be assigned to UN Nos. 3090, 3091, 3480 or 3481 as appropriate. They may be carried under these entries if they meet the following provisions:

(a) Each cell or battery is of the type proved to meet the requirements of each test of the *Manual of Tests and Criteria*, Part III, sub-section 38.3;

NOTE: *Batteries shall be of a design type proved to meet the testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3, irrespective of whether the cells of which they are composed are of a tested type.*

(b) Each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under normal conditions of carriage;

(c) Each cell and battery is equipped with an effective means of preventing external short circuits;

(d) Each battery containing cells or series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.);

(e) Cells and batteries shall be manufactured under a quality management programme that includes:

(i) description of the organizational structure and responsibilities of personnel with regard to design and product quality;

(ii) The relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;

(iii) Process controls that should include relevant activities to prevent and detect internal short circuit failure during manufacture of cells;

(iv) Quality records, such as inspection reports, test data, calibration data and certificates. Test data shall be kept and made available to the competent authority upon request;

(v) Management reviews to ensure the effective operation of the quality management programme;

(vi) A process for control of documents and their revision;

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(vii) A means for control of cells or batteries that are not conforming to the type tested as mentioned in (a) above;

(viii) Training programmes and qualification procedures for relevant personnel; and

(ix) Procedures to ensure that there is no damage to the final product.

NOTE: *In-house quality management programmes may be accepted. Third party certification is not required, but the procedures listed in (i) to (ix) above shall be properly recorded and traceable. A copy of the quality management programme shall be made available to the competent authority upon request.*

(f) Lithium batteries, containing both primary lithium metal cells and rechargeable lithium ion cells, that are not designed to be externally charged (see special provision 387 of Chapter 3.3) shall meet the following conditions:

(i) The rechargeable lithium ion cells can only be charged from the primary lithium metal cells;

(ii) Overcharge of the rechargeable lithium ion cells is precluded by design;

(iii) The battery has been tested as a lithium primary battery;

(iv) Component cells of the battery shall be of a type proved to meet the respective testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3;

(g) Manufacturers and subsequent distributors of cells or batteries manufactured after 30 June 2003 shall make available the test summary as specified in the Manual of Tests and Criteria, Part III, sub-section 38.3, paragraph 38.3.5.

Lithium batteries are not subject to the provisions of ADN if they meet the requirements of special provision 188 of Chapter 3.3.

Life-saving appliances

2.2.9.1.8 Life-saving appliances include life-saving appliances and motor vehicle components which meet the descriptions of special provisions 235 or 296 of Chapter 3.3.

Environmentally hazardous substances

2.2.9.1.9 *(Deleted)*

Pollutants to the aquatic environment

2.2.9.1.10 *Environmentally hazardous substances (aquatic environment)*

2.2.9.1.10.1 For carriage in packages or in bulk, substances, solutions and mixtures meeting the criteria for Acute 1, Chronic 1 or Chronic 2 in Chapter 2.4 (see also 2.1.3.8) shall be considered to be environmentally hazardous (aquatic environment). Substances which cannot be assigned to other classes in ADN or to other Class 9 entries and which meet these criteria shall be assigned to UN Nos. 3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., or 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S, and to packing group III.

2.2.9.1.10.2 For carriage in tank vessels, the substances, solutions and mixtures referred to in 2.2.9.1.10.1 and those meeting the criteria for Acute 2, Acute 3 or Chronic 3 in Chapter 2.4 shall be considered to be environmentally hazardous.

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Substances classified as environmentally hazardous which meet the criteria for Acute or Chronic Category 1 shall be assigned to group 'N1'.

Substances classified as environmentally hazardous which meet the criteria for Chronic Categories 2 or 3 shall be assigned to group 'N2'.

Substances classified as environmentally hazardous which meet the criteria for Acute Categories 2 or 3 shall be assigned to group 'N3'.

Substances which meet the criteria of 2.2.9.1.10.1 shall be assigned to UN Nos. 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S, or 3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., MOLTEN. Those that meet the additional criteria in this paragraph shall be assigned to identification Nos. 9005, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S, MOLTEN, or 9006, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

2.2.9.1.10.3 Substances or mixtures classified as environmentally hazardous substances (aquatic environment) on the basis of Regulation 1272/2008/EC[3]

Notwithstanding the provisions of 2.2.9.1.10.1, if data for classification according to the criteria of 2.4.3 and 2.4.4 are not available, a substance or mixture:

(a) Shall be classified as an environmentally hazardous substance (aquatic environment) if it has to be assigned category(ies) Aquatic Acute 1, Aquatic Chronic 1 or Aquatic Chronic 2 according to Regulation 1272/2008/EC[3];

(b) May be regarded as not being an environmentally hazardous substance (aquatic environment) for carriage in packages or in bulk in the sense of 2.2.9.10.1 if it does not have to be assigned such a category according to the said Regulation.

2.2.9.1.10.4 (*Reserved*)

2.2.9.1.10.5 For carriage in tank vessels, substances, solutions and mixtures are considered as floating substances, solutions and mixtures (floaters) if they meet the following criteria: [9]

Water solubility	< 0.1%
Vapour pressure	< 0.3 kPa
Relative density	≤ 1,000.

For carriage in tank vessels, substances, solutions and mixtures are considered as substances, solutions and mixtures that sink (sinkers) if they meet the following criteria: [9]

Water solubility	< 0.1%
Relative density	> 1,000.

Genetically modified micro-organisms or organisms

2.2.9.1.11 Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs) are micro-organisms and organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally. They are assigned to Class 9 (UN No. 3245) if they do not meet the definition of toxic substances or infectious

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[3] *Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directive 67/548/EEC and 1999/45/EC; and amending Regulation (EC) No 1907/2006, published in the Official Journal of the European Union, L 353, 31 December 2008, p 1-1355.*

[9] *The values of relative density, vapour pressure and water solubility to be used according to the GESAMP model are the values at 20°C.*

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substances, but are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction.

NOTE 1: *GMMOs and GMOs which are infectious are substances of Class 6.2, UN Nos. 2814, 2900 or 3373).*

NOTE 2: *GMMOs or GMOs are not subject to the provisions of ADN when authorized for use by the competent authorities of the countries of origin, transit and destination.* [10]

NOTE 3: *Genetically modified live animals which, in accordance with the current state of scientific knowledge, have no known pathogenic effect on humans, animals and plants and are carried in receptacles that are suitable for safely preventing both the escape of the animals and unauthorized access to them, are not subject to the provisions of ADN. The provisions specified by the International Air Transport Association (IATA) for air transport "Live Animals Regulations, LAR" can be drawn on as guidelines for suitable receptacles for the transport of live animals.*

NOTE 4: *Live animals shall not be used to carry genetically modified micro-organisms classified in Class 9 unless the substance can be carried no other way. Genetically modified live animals shall be carried under terms and conditions of the competent authorities of the countries of origin and destination.*

2.2.9.1.12 (*Deleted*)

Elevated temperature substances

2.2.9.1.13 Elevated temperature substances include substances which are carried or handed over for carriage in the liquid state at or above 100 °C and, in the case of those with a flash-point, below their flash-point. They also include solids which are carried or handed over for carriage at or above 240 °C.

NOTE 1: *Elevated temperature substances may be assigned to Class 9 only if they do not meet the criteria of any other class.*

NOTE 2: *Substances having a flash-point above 60 °C which are carried or handed over for carriage within a range of 15 K below the flash-point are substances of Class 3, identification number 9001.*

Other substances and articles presenting a danger during carriage but not meeting the definitions of another class

2.2.9.1.14 The following other miscellaneous substances not meeting the definitions of another class are assigned to Class 9:

Solid ammonia compounds having a flash-point below 60 °C
Low hazard dithionites
Highly volatile liquids
Substances emitting noxious fumes
Substances containing allergens
Chemical kits and first aid kits
Electric double layer capacitors (with an energy storage capacity greater than 0.3 Wh).
Vehicles, engines and machinery, internal combustion.

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[10] *See Part C of Directive 2001/18/EC of the European Parliament and of the Council on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC (Official Journal of the European Communities, No. L 106, of 17 April 2001, pp 8-14) and Regulation (EC) No. 1829/2003 of the European Parliament and of the Council on genetically modified food and feed (Official Journal of the European Union, No. L 268, of 18 October 2003, pp 1-23), which set out the authorization procedures for the European Union.*

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Articles containing miscellaneous dangerous goods

The following miscellaneous substances not meeting the definition of another class are assigned to Class 9 when they are carried in bulk or in tank vessels:

– UN 2071 AMMONIUM NITRATE BASED FERTILIZERS;

***NOTE**: Solid ammonium nitrate based fertilizers shall be classified in accordance with the procedures as set out in the Manual of Tests and Criteria, Part III, Section 39.*

– UN 2216 FISH MEAL, STABILIZED (humidity between 5% by mass and 12% by mass with not more than 15% fat by mass); or

– UN 2216 FISH SCRAP, STABILIZED (humidity between 5% by mass and 12% by mass with not more than 15% fat by mass);

– Identification No. 9003 SUBSTANCES HAVING A FLASH-POINT ABOVE 60 °C AND NOT MORE THAN 100 °C which cannot be assigned to another class or another entry of Class 9. If these substances can also be assigned to Identification No. 9005 or Identification No. 9006, then Identification No. 9003 shall take precedence.

– Identification No. 9004, 4,4'-DIPHENYLMETHANE DIISOCYANATE;

– Identification No. 9005, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S, MOLTEN, which cannot be assigned to UN No. 3077;

– Identification No. 9006, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., which cannot be assigned to UN No. 3082.

***NOTE:** UN No. 1845 carbon dioxide, solid (dry ice),[11] UN No. 2807 magnetized material, UN No. 3334 aviation regulated liquid, n.o.s. and UN No. 3335 aviation regulated solid, n.o.s., listed in the UN Model Regulations, are not subject to the provisions of ADN.*

Assignment of the packing groups

2.2.9.1.15 When indicated in column 4 of Table A of Chapter 3.2, substances and articles of Class 9 are assigned to one of the following packing groups according to their degree of danger:

Packing group II: substances presenting medium danger;
Packing group III: substances presenting low danger.

2.2.9.2 *Substances and articles not accepted for carriage*

The following substances and articles shall not be accepted for carriage:

– Lithium batteries which do not meet the relevant conditions of special provisions 188, 230, 310, 636 or 670 of Chapter 3.3;

– Uncleaned empty containment vessels for apparatus such as transformers, condensers and hydraulic apparatus containing substances assigned to UN Nos. 2315, 3151, 3152 or 3432.

[11] *For UN No. 1845 carbon dioxide, solid (dry ice) used as a coolant, see 5.5.3.*

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2.2.9.3 *List of entries*

Substances which, on inhalation as fine dust, may endanger health		**M1**	2212 ASBESTOS, AMPHIBOLE (amosite, tremolite, actinolite, anthophyllite, crocidolite) 2590 ASBESTOS, CHRYSOTILE
Substances and articles which, in the event of fire, may form dioxins		**M2**	2315 POLYCHLORINATED BIPHENYLS, LIQUID 3432 POLYCHLORINATED BIPHENYLS, SOLID 3151 POLYHALOGENATED BIPHENYLS, LIQUID or 3151 HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUID or 3151 POLYHALOGENATED TERPHENYLS, LIQUID 3152 POLYHALOGENATED BIPHENYLS, SOLID or 3152 HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or 3152 POLYHALOGENATED TERPHENYLS, SOLID
Substances evolving flammable vapour		**M3**	2211 POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour 3314 PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour
Lithium batteries		**M4**	3090 LITHIUM METAL BATTERIES (including lithium alloy batteries) 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries) or 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries) 3480 LITHIUM ION BATTERIES (including lithium ion polymer batteries) 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including lithium ion polymer batteries) or 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries) 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries
Life-saving appliances		**M5**	2990 LIFE-SAVING APPLIANCES, SELF-INFLATING 3072 LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment 3268 SAFETY DEVICES, electrically initiated
Environmentally hazardous substances	**pollutant to the aquatic environment, liquid**	**M6**	3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. 9005 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., MOLTEN 9006 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
	pollutant to the aquatic environment, solid	**M7**	3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
	genetically modified micro-organisms and organisms	**M8**	3245 GENETICALLY MODIFIED MICROORGANISMS or 3245 GENETICALLY MODIFIED ORGANISMS

(cont'd on next page)

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2.2.9.3 *List of entries (cont'd)*

Elevated temperature substances	**liquid**	**M9**	3257 ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash-point (including molten metal, molten salts, etc.)
	solid	**M10**	3258 ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C
Other substances and articles presenting a danger during carriage, but not meeting the definitions of another class		**M11**	Only substances and articles listed in Table A of Chapter 3.2 are subject to the provisions for Class 9 under this classification code, as follows: 1841 ACETALDEHYDE AMMONIA 1931 ZINC DITHIONITE (ZINC HYDROSULPHITE) 1941 DIBROMODIFLUOROMETHANE 1990 BENZALDEHYDE 2071 AMMONIUM NITRATE BASED FERTILIZER (only in bulk) 2969 CASTOR BEANS, or 2969 CASTOR MEAL, or 2969 CASTOR POMACE, or 2969 CASTOR FLAKE 3166 VEHICLE, FLAMMABLE GAS POWERED or 3166 VEHICLE, FLAMMABLE LIQUID POWERED or 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED 3171 BATTERY POWERED VEHICLE or 3171 BATTERY POWERED EQUIPMENT 3316 CHEMICAL KIT, or 3316 FIRST AID KIT 3359 FUMIGATED CARGO TRANSPORT UNIT 3363 DANGEROUS GOODS IN MACHINERY or 3363 DANGEROUS GOODS IN APPARATUS 3499 CAPACITOR, ELECTRIC DOUBLE LAYER (with an energy storage capacity greater than 0.3Wh) 3508 CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3Wh) 3509 PACKAGINGS, DISCARDED, EMPTY, UNCLEANED 3530 ENGINE, INTERNAL COMBUSTION or 3530 MACHINERY, INTERNAL COMBUSTION 3548 ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS N.O.S.

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CHAPTER 2.3

TEST METHODS

2.3.0 General

Unless otherwise provided for in Chapter 2.2 or in this Chapter, the test methods to be used for the classification of dangerous goods are those described in the Manual of Tests and Criteria.

2.3.1 Exudation test for blasting explosives of Type A

2.3.1.1 Blasting explosives of type A (UN No. 0081) shall, if they contain more than 40 % liquid nitric ester, in addition to the testing specified in the Manual of Tests and Criteria, satisfy the following exudation test.

2.3.1.2 The apparatus for testing blasting explosive for exudation (figs. 1 to 3) consists of a hollow bronze cylinder. This cylinder, which is closed at one end by a plate of the same metal, has an internal diameter of 15.7 mm and a depth of 40 mm.

It is pierced by 20 holes 0.5 mm in diameter (four sets of five holes) on the circumference. A bronze piston, cylindrically fashioned over a length of 48 mm and having a total length of 52 mm, slides into the vertically placed cylinder.

The piston, whose diameter is 15.6 mm, is loaded with a mass of 2 220 g so that a pressure of 120 kPa (1.20 bar) is exerted on the base of the cylinder.

2.3.1.3 A small plug of blasting explosive weighing 5 to 8 g, 30 mm long and 15 mm in diameter, is wrapped in very fine gauze and placed in the cylinder; the piston and its loading mass are then placed on it so that the blasting explosive is subjected to a pressure of 120 kPa (1.20 bar). The time taken for the appearance of the first signs of oily droplets (nitroglycerine) at the outer orifices of the cylinder holes is noted.

2.3.1.4 The blasting explosive is considered satisfactory if the time elapsing before the appearance of the liquid exudations is more than five minutes, the test having been carried out at a temperature of 15 °C to 25 °C.

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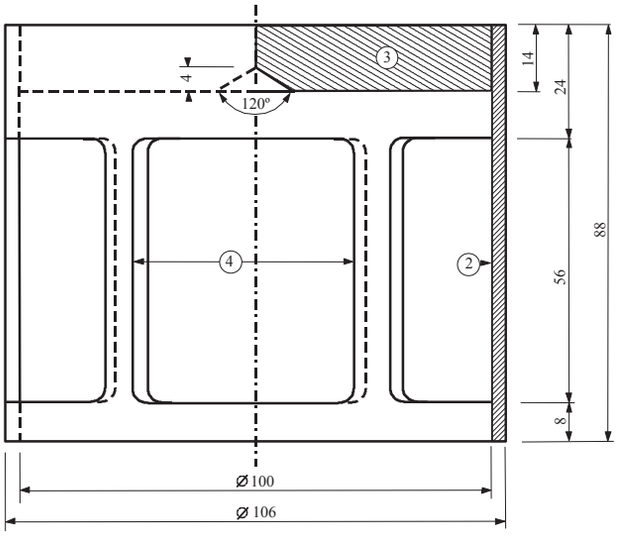

Fig.1: Bell-form charge, mass 2220 g, capable of being suspended from a bronze piston

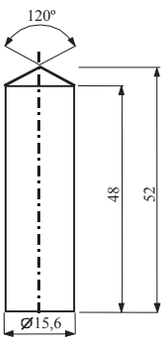

Fig.2: Cylindrical bronze piston,

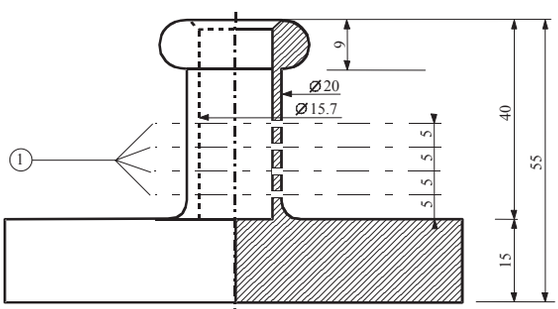

Fig.3: Hollow bronze cylinder, closed at one Plan and cut dimensions in

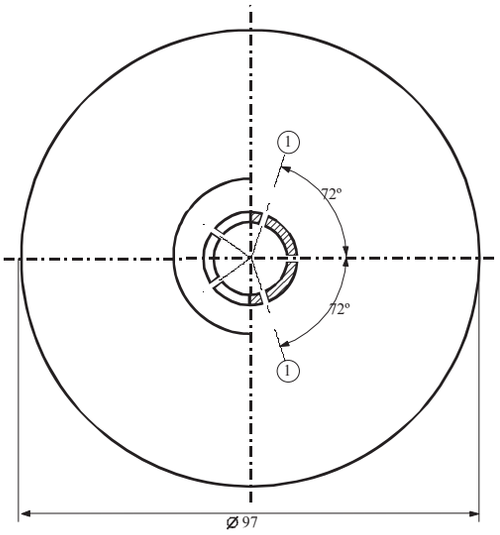

Fig. 1 to 3

(1) 4 series of 5 holes at 0.5 Ø
(2) copper
(3) lead plate with centre cone at the inferior
(4) 4 openings, approximately
set at even intervals on the

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2.3.2 Tests relating to nitrated cellulose mixtures of Class 4.1

2.3.2.1 Nitrocellulose heated for half an hour at 132 °C shall not give off visible yellowish-brown nitrous fumes (nitrous gases). The ignition temperature shall be above 180 °C. See 2.3.2.3 to 2.3.2.8, 2.3.2.9 (a) and 2.3.2.10 below.

2.3.2.2 3 g of plasticized nitrocellulose, heated for one hour at 132 °C, shall not give off visible yellowish-brown nitrous fumes (nitrous gases). The ignition temperature shall be above 170 °C. See 2.3.2.3 to 2.3.2.8, 2.3.2.9 (b) and 2.3.2.10 below.

2.3.2.3 The test procedures set out below are to be applied when differences of opinion arise as to the acceptability of substances for carriage by road.

2.3.2.4 If other methods or test procedures are used to verify the conditions of stability prescribed above in this section, those methods shall lead to the same findings as could be reached by the methods specified below.

2.3.2.5 In carrying out the stability tests by heating described below, the temperature of the oven containing the sample under test shall not deviate by more than 2 °C from the prescribed temperature; the prescribed duration of a 30-minute or 60-minute test shall be observed to within two minutes. The oven shall be such that the required temperature is restored not more than five minutes after insertion of the sample.

2.3.2.6 Before undergoing the tests in 2.3.2.9 and 2.3.2.10, the samples shall be dried for not less than 15 hours at the ambient temperature in a vacuum desiccator containing fused and granulated calcium chloride, the sample substance being spread in a thin layer; for this purpose, substances which are neither in powder form nor fibrous shall be ground, or grated, or cut into small pieces. The pressure in the desiccator shall be brought below 6.5 kPa (0.065 bar).

2.3.2.7 Before being dried as prescribed in 2.3.2.6 above, substances conforming to 2.3.2.2 shall undergo preliminary drying in a well-ventilated oven, with its temperature set at 70 °C, until the loss of mass per quarter-hour is less than 0.3 % of the original mass.

2.3.2.8 Weakly nitrated nitrocellulose conforming to 2.3.2.1 shall first undergo preliminary drying as prescribed in 2.3.2.7 above; drying shall then be completed by keeping the nitrocellulose for at least 15 hours over concentrated sulphuric acid in a desiccator.

2.3.2.9 ***Test of chemical stability under heat***

(a) *Test of the substance listed in paragraph 2.3.2.1 above.*

(i) In each of two glass test tubes having the following dimensions:

length	350	mm
internal diameter	16	mm
thickness of wall	1.5	mm

is placed 1 g of substance dried over calcium chloride (if necessary the drying shall be carried out after reducing the substance to pieces weighing not more than 0.05 g each).

Both test tubes, completely covered with loose-fitting closures, are then so placed in an oven that at least four-fifths of their length is visible, and are kept at a constant temperature of 132 °C for 30 minutes. It is observed whether nitrous gases in the form of yellowish-brown fumes clearly visible against a white background are given off during this time.

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(ii) In the absence of such fumes the substance is deemed to be stable.

(b) *Test of plasticized nitrocellulose (see 2.3.2.2)*

(i) 3 g of plasticized nitrocellulose are placed in glass test tubes, similar to those referred to in (a), which are then placed in an oven kept at a constant temperature of 132 °C.

(ii) The test tubes containing the plasticized nitrocellulose are kept in the oven for one hour. During this time no yellowish-brown nitrous fumes (nitrous gases) shall be visible. Observation and appraisal as in (a).

2.3.2.10 ***Ignition temperature (see 2.3.2.1 and 2.3.2.2)***

(a) The ignition temperature is determined by heating 0.2 g of substance enclosed in a glass test tube immersed in a Wood's alloy bath. The test tube is placed in the bath when the latter has reached 100 °C. The temperature of the bath is then progressively increased by 5 °C per minute;

(b) The test tubes must have the following dimensions:

length	125 mm
internal diameter	15 mm
thickness of wall	0.5 mm

and shall be immersed to a depth of 20 mm;

(c) The test shall be repeated three times, the temperature at which ignition of the substance occurs, i.e., slow or rapid combustion, deflagration or detonation, being noted each time;

(d) The lowest temperature recorded in the three tests is the ignition temperature.

2.3.3 **Tests relating to flammable liquids of Classes 3, 6.1 and 8**

2.3.3.1 ***Test for determining flash-point***

2.3.3.1 ***Determination of flash-point***

2.3.3.1.1 The following methods for determining the flash-point of flammable liquids may be used:

International standards:

ISO 1516 (Determination of flash/no flash – Closed cup equilibrium method)

ISO 1523 (Determination of flash point – Closed cup equilibrium method)

ISO 2719 (Determination of flash point – Pensky-Martens closed cup method)

ISO 13736 (Determination of flash point – Abel closed-cup method)

ISO 3679 (Determination of flash point – Rapid equilibrium closed cup method)

ISO 3680 (Determination of flash/no flash – Rapid equilibrium closed cup method)

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National standards:

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959:

ASTM D3828-07a, Standard Test Methods for Flash Point by Small Scale Closed-Cup Tester

ASTM D56-05, Standard Test Method for Flash Point by Tag Closed-Cup Tester

ASTM D3278-96(2004)e1, Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus

ASTM D93-08, Standard Test Methods for Flash Point by Pensky-Martens Closed-Cup Tester

Association française de normalisation, AFNOR, 11, rue de Pressensé, F-93571 La Plaine Saint-Denis Cedex:

French Standard NF M 07 - 019

French Standards NF M 07 - 011 / NF T 30 - 050 / NF T 66 - 009

French Standard NF M 07 - 036

Deutsches Institut für Normung, Burggrafenstr. 6, D-10787 Berlin:

Standard DIN 51755 (flash-points below 65 °C)

State Committee of the Council of Ministers for Standardization, RUS-113813, GSP, Moscow, M-49 Leninsky Prospect, 9:

GOST 12.1.044-84

2.3.3.1.2 To determine the flash-point of paints, gums and similar viscous products containing solvents, only apparatus and test methods suitable for determining the flash-point for viscous liquids shall be used, in accordance with the following standards:

(a) International Standard ISO 3679:1983;

(b) International Standard ISO 3680:1983;

(c) International Standard ISO 1523:1983;

(d) International Standards EN ISO 13736 and EN ISO 2719, Method B.

2.3.3.1.3 The standards listed in 2.3.3.1.1 shall only be used for flash-point ranges which are specified therein. The possibility of chemical reactions between the substance and the sample holder shall be considered when selecting the standard to be used. The apparatus shall, as far as is consistent with safety, be placed in a draught-free position. For safety, a method utilizing a small sample size, around 2 ml, shall be used for organic peroxides and self-reactive substances (also known as "energetic" substances), or for toxic substances.

2.3.3.1.4 When the flash-point, determined by a non-equilibrium method is found to be 23 ± 2 °C or 60 ± 2 °C, it shall be confirmed for each temperature range by an equilibrium method.

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2.3.3.1.5 In the event of a dispute as to the classification of a flammable liquid, the classification proposed by the consignor shall be accepted if a check-test of the flash-point yields a result not differing by more than 2 °C from the limits (23 °C and 60 °C respectively) stated in 2.2.3.1. If the difference is more than 2 °C, a second check-test shall be carried out, and the lowest figure of the flash-points obtained in either check-test shall be adopted.

2.3.3.2 ***Determination of initial boiling point***

The following methods for determining the initial boiling point of flammable liquids may be used:

International standards:

ISO 3924 (Petroleum products – Determination of boiling range distribution – Gas chromatography method)

ISO 4626 (Volatile organic liquids – Determination of boiling range of organic solvents used as raw materials)

ISO 3405 (Petroleum products – Determination of distillation characteristics at atmospheric pressure)

National standards:

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959:

ASTM D86-07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure

ASTM D1078-05, Standard Test Method for Distillation Range of Volatile Organic Liquids

Further acceptable methods:

Method A.2 as described in Part A of the Annex to Commission Regulation (EC) No 440/2008[1].

2.3.3.3 ***Test for determining peroxide content***

To determine the peroxide content of a liquid, the procedure is as follows:

A quantity p (about 5 g, weighed to the nearest 0.01 g) of the liquid to be titrated is placed in an Erlenmeyer flask; 20 cm^3 of acetic anhydride and about 1 g of powdered solid potassium iodide are added; the flask is shaken and, after 10 minutes, heated for 3 minutes to about 60 °C. When it has been left to cool for 5 minutes, 25 cm^3 of water are added. After this, it is left standing for half an hour, then the liberated iodine is titrated with a decinormal solution of sodium thiosulphate, no indicator being added; complete discoloration indicates the end of the reaction. If n is the number of cm^3 of thiosulphate solution required, the percentage of peroxide (calculated as H_2O_2) present in the sample is obtained by the formula:

$$\frac{17n}{100p}$$

[1] *Commission Regulation (EC) No 440/2008 of 30 May 2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (Official Journal of the European Union, No. L 142 of 31.05.2008, p.1-739 and No. L 143 of 03.06.2008, p.55).*

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2.3.4 Test for determining fluidity

To determine the fluidity of liquid, viscous or pasty substances and mixtures, the following test method shall be used.

2.3.4.1 *Test apparatus*

Commercial penetrometer conforming to ISO 2137:1985, with a guide rod of 47.5 g ± 0.05 g; sieve disc of duralumin with conical bores and a mass of 102.5 g ± 0.05 g (see Figure 1); penetration vessel with an inside diameter of 72 mm to 80 mm for reception of the sample.

2.3.4.2 *Test procedure*

The sample is poured into the penetration vessel not less than half an hour before the measurement. The vessel is then hermetically closed and left standing until the measurement. The sample in the hermetically closed penetration vessel is heated to 35 °C ± 0.5 °C and is placed on the penetrometer table immediately prior to measurement (not more than two minutes). The point S of the sieve disc is then brought into contact with the surface of the liquid and the rate of penetration is measured.

2.3.4.3 *Evaluation of test results*

A substance is pasty if, after the centre S has been brought into contact with the surface of the sample, the penetration indicated by the dial gauge:

(a) after a loading time of 5 s ± 0.1 s, is less than 15.0 mm ± 0.3 mm; or

(b) after a loading time of 5 s ± 0.1 s, is greater than 15.0 mm ± 0.3 mm, but the additional penetration after another 55 s ± 0.5 s is less than 5.0 mm ± 0.5 mm.

***NOTE**: In the case of samples having a flow point, it is often impossible to produce a steady level surface in the penetration vessel and, hence, to establish satisfactory initial measuring conditions for the contact of the point S. Furthermore, with some samples, the impact of the sieve disc can cause an elastic deformation of the surface and, in the first few seconds, simulate a deeper penetration. In all these cases, it may be appropriate to make the evaluation in paragraph (b) above.*

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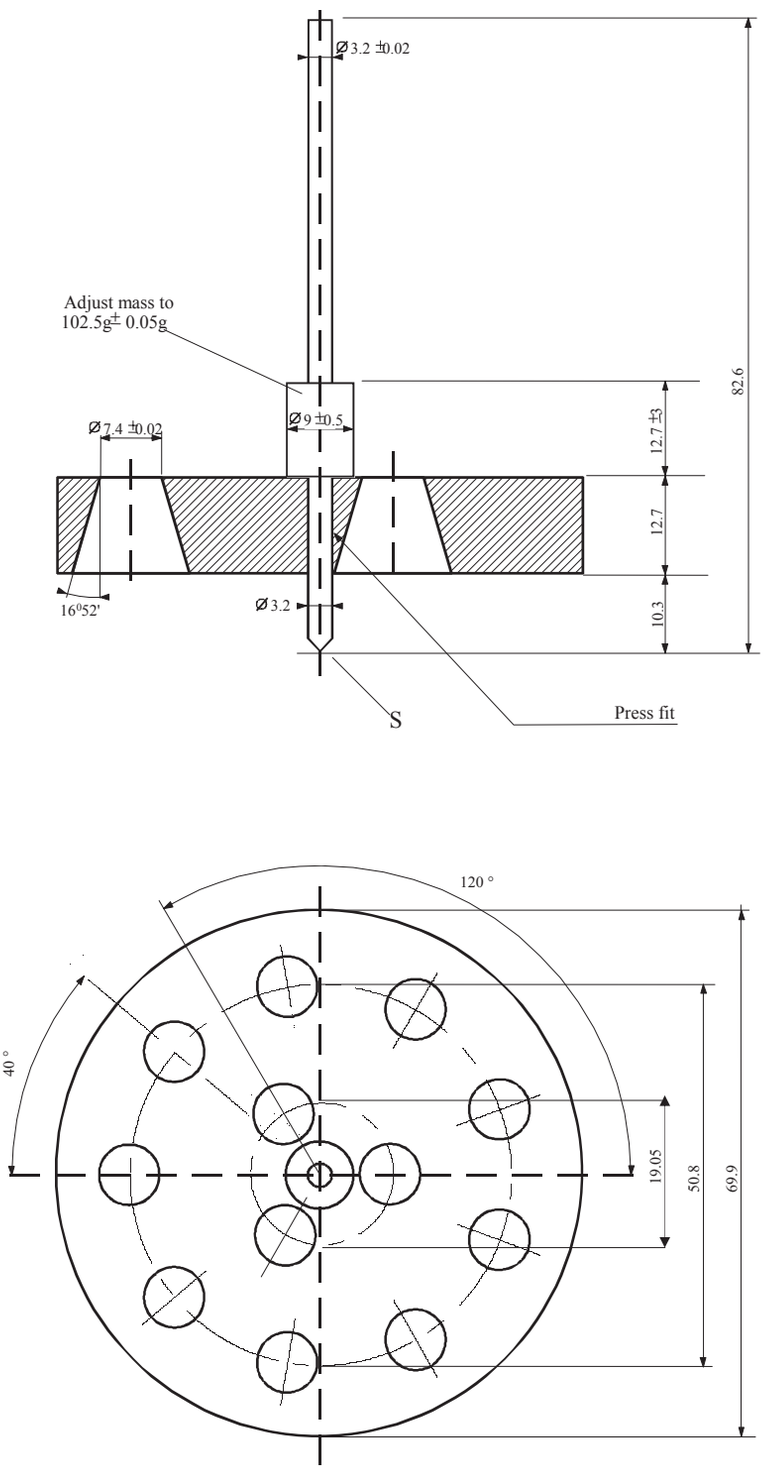
Figure 1 – Penetrometer



Tolerances not specified are ± 0.1 mm.

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2.3.5 Classification of organometallic substances in Classes 4.2 and 4.3

Depending on their properties as determined in accordance with tests N.1 to N.5 of the *Manual of Tests and Criteria*, Part III, section 33, organometallic substances may be classified in Classes 4.2 or 4.3, as appropriate, in accordance with the flowchart scheme given in Figure 2.3.5.

NOTE 1: *Depending on their other properties and on the precedence of hazard table (see 2.1.3.10), organometallic substances may have to be classified in other classes as appropriate.*

NOTE 2*:* *Flammable solutions with organometallic compounds in concentrations which are not liable to spontaneous combustion or, in contact with water, do not emit flammable gases in dangerous quantities, are substances of Class 3.*

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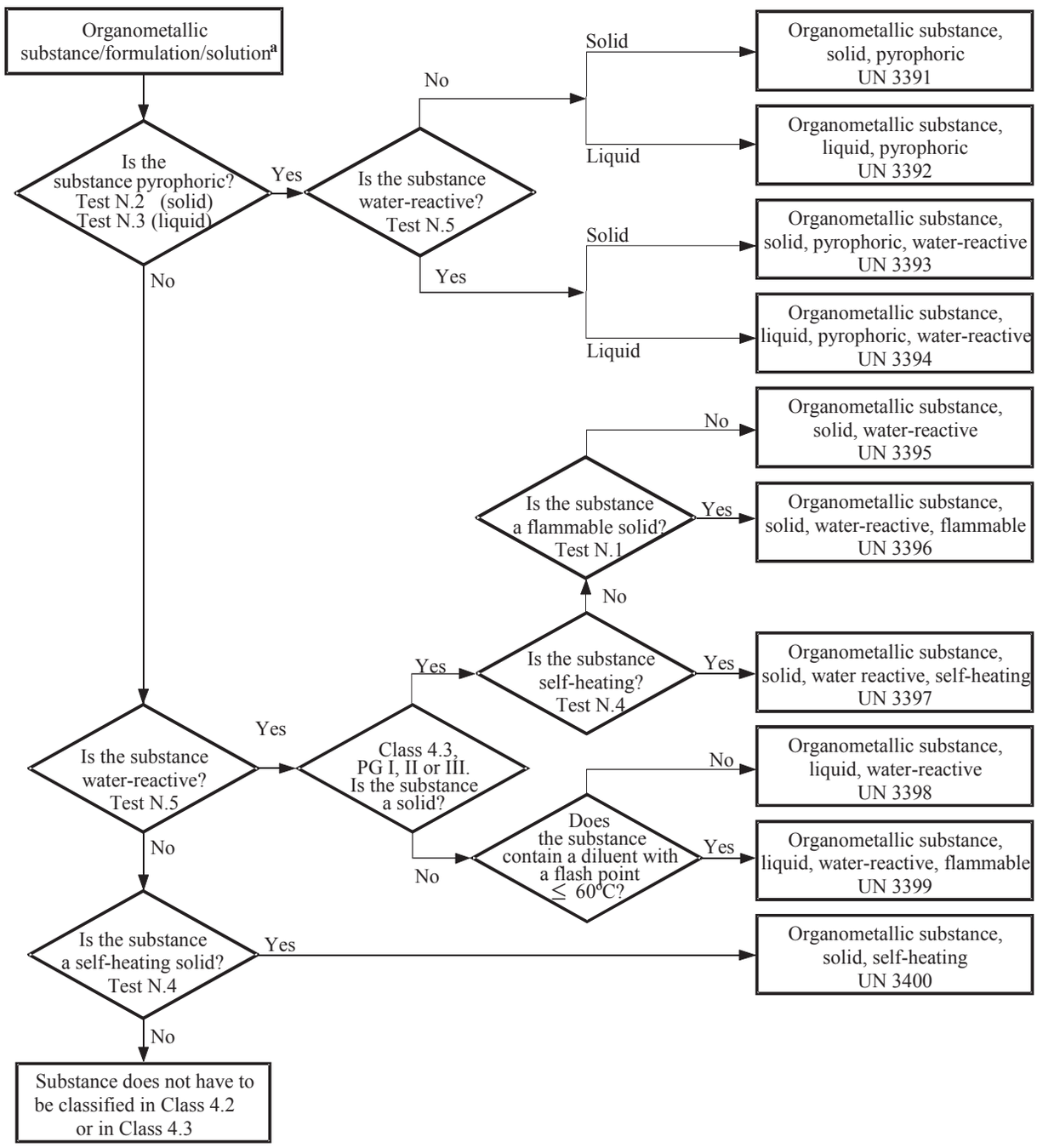
Figure 2.3.5 Flowchart scheme for the classification of organometallic substances in Classes 4.2 and 4.3 [b]



[a] *If applicable and testing is relevant, taking into account reactivity properties, class 6.1 and 8 properties should be considered according to the precedence of hazard table of 2.1.3.10.*

[b] *Test methods N.1 to N.5 can be found in the Manual of Tests and Criteria, Part III, Section 33.*

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CHAPTER 2.4

CRITERIA FOR SUBSTANCES HAZARDOUS TO THE AQUATIC ENVIRONMENT

2.4.1 General definitions

2.4.1.1 Environmentally hazardous substances include, inter alia, liquid or solid substances pollutant to the aquatic environment and solutions and mixtures of such substances (such as preparations and wastes). For the purposes of this Chapter, 'substance' means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

2.4.1.2 The aquatic environment may be considered in terms of the aquatic organisms that live in the water, and the aquatic ecosystem of which they are part.[1] The basis, therefore, of the identification of hazard is the aquatic toxicity of the substance or mixture, although this may be modified by further information on the degradation and bioaccumulation behaviour.

2.4.1.3 While the following classification procedure is intended to apply to all substances and mixtures, it is recognized that in some cases, e.g. metals or poorly soluble inorganic compounds, special guidance will be necessary.[2]

2.4.1.4 The following definitions apply for acronyms or terms used in this section:

- BCF: Bioconcentration Factor;
- BOD: Biochemical Oxygen Demand;
- COD: Chemical Oxygen Demand;
- GLP: Good Laboratory Practices;
- EC_x: the concentration associated with x% response;
- EC_{50}: the effective concentration of substance that causes 50% of the maximum response;
- ErC_{50}: EC_{50} in terms of reduction of growth;
- K_{ow}: octanol/water partition coefficient;
- LC_{50} (50% lethal concentration): the concentration of a substance in water which causes the death of 50% (one half) in a group of test animals;
- $L(E)C_{50}$: LC_{50} or EC_{50};
- NOEC (No Observed Effect Concentration): the test concentration immediately below the lowest tested concentration with statistically significant adverse effect. The NOEC has no statistically significant adverse effect compared to the control;
- OECD Test Guidelines: test guidelines published by the Organisation for Economic Co-operation and Development (OECD).

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[1] *This does not address aquatic pollutants for which there may be a need to consider effects beyond the aquatic environment such as the impacts on human health, etc.*

[2] *See annex 10 of GHS.*

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2.4.2 Definitions and data requirements

2.4.2.1 The basic elements for classification of environmentally hazardous substances (aquatic environment) are as follows:

(a) Acute aquatic toxicity;

(b) Chronic aquatic toxicity;

(c) Potential for or actual bioaccumulation; and

(d) Degradation (biotic or abiotic) for organic chemicals.

2.4.2.2 While data from internationally harmonized test methods are preferred, in practice, data from national methods may also be used where they are considered as equivalent. In general, it has been agreed that freshwater and marine species toxicity data can be considered as equivalent data and are preferably to be derived using OECD Test Guidelines or equivalent according to the principles of Good Laboratory Practices (GLP). Where such data are not available, classification should be based on the best available data.

2.4.2.3 **Acute aquatic toxicity** means the intrinsic property of a substance to be injurious to an organism in a short-term aquatic exposure to that substance.

Acute (short-term) hazard, for classification purposes, means the hazard of a chemical caused by its acute toxicity to an organism during short-term aquatic exposure to that chemical.

Acute aquatic toxicity shall normally be determined using a fish 96-hour LC_{50} (OECD Test Guideline 203 or equivalent), a crustacea species 48-hour EC_{50} (OECD Test Guideline 202 or equivalent) and/or an algal species 72- or 96-hour EC_{50} (OECD Test Guideline 201 or equivalent). These species are considered as surrogate for all aquatic organisms, and data on other species such as Lemna may also be considered if the test methodology is suitable.

2.4.2.4 **Chronic aquatic toxicity** means the intrinsic property of a substance to cause adverse effects to aquatic organisms during aquatic exposures which are determined in relation to the life-cycle of the organism.

Long-term hazard, for classification purposes, means the hazard of a chemical caused by its chronic toxicity following long-term exposure in the aquatic environment.

Chronic toxicity data are less available than acute data and the range of testing procedures less standardized. Data generated according to OECD Test Guidelines 210 (Fish Early Life Stage) or 211 (Daphnia Reproduction) and 201 (Algal Growth Inhibition) can be accepted. Other validated and internationally accepted tests could also be used. The NOECs or other equivalent ECx shall be used.

2.4.2.5 **Bioaccumulation** means net result of uptake, transformation and elimination of a substance in an organism due to all routes of exposure (i.e. air, water, sediment/soil and food).

The **potential for bioaccumulation** shall normally be determined by using the octanol/water partition coefficient, usually reported as a log K_{ow} determined by OECD Test Guidelines 107, 117 or 123. While this represents a potential to bioaccumulate, an experimentally determined Bioconcentration Factor (BCF) provides a better measure and should be used in preference when available. A BCF should be determined according to OECD Test Guideline 305.

2.4.2.6 **Degradation** means the decomposition of organic molecules to smaller molecules and eventually to carbon dioxide, water and salts.

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Environmental degradation may be biotic or abiotic (e.g. hydrolysis) and the criteria reflect this fact. Ready biodegradation can most easily be defined using the biodegradability tests (A-F) of OECD Test Guideline 301. A pass level in these tests can be considered as indicative of rapid degradation in most environments. These are freshwater tests and thus the use of the results from OECD Test Guideline 306, which is more suitable for marine environments, has also been included. Where such data are not available, a BOD_5 (5 days)/COD ratio ≥ 0.5 is considered as indicative of rapid degradation. Abiotic degradation such as hydrolysis, primary degradation, both abiotic and biotic, degradation in non-aquatic media and proven rapid degradation in the environment may all be considered in defining rapid degradability.[3]

Substances shall be considered rapidly degradable in the environment if the following criteria are met:

(a) In 28-day ready biodegradation studies, the following levels of degradation are achieved:

(i) Tests based on dissolved organic carbon: 70%;

(ii) Tests based on oxygen depletion or carbon dioxide generation: 60% of theoretical maxima;

These levels of biodegradation shall be achieved within 10 days of the start of degradation, which point is taken as the time when 10% of the substance has been degraded, unless the substance is identified as a complex, multi-component substance with structurally similar constituents. In this case, and where there is sufficient justification, the 10-day window condition may be waived and the pass level applied at 28 days[4]; or

(b) In those cases where only BOD and COD data are available, when the ratio of BOD_5/COD is ≥ 0.5; or

(c) If other convincing scientific evidence is available to demonstrate that the substance or mixture can be degraded (biotically and/or abiotically) in the aquatic environment to a level above 70% within a 28-day period.

2.4.3 Substance classification categories and criteria

NOTE: *Chronic Category 4 of Chapter 4.1 of GHS is reproduced in this section for information, although it is not relevant in the context of ADN.*

2.4.3.1 The following substances shall be considered to be environmentally hazardous (aquatic environment):

(a) For carriage in packages, substances which meet the criteria for Acute 1, Chronic 1 or Chronic 2, according to table 2.4.3.1 below; and

(b) For carriage in tank vessels, substances which meet the criteria for Acute 1, Acute 2 or Acute 3, or Chronic 1, Chronic 2 or Chronic 3, according to table 2.4.3.1 below.

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[3] *Special guidance on data interpretation is provided in Chapter 4.1 and Annex 9 to GHS.*

[4] *See Chapter 4.1 and Annex 9, paragraph A9.4.2.2.3 of the GHS.*

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Table 2.4.3.1: Categories for substances hazardous to the aquatic environment *(see Note 1)*

(a)	**Acute (short-term) aquatic hazard**	
	Category Acute 1: *(Note 2)*	
	96 hr LC_{50} (for fish)	≤ 1 mg/l and/or
	48 hr EC_{50} (for crustacea)	≤ 1 mg/l and/or
	72 or 96 hr ErC_{50} (for algae or other aquatic plants)	≤ 1 mg/l *(see Note 3)*
	Category Acute 2:	
	96 hr LC_{50} (for fish)	> 1 but ≤ 10 mg/l and/or
	48 hr EC_{50} (for crustacea)	>1 but ≤ 10 mg/l and/or
	72 or 96 hr ErC_{50} (for algae or other aquatic plants)	>1 but ≤ 10 mg/l *(see Note 3)*
	Category Acute 3:	
	96 hr LC_{50} (for fish)	>10 but ≤ 100 mg/l and/or
	48 hr EC_{50} (for crustacea)	>10 but ≤ 100 mg/l and/or
	72 or 96 hr ErC_{50} (for algae or other aquatic plants)	>10 but ≤ 100 mg/l *(see Note 3)*
(b)	**Long-term aquatic hazard** *(see also figure 2.4.3.1)*	
	(i) Non-rapidly degradable substances (*see Note 4*) for which there are adequate chronic toxicity data available	
	Category Chronic 1: (see *Note 2*)	
	Chronic NOEC or EC_x (for fish)	≤ 0.1 mg/l and/or
	Chronic NOEC or EC_x (for crustacea)	≤ 0.1 mg/l and/or
	Chronic NOEC or EC_x (for algae or other aquatic plants)	≤ 0.1 mg/l
	Category Chronic 2:	
	Chronic NOEC or EC_x (for fish)	≤ 1 mg/l and/or
	Chronic NOEC or EC_x (for crustacea)	≤ 1 mg/l and/or
	Chronic NOEC or EC_x (for algae or other aquatic plants)	≤ 1 mg/l
	(ii) Rapidly degradable substances for which there are adequate chronic toxicity data available	
	Category Chronic 1: *(see Note 2)*	
	Chronic NOEC or EC_x (for fish)	≤ 0.01 mg/l and/or
	Chronic NOEC or EC_x (for crustacea)	≤ 0.01 mg/l and/or
	Chronic NOEC or EC_x (for algae or other aquatic plants)	≤ 0.01 mg/l
	Category Chronic 2:	
	Chronic NOEC or EC_x (for fish)	≤ 0.1 mg/l and/or
	Chronic NOEC or EC_x (for crustacea)	≤ 0.1 mg/l and/or
	Chronic NOEC or EC_x (for algae or other aquatic plants)	≤ 0.1 mg/l
	Category Chronic 3:	
	Chronic NOEC or EC_x (for fish)	≤ 1 mg/l and/or
	Chronic NOEC or EC_x (for crustacea)	≤ 1 mg/l and/or
	Chronic NOEC or EC_x (for algae or other aquatic plants)	≤ 1 mg/l

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(iii) Substances for which adequate chronic toxicity data are not available

Category Chronic 1: *(see Note 2)*

96 hr LC_{50} (for fish)	≤ 1 mg/l and/or
48 hr EC_{50} (for crustacea)	≤ 1 mg/l and/or
72 or 96 hr ErC_{50} (for algae or other aquatic plants)	≤ 1 mg/l *(see Note 3)*

and the substance is not rapidly degradable and/or the experimentally determined BCF is ≥ 500 (or, if absent, the log K_{ow} ≥ 4) *(see Notes 4 and 5).*

Category Chronic 2:

96 hr LC_{50} (for fish)	> 1 but ≤ 10 mg/l and/or
48 hr EC_{50} (for crustacea)	> 1 but ≤ 10 mg/l and/or
72 or 96 hr ErC_{50} (for algae or other aquatic plants)	> 1 but ≤ 10 mg/l *(see Note 3)*

and the substance is not rapidly degradable and/or the experimentally determined BCF is ≥ 500 (or, if absent, the log K_{ow} ≥ 4) *(see Notes 4 and 5).*

Category Chronic 3:

96 hr LC_{50} (for fish)	> 10 but ≤ 100 mg/l and/or
48 hr EC_{50} (for crustacea)	> 10 but ≤ 100 mg/l and/or
72 or 96 hr ErC_{50} (for algae or other aquatic plants)	> 10 but ≤ 100 mg/l *(see Note 3)*

and the substance is not rapidly degradable and/or the experimentally determined BCF is ≥ 500 (or, if absent, the log K_{ow} ≥ 4) *(see Notes 4 and 5).*

(c) "Safety net" classification

Category Chronic 4:

Poorly soluble substances for which no acute toxicity is recorded at levels up to the water solubility, and which are not rapidly degradable and have a log K_{ow} ≥ 4, indicating a potential to bioaccumulate, will be classified in this category unless other scientific evidence exists showing classification to be unnecessary. Such evidence would include an experimentally determined BCF < 500, or a chronic toxicity NOECs > 1 mg/l, or evidence of rapid degradation in the environment.

Substances which come under Category Chronic 4 alone are not considered to be environmentally hazardous in the sense of ADN.

NOTE 1: *The organisms, fish, crustacea and algae are tested as surrogate species covering a range of trophic levels and taxa, and the test methods are highly standardized. Data on other organisms may also be considered, however, provided they represent equivalent species and test endpoints.*

NOTE 2: *When classifying substances as Acute 1 and/or Chronic 1 it is necessary at the same time to indicate an appropriate M factor (see 2.4.4.6.4) to apply the summation method.*

NOTE 3: *Where the algal toxicity ErC_{50} (= EC_{50} (growth rate)) falls more than 100 times below the next most sensitive species and results in a classification based solely on this effect, consideration shall be given to whether this toxicity is representative of the toxicity to aquatic plants. Where it can be shown that this is not the case, professional judgement shall be used in deciding if classification shall be applied. Classification shall be based on the ErC_{50}. In circumstances where the basis of the EC_{50} is not specified and no ErC_{50} is recorded, classification shall be based on the lowest EC_{50} available.*

NOTE 4: *Lack of rapid degradability is based on either a lack of ready biodegradability or other evidence of lack of rapid degradation. When no useful data on degradability are available, either experimentally determined or estimated data, the substance shall be regarded as not rapidly degradable.*

NOTE 5: *Potential to bioaccumulate, based on an experimentally derived BCF ≥ 500 or, if absent, a log K_{ow} ≥ 4 provided log K_{ow} is an appropriate descriptor for the bioaccumulation potential of the substance. Measured log K_{ow} values take precedence over estimated values and measured BCF values take precedence over log K_{ow} values.*

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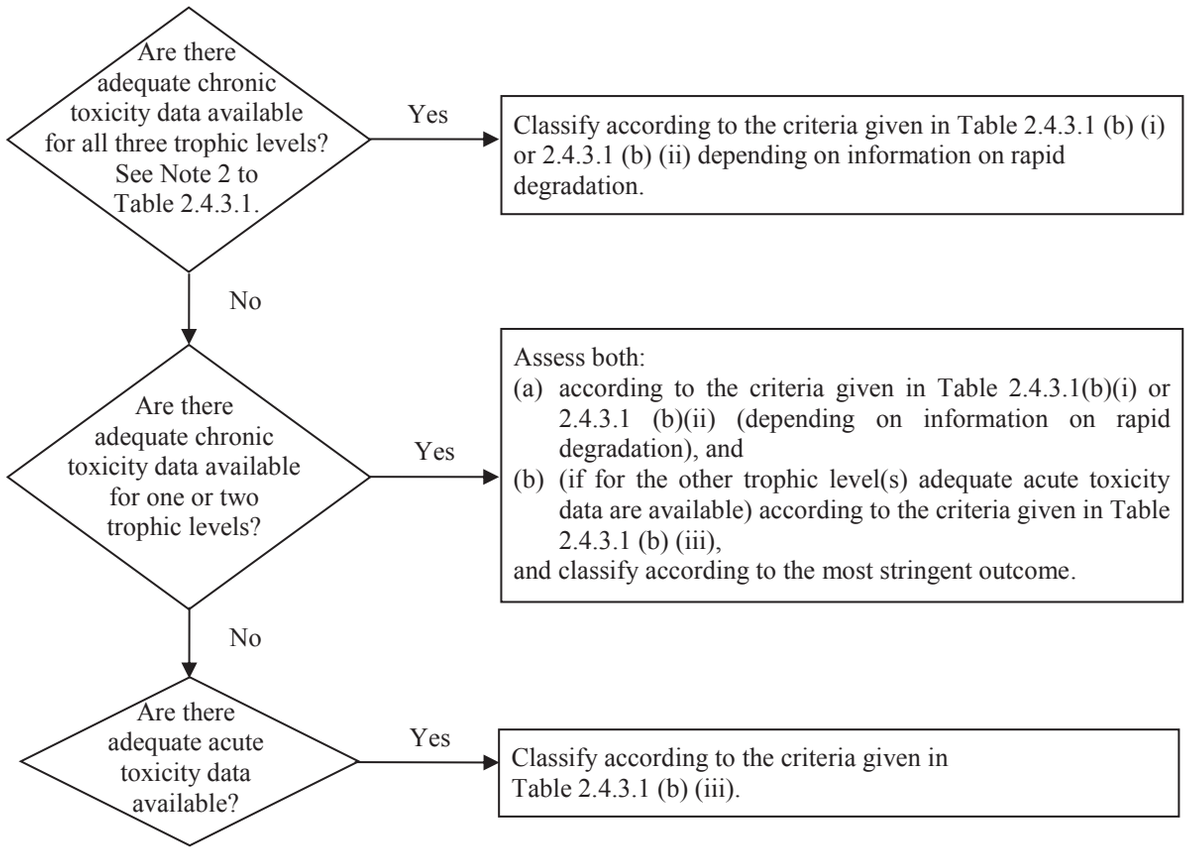
Figure 2.4.3.1: Categories for substances long-term hazardous to the aquatic environment



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2.4.3.2 The classification scheme in Table 2.4.3.2 below summarizes the classification criteria for substances.

Table 2.4.3.2: Classification scheme for substances hazardous to the aquatic environment

Classification categories			
Acute hazard (*Note 1*)	**Long-term hazard** (*Note 2*)		
	Adequate chronic toxicity data available		**Adequate chronic toxicity data not available** (*Note 1*)
	Non-rapidly degradable substances (*Note 3*)	**Rapidly degradable substances** (*Note 3*)	
Category: Acute 1	**Category: Chronic 1**	**Category: Chronic 1**	**Category: Chronic 1**
$L(E)C_{50} \leq 1.00$	NOEC or $EC_x \leq 0.1$	NOEC or $EC_x \leq 0.01$	$L(E)C_{50} \leq 1.00$ and lack of rapid degradability and/or BCF ≥ 500 or, if absent log $K_{ow} \geq 4$
Category: Acute 2	**Category: Chronic 2**	**Category: Chronic 2**	**Category: Chronic 2**
$1.00 < L(E)C_{50} \leq 10.0$	$0.1 <$ NOEC or $EC_x \leq 1$	$0.01 <$ NOEC or $EC_x \leq 0.1$	$1.00 < L(E)C_{50} \leq 10.0$ and lack of rapid degradability and/or BCF ≥ 500 or, if absent log $K_{ow} \geq 4$
Category: Acute 3		**Category: Chronic 3**	**Category: Chronic 3**
$10.0 < L(E)C_{50} \leq 100$		$0.1 <$ NOEC or $EC_x \leq 1$	$10.0 < L(E)C_{50} \leq 100$ and lack of rapid degradability and/or BCF ≥ 500 or, if absent log $K_{ow} \geq 4$
	Category: Chronic 4 (*Note 4*) Example: (*Note 5*) No acute toxicity and lack of rapid degradability and BCF ≥ 500 or, if absent log $K_{ow} \geq 4$, unless NOECs > 1 mg/l		

NOTE 1: *Acute toxicity band based on $L(E)C_{50}$ values in mg/l for fish, crustacea and/or algae or other aquatic plants (or Quantitative Structure Activity Relationships (QSAR) estimation if no experimental data[5]).*

NOTE 2: *Substances are classified in the various chronic categories unless there are adequate chronic toxicity data available for all three trophic levels above the water solubility or above 1 mg/l. ("Adequate" means that the data sufficiently cover the endpoint of concern. Generally this would mean measured test data, but in order to avoid unnecessary testing it can on a case by case basis also be estimated data, e.g. (Q)SAR, or for obvious cases expert judgement).*

NOTE 3: *Chronic toxicity band based on NOEC or equivalent EC_x values in mg/l for fish or crustacea or other recognized measures for chronic toxicity.*

NOTE 4: *The system also introduces a "safety net" classification (referred to as category Chronic 4) for use when the data available do not allow classification under the formal criteria but there are nevertheless some grounds for concern.*

NOTE 5: *For poorly soluble substances for which no acute toxicity has been demonstrated at the solubility limit, and are both not rapidly degraded and have a potential to bioaccumulate, this category should apply unless it can be demonstrated that the substance does not require classification for aquatic long-term hazards.*

[5] *Special guidance is provided in Chapter 4.1, paragraph 4.1.2.13 and Annex 9, Section A9.6 of the GHS.*

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2.4.4 Classification categories and criteria for mixtures

NOTE: *Chronic Category 4 of Chapter 4.1 of GHS is reproduced in this section for information, although it is not relevant in the context of ADN.*

2.4.4.1 The classification system for mixtures covers all classification categories which are used for substances, meaning categories Acute 1 to 3 and Chronic 1 to 4. In order to make use of all available data for purposes of classifying the aquatic environmental hazards of the mixture, the following assumption has been made and is applied where appropriate.

The "relevant ingredients" of a mixture are those which are present in a concentration equal to or greater than 0.1% (by mass) for ingredients classified as Acute and/or Chronic 1 and equal to or greater than 1% for other ingredients, unless there is a presumption (e.g. in the case of highly toxic ingredients) that an ingredient present at less than 0.1% can still be relevant for classifying the mixture for aquatic environmental hazards.

2.4.4.2 The approach for classification of aquatic environmental hazards is tiered and is dependent upon the type of information available for the mixture itself and for its ingredients. Elements of the tiered approach include:

(a) Classification based on tested mixtures;

(b) Classification based on bridging principles;

(c) Use of ‘summation of classified ingredients’ and/or an ‘additivity formula’.

Figure 2.4.4.2 outlines the process to be followed.

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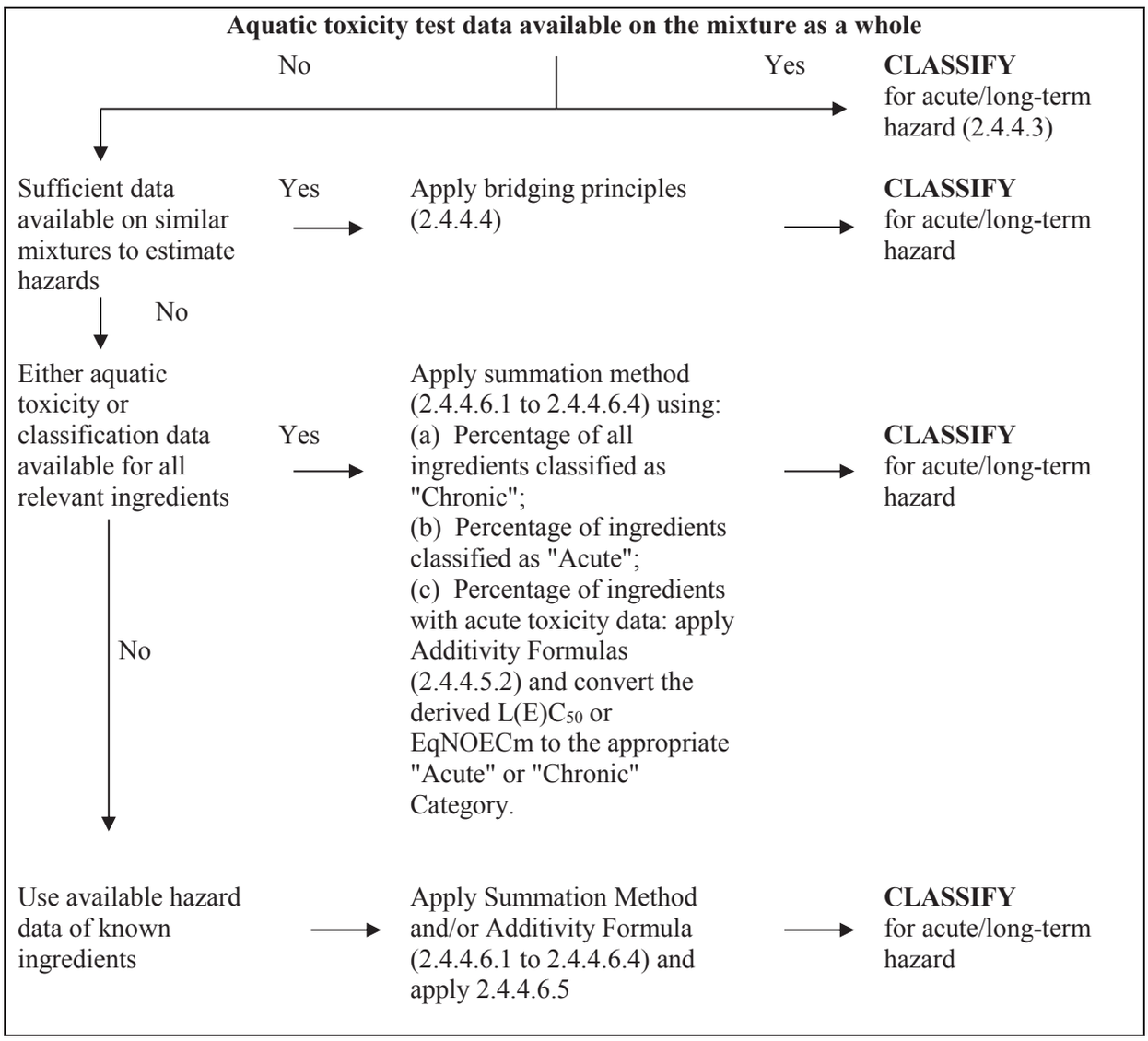
Figure 2.4.4.2: Tiered approach to classification of mixtures for acute and long-term environmental hazards



2.4.4.3 *Classification of mixtures when toxicity data are available for the complete mixture*

2.4.4.3.1 When the mixture as a whole has been tested to determine its aquatic toxicity, this information shall be used for classifying the mixture according to the criteria that have been agreed for substances. The classification is normally based on the data for fish, crustacea and algae/plants (2.4.2.3 and 2.4.2.4). When adequate acute or chronic data for the mixture as a whole are lacking, "bridging principles" or "summation method" shall be applied (see 2.4.4.4 and 2.4.4.5).

2.4.4.3.2 The long-term hazard classification of mixtures requires additional information on degradability and in certain cases bioaccumulation. There are no degradability and bioaccumulation data for mixtures as a whole. Degradability and bioaccumulation tests for mixtures are not used as they are usually difficult to interpret, and such tests may be meaningful only for single substances.

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2.4.4.3.3 *Classification for categories Acute 1, 2 and 3*

(a) When there are adequate acute toxicity test data (LC_{50} or EC_{50}) available for the mixture as a whole showing $L(E)C_{50} \leq 100$ mg/l:

Classify the mixture as Acute 1, 2 or 3 in accordance with Table 2.4.3.1 (a);

(b) When there are acute toxicity test data (LC_{50}(s) or EC_{50}(s) available for the mixture as a whole showing $L(E)C_{50}$(s) > 100 mg/l, or above the water solubility:

No need to classify for acute hazard under ADN.

2.4.4.3.4 *Classification for categories Chronic 1, 2 and 3*

(a) When there are adequate chronic toxicity data (EC_x or NOEC) available for the mixture as a whole showing EC_x or NOEC of the tested mixture ≤ 1mg/l:

(i) classify the mixture as Chronic 1, 2 or 3 in accordance with Table 2.4.3.1 (b) (ii) (rapidly degradable) if the available information allows the conclusion that all relevant ingredients of the mixture are rapidly degradable;

(ii) classify the mixture as Chronic 1, 2 or 3 in all other cases in accordance with Table 2.4.3.1 (b) (i) (non-rapidly degradable);

(b) When there are adequate chronic toxicity data (EC_x or NOEC) available for the mixture as a whole showing EC_x(s) or NOEC(s) of the tested mixture > 1mg/l or above the water solubility:

No need to classify for long-term hazard under ADN.

2.4.4.3.5 *Classification for category Chronic 4*

If there are nevertheless reasons for concern:

Classify the mixture as Chronic 4 (safety net classification) in accordance with Table 2.4.3.1 (c).

2.4.4.4 *Classification of mixtures when toxicity data are not available for the complete mixture: bridging principles*

2.4.4.4.1 Where the mixture itself has not been tested to determine its aquatic environmental hazard, but there are sufficient data on the individual ingredients and similar tested mixtures to adequately characterize the hazards of the mixture, these data shall be used in accordance with the following agreed bridging rules. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture without the necessity for additional testing in animals.

2.4.4.4.2 *Dilution*

Where a new mixture is formed by diluting a tested mixture or a substance with a diluent which has an equivalent or lower aquatic hazard classification than the least toxic original ingredient and which is not expected to affect the aquatic hazards of other ingredients, then the resulting mixture shall be classified as equivalent to the original tested mixture or substance. Alternatively, the method explained in 2.4.4.5 may be applied.

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2.4.4.4.3 *Batching*

The aquatic hazard classification of a tested production batch of a mixture can be assumed to be substantially equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the aquatic hazard classification of the untested batch has changed. If the latter occurs, new classification is necessary.

2.4.4.4.4 *Concentration of mixtures which are classified with the most severe classification categories (Chronic 1 and Acute 1)*

If a tested mixture is classified as Chronic 1 and/or Acute 1, and the ingredients of the mixture which are classified as Chronic 1 and/or Acute 1 are further concentrated, the more concentrated untested mixture shall be classified with the same classification category as the original tested mixture without additional testing.

2.4.4.4.5 *Interpolation within one toxicity category*

For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same toxicity category, and where untested mixture C has the same toxicologically active ingredients as mixtures A and B but has concentrations of toxicologically active ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same category as A and B.

2.4.4.4.6 *Substantially similar mixtures*

Given the following:

(a) Two mixtures:

(i) A + B;

(ii) C + B;

(b) The concentration of ingredient B is essentially the same in both mixtures;

(c) The concentration of ingredient A in mixture (i) equals that of ingredient C in mixture (ii);

(d) Data on aquatic hazards for A and C are available and are substantially equivalent, i.e. they are in the same hazard category and are not expected to affect the aquatic toxicity of B.

If mixture (i) or (ii) is already classified based on test data, then the other mixture can be assigned the same hazard category.

2.4.4.5 *Classification of mixtures when toxicity data are available for all ingredients or only for some ingredients of the mixture*

2.4.4.5.1 The classification of a mixture is based on summation of the concentrations of its classified ingredients. The percentage of ingredients classified as ‘Acute’ or ‘Chronic’ will feed straight into the summation method. Details of the summation method are described in 2.4.4.6.1 to 2.4.4.6.4.

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2.4.4.5.2 Mixtures may be made of a combination of both ingredients that are classified (as Acute 1 to 3 and/or Chronic 1 to 4) and those for which adequate toxicity test data are available. When adequate toxicity data are available for more than one ingredient in the mixture, the combined toxicity of those ingredients shall be calculated using the following additivity formulas (a) or (b), depending on the nature of the toxicity data:

(a) Based on acute aquatic toxicity:

$$\frac{\sum C_i}{L(E)C_{50m}} = \sum_n \frac{C_i}{L(E)C_{50i}}$$

where:

C_i = concentration of ingredient i (mass percentage);

$L(E)C_{50i}$ = LC_{50} or EC_{50} for ingredient i (mg/l);

n = number of ingredients, and i is running from 1 to n;

$L(E)C_{50m}$ = $L(E)C_{50}$ of the part of the mixture with test data;

The calculated toxicity shall be used to assign that portion of the mixture an acute hazard category which is then subsequently used in applying the summation method;

(b) Based on chronic aquatic toxicity:

$$\frac{\sum Ci + \sum Cj}{EqNOEC_m} = \sum_n \frac{Ci}{NOECi} + \sum_n \frac{Cj}{0.1 \times NOECj}$$

where:

C_i = concentration of ingredient i (mass percentage) covering the rapidly degradable ingredients;

C_j = concentration of ingredient j (mass percentage) covering the non-rapidly degradable ingredients;

$NOEC_i$ = NOEC (or other recognized measures for chronic toxicity) for ingredient i covering the rapidly degradable ingredients, in mg/l;

$NOEC_j$ = NOEC (or other recognized measures for chronic toxicity) for ingredient j covering the non-rapidly degradable ingredients, in mg/l;

n = number of ingredients, and i and j are running from 1 to n;

$EqNOEC_m$ = equivalent NOEC of the part of the mixture with test data;

The equivalent toxicity thus reflects the fact that non-rapidly degrading substances are classified one hazard category level more "severe" than rapidly degrading substances.

The calculated equivalent toxicity shall be used to assign that portion of the mixture a long-term hazard category, in accordance with the criteria for rapidly degradable substances (Table 2.4.3.1 (b) (ii)), which is then subsequently used in applying the summation method.

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2.4.4.5.3 When applying the additivity formula for part of the mixture, it is preferable to calculate the toxicity of this part of the mixture using for each ingredient toxicity values that relate to the same taxonomic group (i.e. fish, crustacea or algae) and then to use the highest toxicity (lowest value) obtained (i.e. use the most sensitive of the three groups). However, when toxicity data for each ingredient are not available in the same taxonomic group, the toxicity value of each ingredient shall be selected in the same manner that toxicity values are selected for the classification of substances, i.e. the highest toxicity (from the most sensitive test organism) is used. The calculated acute and chronic toxicity may then be used to classify this part of the mixture as Acute 1, 2 or 3 and/or Chronic 1, 2, or 3 using the same criteria described for substances.

2.4.4.5.4 If a mixture is classified in more than one way, the method yielding the more conservative result shall be used.

2.4.4.6 *Summation method*

2.4.4.6.1 *Classification procedures*

In general, a more severe classification for mixtures overrides a less severe classification, e.g. a classification with Chronic 1 overrides a classification with Chronic 2. As a consequence, the classification procedure is already completed if the result of the classification is Chronic 1. A more severe classification than Chronic 1 is not possible; therefore, it is not necessary to pursue the classification procedure further.

2.4.4.6.2 *Classification for categories Acute 1, 2 and 3*

2.4.4.6.2.1 First, all ingredients classified as Acute 1 are considered. If the sum of the concentrations (in %) of these ingredients is ≥ 25%, the whole mixture is classified as Acute 1. If the result of the calculation is a classification of the mixture as Acute 1, the classification process is completed.

2.4.4.6.2.2 In cases where the mixture is not classified as Acute 1, classification of the mixture as Acute 2 shall be considered. A mixture is classified as Acute 2 if 10 times the sum of all ingredients classified as Acute 1 plus the sum of all ingredients classified as Acute 2 is ≥ 25%. If the result of the calculation is classification of the mixture as Acute 2, the classification process is completed.

2.4.4.6.2.3 In cases where the mixture is not classified either as Acute 1 or Acute 2, classification of the mixture as Acute 3 shall be considered. A mixture is classified as Acute 3 if 100 times the sum of all ingredients classified as Acute 1 plus 10 times the sum of all ingredients classified as Acute 2 plus the sum of all ingredients classified as Acute 3 is ≥ 25%.

2.4.4.6.2.4 The classification of mixtures for acute hazards based on this summation of the concentrations of classified ingredients is summarized in Table 2.4.4.6.2.4.

Table 2.4.4.6.2.4: Classification of a mixture for acute hazards based on summation of the concentrations of classified ingredients

Sum of the concentrations (in %) of ingredients classified as:	Mixture classified as:
Acute 1 × M[a] ≥ 25%	Acute 1
(M ×10 x Acute 1) + Acute 2 ≥ 25%	Acute 2
(M × 100 × Acute 1) + (10 × Acute 2) + Acute 3 ≥ 25%	Acute 3

[a] *For explanation of the M factor, see 2.4.4.6.4.*

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2.4.4.6.3 *Classification for categories Chronic 1, 2, 3 and 4*

2.4.4.6.3.1 First, all ingredients classified as Chronic 1 are considered. If the sum of the concentrations (in %) of these ingredients is ≥ 25%, the mixture shall be classified as Chronic 1. If the result of the calculation is a classification of the mixture as Chronic 1, the classification procedure is completed.

2.4.4.6.3.2 In cases where the mixture is not classified as Chronic 1, classification of the mixture as Chronic 2 shall be considered. A mixture is classified as Chronic 2 if 10 times the sum of the concentrations (in %) of all ingredients classified as Chronic 1 plus the sum of the concentrations (in %) of all ingredients classified as Chronic 2 is ≥ 25%. If the result of the calculation is classification of the mixture as Chronic 2, the classification process is completed.

2.4.4.6.3.3 In cases where the mixture is not classified either as Chronic 1 or Chronic 2, classification of the mixture as Chronic 3 shall be considered. A mixture is classified as Chronic 3 if 100 times the sum of all ingredients classified as Chronic 1 plus 10 times the sum of all ingredients classified as Chronic 2 plus the sum of all ingredients classified as Chronic 3 is ≥ 25%.

2.4.4.6.3.4 If the mixture is still not classified in Category Chronic 1, 2 or 3, classification of the mixture as Chronic 4 need not be considered for the purposes of ADN. A mixture is classified as Chronic 4 if the sum of the percentages of ingredients classified as Chronic 1, 2, 3 and 4 is ≥ 25%.

2.4.4.6.3.5 The classification of mixtures for long-term hazards based on this summation of the concentrations of classified ingredients is summarized in Table 2.4.4.6.3.5 below.

Table 2.4.4.6.3.5: Classification of a mixture for long-term hazards based on summation of the concentrations of classified ingredients

Sum of the concentrations (in %) of ingredients classified as:	Mixture classified as:
Chronic 1 × M [a] ≥ 25%	Chronic 1
(M × 10 × Chronic 1) + Chronic 2 ≥ 25%	Chronic 2
(M × 100 × Chronic 1) + (10 × Chronic 2) + Chronic 3 ≥ 25%	Chronic 3
Chronic 1 + Chronic 2 + Chronic 3 + Chronic 4 ≥ 25 %	Chronic 4

[a] *For explanation of the M factor, see 2.4.4.6.4.*

2.4.4.6.4 *Mixtures with highly toxic ingredients*

Acute 1 or Chronic 1 ingredients with acute toxicities well below 1 mg/l and/or chronic toxicities well below 0.1 mg/l (if non-rapidly degradable) and 0.01 mg/l (if rapidly degradable) may influence the toxicity of the mixture and shall be given increased weight in applying the summation method. When a mixture contains ingredients classified as Acute or Chronic 1, the tiered approach described in 2.4.4.6.2 and 2.4.4.6.3 shall be applied using a weighted sum by multiplying the concentrations of Acute 1 and Chronic 1 ingredients by a factor, instead of merely adding up the percentages. This means that the concentration of "Acute 1" in the left column of Table 2.4.4.6.2.4 and the concentration of "Chronic 1" in the left column of Table 2.4.4.6.3.4 are multiplied by the appropriate multiplying factor. The multiplying factors to be applied to these ingredients are defined using the toxicity value, as summarized in Table 2.4.4.6.4 below. Therefore, in order to classify a mixture containing Acute/Chronic 1 ingredients, the classifier needs to be informed of the value of the M factor in order to apply the summation method. Alternatively, the additivity formula (see 2.4.4.5.2) may be used when toxicity data are available for all highly toxic ingredients in the mixture and there is convincing evidence that all other ingredients, including those for which specific acute and/or chronic toxicity data are not available, are of low or no toxicity and do not significantly contribute to the environmental hazard of the mixture.

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Table 2.4.4.6.4 Multiplying factors for highly toxic ingredients of mixtures

Acute toxicity	M factor	Chronic toxicity	M factor	
$L(E)C_{50}$ value		NOEC value	NRD [a] ingredients	RD [b] ingredients
$0.1 < L(E)C_{50} \leq 1$	1	$0.01 < NOEC \leq 0.1$	1	–
$0.01 < L(E)C_{50} \leq 0.1$	10	$0.001 < NOEC \leq 0.01$	10	1
$0.001 < L(E)C_{50} \leq 0.01$	100	$0.0001 < NOEC \leq 0.001$	100	10
$0.0001 < L(E)C_{50} \leq 0.001$	1 000	$0.00001 < NOEC \leq 0.0001$	1 000	100
$0.00001 < L(E)C_{50} \leq 0.0001$	10 000	$0.000001 < NOEC \leq 0.00001$	10 000	1 000
(continue in factor 10 intervals)		(continue in factor 10 intervals)		

[a] *Non-rapidly degradable.*
[b] *Rapidly degradable.*

2.4.4.6.5 Classification of mixtures with ingredients without any useable information

In the event that no useable information on acute and/or chronic aquatic toxicity is available for one or more relevant ingredients, it is concluded that the mixture cannot be attributed (a) definitive hazard category(ies). In this situation, the mixture shall be classified based on the known ingredients only.

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PART 3

Dangerous goods list, special provisions and exemptions related to limited and excepted quantities

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CHAPTER 3.1

GENERAL

3.1.1 Introduction

In addition to the provisions referred to or given in the tables of this Part, the general requirements of each Part, Chapter and/or Section are to be observed. These general requirements are not given in the tables. When a general requirement is contradictory to a special provision, the special provision prevails.

3.1.2 Proper shipping name

NOTE: *For proper shipping names used for the carriage of samples, see 2.1.4.1.*

3.1.2.1 The proper shipping name is that portion of the entry most accurately describing the goods in Table A or Table C in Chapter 3.2, which is shown in upper case characters (plus any numbers, Greek letters, "sec", "tert", and the letters "m", "n", "o", "p", which form an integral part of the name). Particulars concerning the vapour pressure (vp) and the boiling point (bp) in column (2) of Table C in chapter 3.2 are part of the proper shipping name. An alternative proper shipping name may be shown in brackets following the main proper shipping name. In Table A, it is shown in upper case characters (e.g., ETHANOL (ETHYL ALCOHOL)). In Table C, it is shown in lower case characters (e.g. ACETONITRILE (methyl cyanide)). Portions of an entry appearing in lower case need not be considered as part of the proper shipping name unless otherwise stated above.

3.1.2.2 When a combination of several distinct proper shipping names are listed under a single UN number, and these are separated by “and” or ”or” in lower case or are punctuated by commas, only the most appropriate shall be shown in the transport document and package marks. Examples illustrating the selection of the proper shipping name for such entries are:

(a) UN 1057 LIGHTERS or LIGHTER REFILLS - The proper shipping name is the most appropriate of the following possible combinations:

LIGHTERS

LIGHTER REFILLS;

(b) UN 2793 FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS in a form liable to self-heating. The proper shipping name is the most appropriate of the following combinations:

FERROUS METAL BORINGS

FERROUS METAL SHAVINGS

FERROUS METAL TURNINGS

FERROUS METAL CUTTINGS.

3.1.2.3 Proper shipping names may be used in the singular or plural as appropriate. In addition, when qualifying words are used as part of the proper shipping name, their sequence on documentation or package marks is optional. For instance, "DIMETHYLAMINE AQUEOUS SOLUTION" may alternatively be shown "AQUEOUS SOLUTION OF DIMETHYLAMINE". Commercial or military names for goods of Class 1 which contain the proper shipping name supplemented by additional descriptive text may be used.

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3.1.2.4 Many substances have an entry for both the liquid and solid state (see definitions for liquid and solid in 1.2.1), or for the solid and solution. These are allocated separate UN numbers which are not necessarily adjacent to each other[1].

3.1.2.5 Unless it is already included in capital letters in the name indicated in Table A or Table C in Chapter 3.2, the qualifying word "MOLTEN" shall be added as part of the proper shipping name when a substance, which is a solid in accordance with the definition in 1.2.1, is offered for carriage in the molten state (e.g. ALKYLPHENOL, SOLID, N.O.S., MOLTEN).

3.1.2.6 Except for self-reactive substances and organic peroxides and unless it is already included in capital letters in the name indicated in Column (2) of Table A of Chapter 3.2, the word "STABILIZED" shall be added as part of the proper shipping name of a substance which without stabilization would be forbidden from carriage in accordance with paragraphs 2.2.X.2 due to it being liable to dangerously react under conditions normally encountered in carriage (e.g.: "TOXIC LIQUID, ORGANIC, N.O.S., STABILIZED").

When temperature control is used to stabilize such substances to prevent the development of any dangerous excess pressure, or the evolution of excessive heat, or when chemical stabilization is used in combination with temperature control, then:

(a) For liquids and solids where the SAPT[2] (measured without or with inhibitor, when chemical stabilization is applied) is less than or equal to that prescribed in 2.2.41.1.21, the provisions of 2.2.41.1.17, special provision 386 of Chapter 3.3, 7.1.7, special provision V8 of Chapter 7.2 of ADR, special provision S4 of Chapter 8.5 of ADR and the requirements of Chapter 9.6 of ADR apply except that the term “SADT” as used in these paragraphs is understood to include also “SAPT” when the substance concerned reacts by polymerization;

(b) Unless it is already included in capital letters in the name indicated in Column (2) of Table A in Chapter 3.2, the words “TEMPERATURE CONTROLLED” shall be added as part of the proper shipping name;

(c) For gases: the conditions of carriage shall be approved by the competent authority.

3.1.2.7 Hydrates may be carried under the proper shipping name for the anhydrous substance.

3.1.2.8 ***Generic or "not otherwise specified" (N.O.S.) names***

3.1.2.8.1 Generic and "not otherwise specified" proper shipping names that are assigned to special provision 274 or 318 in Column (6) of Table A in Chapter 3.2 or remark 27 in column (20) of Table C in Chapter 3.2 shall be supplemented with the technical name of the goods unless a national law or international convention prohibits its disclosure if it is a controlled substance. For explosive substances and articles of Class 1, the dangerous goods description may be supplemented by additional descriptive text to indicate commercial or military names. Technical names shall be entered in brackets immediately following the proper shipping name. An appropriate modifier, such as "contains" or "containing" or other qualifying words such as "mixture", "solution", etc. and the percentage of the technical constituent may also be used. For example: "UN 1993 FLAMMABLE LIQUID, N.O.S. (CONTAINS XYLENE AND BENZENE), 3, II".

3.1.2.8.1.1 The technical name shall be a recognized chemical name or biological name, or other name currently used in scientific and technical handbooks, journals and texts. Trade names shall not be used for this purpose. In the case of pesticides, only ISO common name(s), other name(s)

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[1] *Details are provided in the alphabetical index (Table B of Chapter 3.2), e.g.:*

NITROXYLENES, LIQUID	*6.1*	*1665*
NITROXYLENES, SOLID	*6.1*	*3447*

[2] *For the definition of self-accelerating polymerization temperature (SAPT), see 1.2.1.*

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in the World Health Organization (WHO) Recommended Classification of Pesticides by Hazard and Guidelines to Classification, or the name(s) of the active substance(s) may be used.

3.1.2.8.1.2 When a mixture of dangerous goods or articles containing dangerous goods are described by one of the "N.O.S." or "generic" entries to which special provision 274 has been allocated in Column (6) of Table A in Chapter 3.2, not more than the two constituents which most predominantly contribute to the hazard or hazards of the mixture or of the articles need to be shown, excluding controlled substances when their disclosure is prohibited by national law or international convention. If a package containing a mixture is labelled with any subsidiary hazard label, one of the two technical names shown in parentheses shall be the name of the constituent which compels the use of the subsidiary hazard label.

***NOTE**: see 5.4.1.2.2.*

3.1.2.8.1.3 Examples illustrating the selection of the proper shipping name supplemented with the technical name of goods for such N.O.S. entries are:

UN 2902 PESTICIDE, LIQUID, TOXIC, N.O.S. (drazoxolon);

UN 3394 ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE (trimethylgallium).

UN 3540 ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S. (pyrrolidine)

3.1.2.8.1.4 Examples illustrating how the proper shipping name is supplemented in the indication of the vapour pressure or the boiling-point for N.O.S entries for carriage in tank vessels are:

UN 1268 PETROLEUM DISTILLATES, N.O.S (NAPHTHA). 110 kPa < pv50 ≤ 150 kPa;

UN 1993 FLAMMABLE LIQUID, N.O.S. WITH MORE THAN 10% BENZENE, 60 °C < INITIAL BOILING POINT ≤ 85 °C (containing ACETONE).

3.1.3 Solutions or mixtures

***NOTE:** Where a substance is specifically mentioned by name in Table A of Chapter 3.2, it shall be identified in carriage by the proper shipping name in Column (2) of Table A of Chapter 3.2. Such substances may contain technical impurities (for example those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance mentioned by name containing technical impurities or additives for stability or other purposes affecting its classification shall be considered a solution or mixture (see 2.1.3.3).*

3.1.3.1 A solution or mixture is not subject to ADN if the characteristics, properties, form or physical state of the solution or mixture are such that it does not meet the criteria, including human experience criteria, for inclusion in any class.

3.1.3.2 A solution or mixture meeting the classification criteria of ADN composed of a single predominant substance mentioned by name in Table A of Chapter 3.2 and one or more substances not subject to ADN and/or traces of one or more substances mentioned by name in Table A of Chapter 3.2, shall be assigned the UN number and proper shipping name of the predominant substance mentioned by name in Table A of Chapter 3.2 unless:

(a) The solution or mixture is mentioned by name in Table A of Chapter 3.2;

(b) The name and description of the substance mentioned by name in Table A of Chapter 3.2 specifically indicate that they apply only to the pure substance;

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(c) The class, classification code, packing group, or physical state of the solution or mixture is different from that of the substance mentioned by name in Table A of Chapter 3.2; or

(d) The hazard characteristics and properties of the solution or mixture necessitate emergency response measures that are different from those required for the substance mentioned by name in Table A of Chapter 3.2.

Qualifying words such as "SOLUTION" or "MIXTURE", as appropriate, shall be added as part of the proper shipping name, for example, "ACETONE SOLUTION". In addition, the concentration of the mixture or solution may also be indicated after the basic description of the mixture or solution, for example, "ACETONE 75% SOLUTION".

3.1.3.3 A solution or mixture meeting the classification criteria of ADN that is not mentioned by name in Table A of Chapter 3.2 and that is composed of two or more dangerous goods shall be assigned to an entry that has the proper shipping name, description, class, classification code and packing group that most precisely describe the solution or mixture.

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CHAPTER 3.2

DANGEROUS GOODS LIST

3.2.1 Table A: List of dangerous goods in numerical order

Explanations concerning Table A:

As a rule, each row of Table A deals with the substance(s) or article(s) covered by a specific UN number or an identification number. However, when substances or articles belonging to the same UN number have different chemical properties, physical properties and/or carriage conditions, several consecutive rows may be used for that UN number or identification number.

Each column of Table A is dedicated to a specific subject as indicated in the explanatory notes below. The intersection of columns and rows (cell) contains information concerning the subject treated in that column, for the substance(s) or article(s) of that row:

– The first four cells identify the substance(s) or article(s) belonging to that row (additional information in that respect may be given by the special provisions referred to in Column (6));

– The following cells give the applicable special provisions, either in the form of complete information or in coded form. The codes cross-refer to detailed information that is to be found in the numbers indicated in the explanatory notes below. An empty cell means either that there is no special provision and that only the general requirements apply, or that the carriage restriction indicated in the explanatory notes is in force. When used in this table, an alphanumeric code starting with the letters "SP" designates a special provision of Chapter 3.3.

The applicable general requirements are not referred to in the corresponding cells.

Explanatory notes for each column:

Column (1) "UN number/identification number".

Contains the UN number or the identification number:

– of the dangerous substance or article if the substance or article has been assigned its own specific UN number or identification number, or

– of the generic or n.o.s. entry to which the dangerous substances or articles not mentioned by name shall be assigned in accordance with the criteria ("decision trees") of Part 2.

Column (2) "Name and description"

Contains, in upper case characters, the name of the substance or article, if the substance or article has been assigned its own specific UN number or identification number, or of the generic or n.o.s. entry to which it has been assigned in accordance with the criteria ("decision trees") of Part 2. This name shall be used as the proper shipping name or, when applicable, as part of the proper shipping name (see 3.1.2 for further details on the proper shipping name).

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A descriptive text in lower case characters is added after the proper shipping name to clarify the scope of the entry if the classification and/or carriage conditions of the substance or article may be different under certain conditions.

Column (3a) "Class"

Contains the number of the Class, whose heading covers the dangerous substance or article. This Class number is assigned in accordance with the procedures and criteria of Part 2.

Column (3b) "Classification code"

Contains the classification code of the dangerous substance or article.

– For dangerous substances or articles of Class 1, the code consists of a division number and compatibility group letter, which are assigned in accordance with the procedures and criteria of 2.2.1.1.4.

– For dangerous substances or articles of Class 2, the code consists of a number and one or more letters representing the hazardous property group, which are explained in 2.2.2.1.2 and 2.2.2.1.3.

– For dangerous substances or articles of Classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2 and 9, the codes are explained in 2.2.x.1.2. [1]

– For dangerous substances or articles of Class 8, the codes are explained in 2.2.8.1.4.1;

– Dangerous substances or articles of Class 7 do not have a classification code.

Column (4) "Packing group"

Contains the packing group number(s) (I, II or III) assigned to the dangerous substance. These packing group numbers are assigned on the basis of the procedures and criteria of Part 2. Certain articles and substances are not assigned to packing groups.

Column (5) "Labels"

Contains the model number of the labels/placards (see 5.2.2.2 and 5.3.1.1.7) that have to be affixed to packages, containers, tank-containers, portable tanks, MEGCs, vehicles and wagons. However:

– For substances or articles of Class 7, 7X means label model No. 7A, 7B or 7C as appropriate according to the category (see 5.1.5.3.4 and 5.2.2.1.11.1) or placard No. 7D (see 5.3.1.1.3 and 5.3.1.1.7.2).

The general provisions on labelling/placarding (e.g. number of labels, their location) are to be found in 5.2.2.1 for packages, and in 5.3.1, for containers, tank-containers, MEGCs, portable tanks, vehicles and wagons.

NOTE: *Special provisions, indicated in Column (6), may change the above labelling provisions.*

[1] *x = the Class number of the dangerous substance or article, without dividing point if applicable.*

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Column (6) "Special provisions"

Contains the numeric codes of special provisions that have to be met. These provisions concern a wide array of subjects, mainly connected with the contents of Columns (1) to (5) (e.g. carriage prohibitions, exemptions from certain requirements, explanations concerning the classification of certain forms of the dangerous goods concerned and additional labelling or marking provisions), and are listed in Chapter 3.3 in numerical order. If Column (6) is empty, no special provisions apply to the contents of Columns (1) to (5) for the dangerous goods concerned. Special provisions specific to inland navigation begin at 800.

Column (7a) "Limited Quantities"

Provides the maximum quantity per inner packaging or article for carrying dangerous goods as limited quantities in accordance with Chapter 3.4.

Column (7b) "Excepted Quantities"

Contains an alphanumeric code with the following meaning:

– "E0" signifies that no exemption from the provisions of ADN exists for the dangerous goods packed in excepted quantities;

– All the other alphanumerical codes starting with the letter "E" signify that the provisions of ADN are not applicable if the conditions indicated in Chapter 3.5 are fulfilled.

Column (8) "Carriage permitted"

This column contains the alphabetic codes concerning the permitted form of carriage in inland navigation vessels.

If column (8) is empty, the substance or article may only be carried in packages.

If column (8) contains code "B", carriage is permitted in packages or in bulk (see 7.1.1.11).

If column (8) contains code "T", carriage is permitted in packages and in tank vessels. In the event of carriage in tank vessels, the requirements of Table C are applicable (see 7.2.1.21).

Column (9) "Equipment required"

This column contains the alphanumeric codes for the equipment required for the carriage of the dangerous substance or article (see 8.1.5).

Column (10) "Ventilation"

This column contains the alphanumeric codes of the special requirements concerning ventilation applicable to carriage with the following meaning:

– alphanumeric codes starting with the letters "VE" mean that special additional conditions are applicable to carriage. These can be found in 7.1.6.12 and establish special requirements.

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Column (11) "Provisions concerning loading, unloading and carriage"

This column contains the alphanumeric codes of the special requirements applicable to carriage with the following meaning:

– alphanumeric codes starting with the letters "CO", "ST" and "RA" mean that special additional conditions are applicable to carriage in bulk. These can be found in 7.1.6.11 and establish special requirements.

– alphanumeric codes starting with the letters "LO" mean that special additional conditions are applicable prior to loading. These can be found in 7.1.6.13 and establish special requirements.

– alphanumeric codes starting with the letters "HA" mean that special additional conditions are applicable to the handling and stowage of the cargo. These can be found in 7.1.6.14 and establish special requirements.

– alphanumeric codes starting with the letters "IN" mean that special additional conditions are applicable to the inspection of holds during carriage. These can be found in 7.1.6.16 and establish special requirements.

Column (12) "Number of blue cones/lights"

This column contains the number of cones/lights which should constitute the marking of the vessel during the carriage of this dangerous substance or article (see 7.1.5).

Column (13) "Additional requirements/Remarks"

This column contains additional requirements or observations concerning the carriage of this dangerous substance or article.

UN No. or ID No.	Name and description	Class	Classi-fication Code	Packing group	Labels	Special provis-ions	Limited and excepted quantities		Carriage permitted	Equipment required	Venti-lation	Provisions concerning loading, unloading and carriage			Number of blue cones/ lights	Remarks
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
0004	AMMONIUM PICRATE dry or wetted with less than 10% water, by mass	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0005	CARTRIDGES FOR WEAPONS with bursting charge	1	1.1F		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0006	CARTRIDGES FOR WEAPONS with bursting charge	1	1.1E		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0007	CARTRIDGES FOR WEAPONS with bursting charge	1	1.2F		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0009	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1	1.2G		1		0	E0		PP		LO01	HA01, HA03		3	
0010	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1	1.3G		1		0	E0		PP		LO01	HA01, HA03		3	
0012	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1	1.4S		1.4	364	5 kg	E0		PP		LO01	HA01, HA03		0	
0014	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK or CARTRIDGES FOR TOOLS, BLANK	1	1.4S		1.4	364	5 kg	E0		PP		LO01	HA01, HA03		0	
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	1	1.2G		1		0	E0		PP		LO01	HA01, HA03		3	
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances	1	1.2G		1 +8		0	E0		PP		LO01	HA01, HA03		3	
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing toxic by inhalation substances	1	1.2G		1+6.1		0	E0		PP		LO01	HA01, HA03		3	
0016	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	1	1.3G		1		0	E0		PP		LO01	HA01, HA03		3	
0016	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances	1	1.3G		1 +8		0	E0		PP		LO01	HA01, HA03		3	
0016	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing toxic by inhalation substances	1	1.3G		1+6.1		0	E0		PP		LO01	HA01, HA03		3	
0018	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1	1.2G		1+6.1+8	802	0	E0		PP		LO01	HA01, HA03		3	
0019	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1	1.3G		1+6.1+8	802	0	E0		PP		LO01	HA01, HA03		3	
0020	AMMUNITION, TOXIC with burster, expelling charge or propelling charge	1	1.2K	**CARRIAGE PROHIBITED**												
0021	AMMUNITION, TOXIC with burster, expelling charge or propelling charge	1	1.3K	**CARRIAGE PROHIBITED**												
0027	BLACK POWDER (GUNPOWDER), granular or as a meal	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0028	BLACK POWDER (GUNPOWDER), COMPRESSED or BLACK POWDER (GUNPOWDER), IN PELLETS	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0029	DETONATORS, NON-ELECTRIC for blasting	1	1.1B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0030	DETONATORS, ELECTRIC for blasting	1	1.1B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0033	BOMBS with bursting charge	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0034	BOMBS with bursting charge	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0035	BOMBS with bursting charge	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0037	BOMBS, PHOTO-FLASH	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0038	BOMBS, PHOTO-FLASH	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0039	BOMBS, PHOTO-FLASH	1	1.2G		1		0	E0		PP		LO01 HA01, HA03	3	
0042	BOOSTERS without detonator	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0043	BURSTERS, explosive	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0044	PRIMERS, CAP TYPE	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0048	CHARGES, DEMOLITION	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0049	CARTRIDGES, FLASH	1	1.1G		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0050	CARTRIDGES, FLASH	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0054	CARTRIDGES, SIGNAL	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0055	CASES, CARTRIDGE, EMPTY, WITH PRIMER	1	1.4S		1.4	364	5 kg	E0		PP		LO01 HA01, HA03	0	
0056	CHARGES, DEPTH	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0059	CHARGES, SHAPED without detonator	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
0060	CHARGES, SUPPLEMENTARY, EXPLOSIVE	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0065	CORD, DETONATING, flexible	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0066	CORD, IGNITER	1	1.4G		1.4		0	E0		PP		LO01	HA01, HA03		1	
0070	CUTTERS, CABLE, EXPLOSIVE	1	1.4S		1.4		0	E0		PP		LO01	HA01, HA03		0	
0072	CYCLOTRIMETHYLENETRINITRAMINE (CYCLONITE; HEXOGEN; RDX), WETTED with not less than 15% water, by mass	1	1.1D		1	266	0	E0		PP		LO01	HA01, HA02, HA03		3	
0073	DETONATORS FOR AMMUNITION	1	1.1B		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0074	DIAZODINITROPHENOL, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	1	1.1A		1	266	0	E0		PP		LO01	HA01, HA02, HA03		3	
0075	DIETHYLENEGLYCOL DINITRATE, DESENSITIZED with not less than 25% non-volatile, water-insoluble phlegmatizer, by mass	1	1.1D		1	266	0	E0		PP		LO01	HA01, HA02, HA03		3	
0076	DINITROPHENOL, dry or wetted with less than 15% water, by mass	1	1.1D		1+6.1	802	0	E0		PP		LO01	HA01, HA02, HA03		3	
0077	DINITROPHENOLATES, alkali metals, dry or wetted with less than 15% water, by mass	1	1.3C		1+6.1	802	0	E0		PP		LO01	HA01, HA03		3	
0078	DINITRORESORCINOL, dry or wetted with less than 15% water, by mass	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0079	HEXANITRODIPHENYLAMINE (DIPICRYLAMINE; HEXYL)	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0081	EXPLOSIVE, BLASTING, TYPE A	1	1.1D		1	616 617	0	E0		PP		LO01	HA01, HA02, HA03		3	
0082	EXPLOSIVE, BLASTING, TYPE B	1	1.1D		1	617	0	E0		PP		LO01	HA01, HA02, HA03		3	
0083	EXPLOSIVE, BLASTING, TYPE C	1	1.1D		1	267 617	0	E0		PP		LO01	HA01, HA02, HA03		3	
0084	EXPLOSIVE, BLASTING, TYPE D	1	1.1D		1	617	0	E0		PP		LO01	HA01, HA02, HA03		3	
0092	FLARES, SURFACE	1	1.3G		1		0	E0		PP		LO01	HA01, HA03		3	
0093	FLARES, AERIAL	1	1.3G		1		0	E0		PP		LO01	HA01, HA03		3	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0094	FLASH POWDER	1	1.1G		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0099	FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0101	FUSE, NON-DETONATING	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0102	CORD (FUSE), DETONATING, metal clad	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0103	FUSE, IGNITER, tubular, metal clad	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0104	CORD (FUSE), DETONATING, MILD EFFECT, metal clad	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0105	FUSE, SAFETY	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0106	FUZES, DETONATING	1	1.1B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0107	FUZES, DETONATING	1	1.2B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0110	GRENADES, PRACTICE, hand or rifle	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0113	GUANYLNITROSAMINOGUANYLIDENE HYDRAZINE, WETTED with not less than 30% water, by mass	1	1.1A		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	
0114	GUANYLNITROSAMINOGUANYLTETRAZENE (TETRAZENE), WETTED with not less than 30% water, or mixture of alcohol and water, by mass	1	1.1A		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	
0118	HEXOLITE (HEXOTOL), dry or wetted with less than 15% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0121	IGNITERS	1	1.1G		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0124	JET PERFORATING GUNS, CHARGED, oil well, without detonator	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0129	LEAD AZIDE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	
0130	LEAD STYPHNATE (LEAD TRINITRORESORCINATE), WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	
0131	LIGHTERS, FUSE	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0132	DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES, N.O.S.	1	1.3C		1	274	0	E0		PP		LO01 HA01, HA03	3	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0133	MANNITOL HEXANITRATE (NITROMANNITE), WETTED with not less than 40% water, or mixture of alcohol and water, by mass	1	1.1D		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	
0135	MERCURY FULMINATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	
0136	MINES with bursting charge	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0137	MINES with bursting charge	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0138	MINES with bursting charge	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0143	NITROGLYCERIN, DESENSITIZED with not less than 40% non-volatile water-insoluble phlegmatizer, by mass	1	1.1D		1+6.1	266 271 802	0	E0		PP		LO01 HA01, HA02, HA03	3	
0144	NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 10% nitroglycerin	1	1.1D		1	358	0	E0		PP		LO01 HA01, HA02, HA03	3	
0146	NITROSTARCH, dry or wetted with less than 20% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0147	NITRO UREA	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0150	PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), WETTED with not less than 25% water, by mass, or DESENSITIZED with not less than 15% phlegmatizer, by mass	1	1.1D		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	
0151	PENTOLITE, dry or wetted with less than 15% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0153	TRINITROANILINE (PICRAMIDE)	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0154	TRINITROPHENOL (PICRIC ACID), dry or wetted with less than 30% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0155	TRINITROCHLOROBENZENE (PICRYL CHLORIDE)	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0159	POWDER CAKE (POWDER PASTE), WETTED with not less than 25% water, by mass	1	1.3C		1	266	0	E0		PP		LO01 HA01, HA03	3	
0160	POWDER, SMOKELESS	1	1.1C		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0161	POWDER, SMOKELESS	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0167	PROJECTILES with bursting charge	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0168	PROJECTILES with bursting charge	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0169	PROJECTILES with bursting charge	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0171	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	1	1.2G		1		0	E0		PP		LO01 HA01, HA03	3	
0173	RELEASE DEVICES, EXPLOSIVE	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0174	RIVETS, EXPLOSIVE	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0180	ROCKETS with bursting charge	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0181	ROCKETS with bursting charge	1	1.1E		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0182	ROCKETS with bursting charge	1	1.2E		1		0	E0		PP		LO01 HA01, HA03	3	
0183	ROCKETS with inert head	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0186	ROCKET MOTORS	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0190	SAMPLES, EXPLOSIVE, other than initiating explosive	1				16 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0191	SIGNAL DEVICES, HAND	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0192	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1	1.1G		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0193	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0194	SIGNALS, DISTRESS, ship	1	1.1G		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0195	SIGNALS, DISTRESS, ship	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0196	SIGNALS, SMOKE	1	1.1G		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0197	SIGNALS, SMOKE	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0204	SOUNDING DEVICES, EXPLOSIVE	1	1.2F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0207	TETRANITROANILINE	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0208	TRINITROPHENYLMETHYLNITRAMINE (TETRYL)	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0209	TRINITROTOLUENE (TNT), dry or wetted with less than 30% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0212	TRACERS FOR AMMUNITION	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0213	TRINITROANISOLE	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0214	TRINITROBENZENE, dry or wetted with less than 30% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0215	TRINITROBENZOIC ACID, dry or wetted with less than 30% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0216	TRINITRO-m-CRESOL	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0217	TRINITRONAPHTHALENE	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0218	TRINITROPHENETOLE	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0219	TRINITRORESORCINOL (STYPHNIC ACID), dry or wetted with less than 20% water, or mixture of alcohol and water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0220	UREA NITRATE, dry or wetted with less than 20% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0221	WARHEADS, TORPEDO with bursting charge	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0222	AMMONIUM NITRATE	1	1.1D		1	370	0	E0		PP		LO01 HA01, HA02, HA03	3	
0224	BARIUM AZIDE, dry or wetted with less than 50% water, by mass	1	1.1A		1+6.1	802	0	E0		PP		LO01 HA01, HA02, HA03	3	
0225	BOOSTERS WITH DETONATOR	1	1.1B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0226	CYCLOTETRAMETHYLENETETRANITRAMINE (HMX; OCTOGEN), WETTED with not less than 15% water, by mass	1	1.1D		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0234	SODIUM DINITRO-o-CRESOLATE, dry or wetted with less than 15% water, by mass	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0235	SODIUM PICRAMATE, dry or wetted with less than 20% water, by mass	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0236	ZIRCONIUM PICRAMATE, dry or wetted with less than 20% water, by mass	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0237	CHARGES, SHAPED, FLEXIBLE, LINEAR	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0238	ROCKETS, LINE-THROWING	1	1.2G		1		0	E0		PP		LO01 HA01, HA03	3	
0240	ROCKETS, LINE-THROWING	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0241	EXPLOSIVE, BLASTING, TYPE E	1	1.1D		1	617	0	E0		PP		LO01 HA01, HA02, HA03	3	
0242	CHARGES, PROPELLING, FOR CANNON	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0243	AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.2H		1		0	E0		PP		LO01 HA01, HA03	3	
0244	AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.3H		1		0	E0		PP		LO01 HA01, HA03	3	
0245	AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.2H		1		0	E0		PP		LO01 HA01, HA03	3	
0246	AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.3H		1		0	E0		PP		LO01 HA01, HA03	3	
0247	AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge	1	1.3J		1		0	E0		PP		LO01 HA01, HA03	3	
0248	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	1	1.2L		1	274	0	E0		PP		LO01 HA01, HA03	3	
0249	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	1	1.3L		1	274	0	E0		PP		LO01 HA01, HA03	3	
0250	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	1	1.3L		1		0	E0		PP		LO01 HA01, HA03	3	
0254	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0255	DETONATORS, ELECTRIC for blasting	1	1.4B		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	
0257	FUZES, DETONATING	1	1.4B		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	
0266	OCTOLITE (OCTOL), dry or wetted with less than 15% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0267	DETONATORS, NON-ELECTRIC for blasting	1	1.4B		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0268	BOOSTERS WITH DETONATOR	1	1.2B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0271	CHARGES, PROPELLING	1	1.1C		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0272	CHARGES, PROPELLING	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0275	CARTRIDGES, POWER DEVICE	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0276	CARTRIDGES, POWER DEVICE	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0277	CARTRIDGES, OIL WELL	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0278	CARTRIDGES, OIL WELL	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0279	CHARGES, PROPELLING, FOR CANNON	1	1.1C		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0280	ROCKET MOTORS	1	1.1C		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0281	ROCKET MOTORS	1	1.2C		1		0	E0		PP		LO01 HA01, HA03	3	
0282	NITROGUANIDINE (PICRITE), dry or wetted with less than 20% water, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0283	BOOSTERS without detonator	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0284	GRENADES, hand or rifle, with bursting charge	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0285	GRENADES, hand or rifle, with bursting charge	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0286	WARHEADS, ROCKET with bursting charge	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0287	WARHEADS, ROCKET with bursting charge	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0288	CHARGES, SHAPED, FLEXIBLE, LINEAR	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0289	CORD, DETONATING, flexible	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0290	CORD (FUSE), DETONATING, metal clad	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0291	BOMBS with bursting charge	1	1.2F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0292	GRENADES, hand or rifle, with bursting charge	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0293	GRENADES, hand or rifle, with bursting charge	1	1.2F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0294	MINES with bursting charge	1	1.2F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0295	ROCKETS with bursting charge	1	1.2F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0296	SOUNDING DEVICES, EXPLOSIVE	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0297	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0299	BOMBS, PHOTO-FLASH	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0300	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0301	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1	1.4G		1.4+6.1+8	802	0	E0		PP		LO01 HA01, HA03	1	
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances	1	1.4G		1.4 +8		0	E0		PP		LO01 HA01, HA03	1	
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing toxic by inhalation substances	1	1.4G		1.4+6.1		0	E0		PP		LO01 HA01, HA03	1	
0305	FLASH POWDER	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0306	TRACERS FOR AMMUNITION	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0312	CARTRIDGES, SIGNAL	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0313	SIGNALS, SMOKE	1	1.2G		1		0	E0		PP		LO01 HA01, HA03	3	
0314	IGNITERS	1	1.2G		1		0	E0		PP		LO01 HA01, HA03	3	
0315	IGNITERS	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0316	FUZES, IGNITING	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0317	FUZES, IGNITING	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0318	GRENADES, PRACTICE, hand or rifle	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0319	PRIMERS, TUBULAR	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0320	PRIMERS, TUBULAR	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0321	CARTRIDGES FOR WEAPONS with bursting charge	1	1.2E		1		0	E0		PP		LO01 HA01, HA03	3	
0322	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	1	1.2L		1		0	E0		PP		LO01 HA01, HA03	3	
0323	CARTRIDGES, POWER DEVICE	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0324	PROJECTILES with bursting charge	1	1.2F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0325	IGNITERS	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0326	CARTRIDGES FOR WEAPONS, BLANK	1	1.1C		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0327	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0328	CARTRIDGES FOR WEAPONS, INERT PROJECTILE	1	1.2C		1		0	E0		PP		LO01 HA01, HA03	3	
0329	TORPEDOES with bursting charge	1	1.1E		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0330	TORPEDOES with bursting charge	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0331	EXPLOSIVE, BLASTING, TYPE B (AGENT, BLASTING, TYPE B)	1	1.5D		1.5	617	0	E0		PP		LO01 HA01, HA03	3	
0332	EXPLOSIVE, BLASTING, TYPE E (AGENT, BLASTING, TYPE E)	1	1.5D		1.5	617	0	E0		PP		LO01 HA01, HA03	3	
0333	FIREWORKS	1	1.1G		1	645	0	E0		PP		LO01 HA01, HA02, HA03	3	
0334	FIREWORKS	1	1.2G		1	645	0	E0		PP		LO01 HA01, HA03	3	
0335	FIREWORKS	1	1.3G		1	645	0	E0		PP		LO01 HA01, HA03	3	
0336	FIREWORKS	1	1.4G		1.4	645 651	0	E0		PP		LO01 HA01, HA03	1	
0337	FIREWORKS	1	1.4S		1.4	645	0	E0		PP		LO01 HA01, HA03	0	
0338	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0339	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0340	NITROCELLULOSE, dry or wetted with less than 25% water (or alcohol), by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0341	NITROCELLULOSE, unmodified or plasticized with less than 18% plasticizing substance, by mass	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0342	NITROCELLULOSE, WETTED with not less than 25% alcohol, by mass	1	1.3C		1	105	0	E0		PP		LO01 HA01, HA03	3	
0343	NITROCELLULOSE, PLASTICIZED with not less than 18% plasticizing substance, by mass	1	1.3C		1	105	0	E0		PP		LO01 HA01, HA03	3	
0344	PROJECTILES with bursting charge	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0345	PROJECTILES, inert with tracer	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0346	PROJECTILES with burster or expelling charge	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0347	PROJECTILES with burster or expelling charge	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0348	CARTRIDGES FOR WEAPONS with bursting charge	1	1.4F		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	
0349	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4S		1.4	178 274 347	0	E0		PP		LO01 HA01, HA03	0	
0350	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4B		1.4	178 274	0	E0		PP		LO01 HA01, HA02, HA03	1	
0351	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4C		1.4	178 274	0	E0		PP		LO01 HA01, HA03	1	
0352	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4D		1.4	178 274	0	E0		PP		LO01 HA01, HA03	1	
0353	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4G		1.4	178 274	0	E0		PP		LO01 HA01, HA03	1	
0354	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1L		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0355	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2L		1	178 274	0	E0		PP		LO01 HA01, HA03	3	
0356	ARTICLES, EXPLOSIVE, N.O.S.	1	1.3L		1	178 274	0	E0		PP		LO01 HA01, HA03	3	
0357	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1L		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0358	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.2L		1	178 274	0	E0		PP		LO01 HA01, HA03	3	
0359	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3L		1	178 274	0	E0		PP		LO01 HA01, HA03	3	
0360	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1	1.1B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0361	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1	1.4B		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	
0362	AMMUNITION, PRACTICE	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0363	AMMUNITION, PROOF	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0364	DETONATORS FOR AMMUNITION	1	1.2B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0365	DETONATORS FOR AMMUNITION	1	1.4B		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	
0366	DETONATORS FOR AMMUNITION	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0367	FUZES, DETONATING	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0368	FUZES, IGNITING	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0369	WARHEADS, ROCKET with bursting charge	1	1.1F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0370	WARHEADS, ROCKET with burster or expelling charge	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0371	WARHEADS, ROCKET with burster or expelling charge	1	1.4F		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	
0372	GRENADES, PRACTICE, hand or rifle	1	1.2G		1		0	E0		PP		LO01 HA01, HA03	3	
0373	SIGNAL DEVICES, HAND	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0374	SOUNDING DEVICES, EXPLOSIVE	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0375	SOUNDING DEVICES, EXPLOSIVE	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0376	PRIMERS, TUBULAR	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0377	PRIMERS, CAP TYPE	1	1.1B		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0378	PRIMERS, CAP TYPE	1	1.4B		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	
0379	CASES, CARTRIDGE, EMPTY, WITH PRIMER	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0380	ARTICLES, PYROPHORIC	1	1.2L		1		0	E0		PP		LO01 HA01, HA03	3	
0381	CARTRIDGES, POWER DEVICE	1	1.2C		1		0	E0		PP		LO01 HA01, HA03	3	
0382	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.2B		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0383	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.4B		1.4	178 274	0	E0		PP		LO01 HA01, HA02, HA03	1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
0384	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.4S		1.4	178 274 347	0	E0		PP		LO01	HA01, HA03		0	
0385	5-NITROBENZOTRIAZOL	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0386	TRINITROBENZENESULPHONIC ACID	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0387	TRINITROFLUORENONE	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0388	TRINITROTOLUENE (TNT) AND TRINITROBENZENE MIXTURE or TRINITROTOLUENE (TNT) AND HEXANITROSTILBENE MIXTURE	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0389	TRINITROTOLUENE (TNT) MIXTURE CONTAINING TRINITROBENZENE AND HEXANITROSTILBENE	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0390	TRITONAL	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0391	CYCLOTRIMETHYLENETRINITRAMINE (CYCLONITE; HEXOGEN; RDX) AND CYCLOTETRAMETHYLENETETRANITRAMINE (HMX; OCTOGEN) MIXTURE, WETTED with not less than 15% water, by mass or DESENSITIZED with not less than 10% phlegmatiser by mass	1	1.1D		1	266	0	E0		PP		LO01	HA01, HA02, HA03		3	
0392	HEXANITROSTILBENE	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0393	HEXOTONAL	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0394	TRINITRORESORCINOL (STYPHNIC ACID), WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0395	ROCKET MOTORS, LIQUID FUELLED	1	1.2J		1		0	E0		PP		LO01	HA01, HA03		3	
0396	ROCKET MOTORS, LIQUID FUELLED	1	1.3J		1		0	E0		PP		LO01	HA01, HA03		3	
0397	ROCKETS, LIQUID FUELLED with bursting charge	1	1.1J		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0398	ROCKETS, LIQUID FUELLED with bursting charge	1	1.2J		1		0	E0		PP		LO01	HA01, HA03		3	
0399	BOMBS WITH FLAMMABLE LIQUID with bursting charge	1	1.1J		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0400	BOMBS WITH FLAMMABLE LIQUID with bursting charge	1	1.2J		1		0	E0		PP		LO01	HA01, HA03		3	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
0401	DIPICRYL SULPHIDE, dry or wetted with less than 10% water, by mass	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0402	AMMONIUM PERCHLORATE	1	1.1D		1	152	0	E0		PP		LO01	HA01, HA02, HA03		3	
0403	FLARES, AERIAL	1	1.4G		1.4		0	E0		PP		LO01	HA01, HA03		1	
0404	FLARES, AERIAL	1	1.4S		1.4		0	E0		PP		LO01	HA01, HA03		0	
0405	CARTRIDGES, SIGNAL	1	1.4S		1.4		0	E0		PP		LO01	HA01, HA03		0	
0406	DINITROSOBENZENE	1	1.3C		1		0	E0		PP		LO01	HA01, HA03		3	
0407	TETRAZOL-1-ACETIC ACID	1	1.4C		1.4		0	E0		PP		LO01	HA01, HA03		1	
0408	FUZES, DETONATING with protective features	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0409	FUZES, DETONATING with protective features	1	1.2D		1		0	E0		PP		LO01	HA01, HA03		3	
0410	FUZES, DETONATING with protective features	1	1.4D		1.4		0	E0		PP		LO01	HA01, HA03		1	
0411	PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN) with not less than 7% wax, by mass	1	1.1D		1	131	0	E0		PP		LO01	HA01, HA02, HA03		3	
0412	CARTRIDGES FOR WEAPONS with bursting charge	1	1.4E		1.4		0	E0		PP		LO01	HA01, HA03		1	
0413	CARTRIDGES FOR WEAPONS, BLANK	1	1.2C		1		0	E0		PP		LO01	HA01, HA03		3	
0414	CHARGES, PROPELLING, FOR CANNON	1	1.2C		1		0	E0		PP		LO01	HA01, HA03		3	
0415	CHARGES, PROPELLING	1	1.2C		1		0	E0		PP		LO01	HA01, HA03		3	
0417	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1	1.3C		1		0	E0		PP		LO01	HA01, HA03		3	
0418	FLARES, SURFACE	1	1.1G		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0419	FLARES, SURFACE	1	1.2G		1		0	E0		PP		LO01	HA01, HA03		3	
0420	FLARES, AERIAL	1	1.1G		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0421	FLARES, AERIAL	1	1.2G		1		0	E0		PP		LO01	HA01, HA03		3	
0424	PROJECTILES, inert with tracer	1	1.3G		1		0	E0		PP		LO01	HA01, HA03		3	
0425	PROJECTILES, inert with tracer	1	1.4G		1.4		0	E0		PP		LO01	HA01, HA03		1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0426	PROJECTILES with burster or expelling charge	1	1.2F		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0427	PROJECTILES with burster or expelling charge	1	1.4F		1.4		0	E0		PP		LO01 HA01, HA02, HA03	1	
0428	ARTICLES, PYROTECHNIC for technical purposes	1	1.1G		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0429	ARTICLES, PYROTECHNIC for technical purposes	1	1.2G		1		0	E0		PP		LO01 HA01, HA03	3	
0430	ARTICLES, PYROTECHNIC for technical purposes	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0431	ARTICLES, PYROTECHNIC for technical purposes	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0432	ARTICLES, PYROTECHNIC for technical purposes	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0433	POWDER CAKE (POWDER PASTE), WETTED with not less than 17% alcohol, by mass	1	1.1C		1	266	0	E0		PP		LO01 HA01, HA02, HA03	3	
0434	PROJECTILES with burster or expelling charge	1	1.2G		1		0	E0		PP		LO01 HA01, HA03	3	
0435	PROJECTILES with burster or expelling charge	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0436	ROCKETS with expelling charge	1	1.2C		1		0	E0		PP		LO01 HA01, HA03	3	
0437	ROCKETS with expelling charge	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0438	ROCKETS with expelling charge	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0439	CHARGES, SHAPED, without detonator	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0440	CHARGES, SHAPED, without detonator	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0441	CHARGES, SHAPED, without detonator	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0442	CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0443	CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0444	CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0445	CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0446	CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0447	CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0448	5-MERCAPTOTETRAZOL-1-ACETIC ACID	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0449	TORPEDOES, LIQUID FUELLED with or without bursting charge	1	1.1J		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0450	TORPEDOES, LIQUID FUELLED with inert head	1	1.3J		1		0	E0		PP		LO01 HA01, HA03	3	
0451	TORPEDOES with bursting charge	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0452	GRENADES, PRACTICE, hand or rifle	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0453	ROCKETS, LINE-THROWING	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0454	IGNITERS	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0455	DETONATORS, NON-ELECTRIC for blasting	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0456	DETONATORS, ELECTRIC for blasting	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0457	CHARGES, BURSTING, PLASTICS BONDED	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0458	CHARGES, BURSTING, PLASTICS BONDED	1	1.2D		1		0	E0		PP		LO01 HA01, HA03	3	
0459	CHARGES, BURSTING, PLASTICS BONDED	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0460	CHARGES, BURSTING, PLASTICS BONDED	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0461	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.1B		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0462	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1C		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0463	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1D		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0464	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1E		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0465	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1F		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	
0466	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2C		1	178 274	0	E0		PP		LO01 HA01, HA03	3	
0467	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2D		1	178 274	0	E0		PP		LO01 HA01, HA03	3	
0468	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2E		1	178 274	0	E0		PP		LO01 HA01, HA03	3	
0469	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2F		1	178 274	0	E0		PP		LO01 HA01, HA02, HA03	3	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
0470	ARTICLES, EXPLOSIVE, N.O.S.	1	1.3C		1	178 274	0	E0		PP		LO01	HA01, HA03		3	
0471	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4E		1.4	178 274	0	E0		PP		LO01	HA01, HA03		1	
0472	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4F		1.4	178 274	0	E0		PP		LO01	HA01, HA02, HA03		1	
0473	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1A		1	178 274	0	E0		PP		LO01	HA01, HA02, HA03		3	
0474	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1C		1	178 274	0	E0		PP		LO01	HA01, HA02, HA03		3	
0475	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1D		1	178 274	0	E0		PP		LO01	HA01, HA02, HA03		3	
0476	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1G		1	178 274	0	E0		PP		LO01	HA01, HA02, HA03		3	
0477	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3C		1	178 274	0	E0		PP		LO01	HA01, HA03		3	
0478	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3G		1	178 274	0	E0		PP		LO01	HA01, HA03		3	
0479	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4C		1.4	178 274	0	E0		PP		LO01	HA01, HA03		1	
0480	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4D		1.4	178 274	0	E0		PP		LO01	HA01, HA03		1	
0481	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4S		1.4	178 274 347	0	E0		PP		LO01	HA01, HA03		0	
0482	SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI), N.O.S.	1	1.5D		1.5	178 274	0	E0		PP		LO01	HA01, HA03		3	
0483	CYCLOTRIMETHYLENETRINITRAMINE (CYCLONITE; HEXOGEN; RDX), DESENSITIZED	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0484	CYCLOTETRAMETHYLENETETRANITRAMINE (HMX; OCTOGEN), DESENSITIZED	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	
0485	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4G		1.4	178 274	0	E0		PP		LO01	HA01, HA03		1	
0486	ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)	1	1.6N		1.6		0	E0		PP		LO01	HA01, HA03		3	
0487	SIGNALS, SMOKE	1	1.3G		1		0	E0		PP		LO01	HA01, HA03		3	
0488	AMMUNITION, PRACTICE	1	1.3G		1		0	E0		PP		LO01	HA01, HA03		3	
0489	DINITROGLYCOLURIL (DINGU)	1	1.1D		1		0	E0		PP		LO01	HA01, HA02, HA03		3	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
0490	NITROTRIAZOLONE (NTO)	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0491	CHARGES, PROPELLING	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0492	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1	1.3G		1		0	E0		PP		LO01 HA01, HA03	3	
0493	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0494	JET PERFORATING GUNS, CHARGED, oil well, without detonator	1	1.4D		1.4		0	E0		PP		LO01 HA01, HA03	1	
0495	PROPELLANT, LIQUID	1	1.3C		1	224	0	E0		PP		LO01 HA01, HA03	3	
0496	OCTONAL	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0497	PROPELLANT, LIQUID	1	1.1C		1	224	0	E0		PP		LO01 HA01, HA02, HA03	3	
0498	PROPELLANT, SOLID	1	1.1C		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0499	PROPELLANT, SOLID	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0500	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1	1.4S		1.4	347	0	E0		PP		LO01 HA01, HA03	0	
0501	PROPELLANT, SOLID	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0502	ROCKETS with inert head	1	1.2C		1		0	E0		PP		LO01 HA01, HA03	3	
0503	SAFETY DEVICES, PYROTECHNIC	1	1.4G		1.4	235 289	0	E0		PP		LO01 HA01, HA03	1	
0504	1H-TETRAZOLE	1	1.1D		1		0	E0		PP		LO01 HA01, HA02, HA03	3	
0505	SIGNALS, DISTRESS, ship	1	1.4G		1.4		0	E0		PP		LO01 HA01, HA03	1	
0506	SIGNALS, DISTRESS, ship	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0507	SIGNALS, SMOKE	1	1.4S		1.4		0	E0		PP		LO01 HA01, HA03	0	
0508	1-HYDROXY-BENZOTRIAZOLE, ANHYDROUS, dry or wetted with less than 20% water, by mass	1	1.3C		1		0	E0		PP		LO01 HA01, HA03	3	
0509	POWDER, SMOKELESS	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
0510	ROCKET MOTORS	1	1.4C		1.4		0	E0		PP		LO01 HA01, HA03	1	
1001	ACETYLENE, DISSOLVED	2	4F		2.1	662	0	E0		PP, EX, A	VE01		1	
1002	AIR, COMPRESSED	2	1A		2.2	655 660 662	120 ml	E1		PP			0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
1003	AIR, REFRIGERATED LIQUID	2	3O		2.2+5.1		0	E0		PP			0	
1005	AMMONIA, ANHYDROUS	2	2TC		2.3+8	23 379	0	E0	**T**	PP, EP, TOX, A	VE02		2	
1006	ARGON, COMPRESSED	2	1A		2.2	378 653 660 662	120 ml	E1		PP			0	
1008	BORON TRIFLUORIDE	2	2TC		2.3+8	373	0	E0		PP, EP, TOX, A	VE02		2	
1009	BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	2	2A		2.2	662	120 ml	E1		PP			0	
1010	BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, having a vapour pressure at 70°C not exceeding 1.1 MPa (11 bar) and a density at 50°C not lower than 0.525 kg/l	2	2F		2.1	386 618 662	0	E0	**T**	PP, EX, A	VE01		1	
1011	BUTANE	2	2F		2.1	392 657 662 674	0	E0	**T**	PP, EX, A	VE01		1	
1012	BUTYLENES MIXTURE or 1-BUTYLENE or CIS-2-BUTYLENE or TRANS-2-BUTYLENE	2	2F		2.1	662	0	E0	**T**	PP, EX, A	VE01		1	
1013	CARBON DIOXIDE	2	2A		2.2	378 584 653 660 662	120 ml	E1		PP			0	
1016	CARBON MONOXIDE, COMPRESSED	2	1TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
1017	CHLORINE	2	2TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02		2	
1018	CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)	2	2A		2.2	662	120 ml	E1		PP			0	
1020	CHLOROPENTAFLUORO-ETHANE (REFRIGERANT GAS R 115)	2	2A		2.2	662	120 ml	E1	**T**	PP			0	
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	2	2A		2.2	662	120 ml	E1		PP			0	
1022	CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)	2	2A		2.2	662	120 ml	E1		PP			0	
1023	COAL GAS, COMPRESSED	2	1TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
1026	CYANOGEN	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
1027	CYCLOPROPANE	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
1028	DICHLORODIFLUORO-METHANE (REFRIGERANT GAS R 12)	2	2A		2.2	662	120 ml	E1		PP			0	
1029	DICHLOROFLUORO-METHANE (REFRIGERANT GAS R 21)	2	2A		2.2	662	120 ml	E1		PP			0	
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	2	2F		2.1	662	0	E0	**T**	PP, EX, A	VE01		1	
1032	DIMETHYLAMINE, ANHYDROUS	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
1033	DIMETHYL ETHER	2	2F		2.1	662	0	E0	**T**	PP, EX, A	VE01		1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
1035	ETHANE	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
1036	ETHYLAMINE	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
1037	ETHYL CHLORIDE	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
1038	ETHYLENE, REFRIGERATED LIQUID	2	3F		2.1		0	E0	**T**	PP, EX, A	VE01		1	
1039	ETHYL METHYL ETHER	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
1040	ETHYLENE OXIDE	2	2TF		2.3+2.1	342	0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
1040	ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 °C	2	2TF		2.3+2.1	342	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02		2	
1041	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% but not more than 87% ethylene oxide	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
1043	FERTILIZER AMMONIATING SOLUTION with free ammonia	2	4A		2.2			E0		PP			0	
1044	FIRE EXTINGUISHERS with compressed or liquefied gas	2	6A		2.2	225 594	120 ml	E0		PP			0	
1045	FLUORINE, COMPRESSED	2	1TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02		2	
1046	HELIUM, COMPRESSED	2	1A		2.2	378 653 660 662	120 ml	E1		PP			0	
1048	HYDROGEN BROMIDE, ANHYDROUS	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02		2	
1049	HYDROGEN, COMPRESSED	2	1F		2.1	392 662	0	E0		PP, EX, A	VE01		1	
1050	HYDROGEN CHLORIDE, ANHYDROUS	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02		2	
1051	HYDROGEN CYANIDE, STABILIZED containing less than 3% water	6.1	TF1	I	6.1+3	386 603 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
1052	HYDROGEN FLUORIDE, ANHYDROUS	8	CT1	I	8+6.1	802	0	E0		PP, EP, TOX, A	VE02		2	
1053	HYDROGEN SULPHIDE	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
1055	ISOBUTYLENE	2	2F		2.1	662	0	E0	**T**	PP, EX, A	VE01		1	
1056	KRYPTON, COMPRESSED	2	1A		2.2	378 660 662	120 ml	E1		PP			0	
1057	LIGHTERS or LIGHTER REFILLS containing flammable gas	2	6F		2.1	201 654 658	0	E0		PP, EX, A	VE01		1	
1058	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	2	2A		2.2	660 662	120 ml	E1		PP			0	
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED such as mixture P1 or mixture P2	2	2F		2.1	386 581 662	0	E0		PP, EX, A	VE01		1	
1061	METHYLAMINE, ANHYDROUS	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
1062	METHYL BROMIDE with not more than 2% chloropicrin	2	2T		2.3	23	0	E0		PP, EP, TOX, A	VE02		2	
1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	2	2F		2.1	662	0	E0	**T**	PP, EX, A	VE01		1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1064	METHYL MERCAPTAN	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1065	NEON, COMPRESSED	2	1A		2.2	378 660 662	120 ml	E1		PP					0	
1066	NITROGEN, COMPRESSED	2	1A		2.2	378 653 660 662	120 ml	E1		PP					0	
1067	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	2	2TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02				2	
1069	NITROSYL CHLORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
1070	NITROUS OXIDE	2	2O		2.2+5.1	584 662	0	E0		PP					0	
1071	OIL GAS, COMPRESSED	2	1TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1072	OXYGEN, COMPRESSED	2	1O		2.2+5.1	355 655 662	0	E0		PP					0	
1073	OXYGEN, REFRIGERATED LIQUID	2	3O		2.2+5.1		0	E0		PP					0	
1075	PETROLEUM GASES, LIQUEFIED	2	2F		2.1	274 392 583 639 662 674	0	E0		PP, EX, A	VE01				1	
1076	PHOSGENE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
1077	PROPYLENE	2	2F		2.1	662	0	E0	**T**	PP, EX, A	VE01				1	
1078	REFRIGERANT GAS, N.O.S., such as mixture F1, mixture F2 or mixture F3	2	2A		2.2	274 582 662	120 ml	E1		PP					0	
1079	SULPHUR DIOXIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
1080	SULPHUR HEXAFLUORIDE	2	2A		2.2	660 662	120 ml	E1		PP					0	
1081	TETRAFLUOROETHYLENE, STABILIZED	2	2F		2.1	386 662	0	E0		PP, EX, A	VE01				1	
1082	TRIFLUOROCHLOROETHYLENE, STABILIZED (REFRIGERANT GAS R 1113)	2	2TF		2.3+2.1	386	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1083	TRIMETHYLAMINE, ANHYDROUS	2	2F		2.1	662	0	E0	**T**	PP, EX, A	VE01				1	
1085	VINYL BROMIDE, STABILIZED	2	2F		2.1	386 662	0	E0		PP, EX, A	VE01				1	
1086	VINYL CHLORIDE, STABILIZED	2	2F		2.1	386 662	0	E0	**T**	PP, EX, A	VE01				1	
1087	VINYL METHYL ETHER, STABILIZED	2	2F		2.1	386 662	0	E0		PP, EX, A	VE01				1	
1088	ACETAL	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1089	ACETALDEHYDE	3	F1	I	3		0	E0	**T**	PP, EX, A	VE01				1	
1090	ACETONE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1091	ACETONE OILS	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1092	ACROLEIN, STABILIZED	6.1	TF1	I	6.1+3	354 386 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1093	ACRYLONITRILE, STABILIZED	3	FT1	I	3+6.1	386 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1098	ALLYL ALCOHOL	6.1	TF1	I	6.1+3	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1099	ALLYL BROMIDE	3	FT1	I	3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1100	ALLYL CHLORIDE	3	FT1	I	3+6.1	802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1104	AMYL ACETATES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1105	PENTANOLS	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1105	PENTANOLS	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1106	AMYLAMINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1106	AMYLAMINE	3	FC	III	3+8		5 L	E1		PP, EP, EX, A	VE01				0	
1107	AMYL CHLORIDE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1108	1-PENTENE (n-AMYLENE)	3	F1	I	3		0	E3	**T**	PP, EX, A	VE01				1	
1109	AMYL FORMATES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1110	n-AMYL METHYL KETONE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1111	AMYL MERCAPTAN	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1112	AMYL NITRATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1113	AMYL NITRITE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1114	BENZENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1120	BUTANOLS	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1120	BUTANOLS	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1123	BUTYL ACETATES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1123	BUTYL ACETATES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1125	n-BUTYLAMINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1126	1-BROMOBUTANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1127	CHLOROBUTANES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1128	n-BUTYL FORMATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1129	BUTYRALDEHYDE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1130	CAMPHOR OIL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1131	CARBON DISULPHIDE	3	FT1	I	3+6.1	802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1133	ADHESIVES containing flammable liquid	3	F1	I	3		500 ml	E3		PP, EX, A	VE01				1	
1133	ADHESIVES containing flammable liquid (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5 L	E2		PP, EX, A	VE01				1	
1133	ADHESIVES containing flammable liquid (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5 L	E2		PP, EX, A	VE01				1	
1133	ADHESIVES containing flammable liquid	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1133	ADHESIVES containing flammable liquid (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1133	ADHESIVES containing flammable liquid (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1134	CHLOROBENZENE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1135	ETHYLENE CHLOROHYDRIN	6.1	TF1	I	6.1+3	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1136	COAL TAR DISTILLATES, FLAMMABLE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1136	COAL TAR DISTILLATES, FLAMMABLE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining)	3	F1	I	3		500 ml	E3		PP, EX, A	VE01				1	
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining) (vapour pressure at 50°C more than 110 kPa)	3	F1	II	3	640C	5 L	E2		PP, EX, A	VE01				1	
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining) (vapour pressure at 50°C not more than 110 kPa)	3	F1	II	3	640D	5 L	E2		PP, EX, A	VE01				1	
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining) (having a flash-point below 23°C and viscous according to 2.2.3.1.4) (vapour pressure at 50°C)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining) (having a flash-point below 23°C and viscous according to 2.2.3.1.4) (vapour pressure at 50°C not more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1143	CROTONALDEHYDE or CROTONALDEHYDE, STABILIZED	6.1	TF1	I	6.1+3	324 354 386 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1144	CROTONYLENE	3	F1	I	3		0	E3		PP, EX, A	VE01				1	
1145	CYCLOHEXANE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1146	CYCLOPENTANE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1147	DECAHYDRONAPHTHALENE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1148	DIACETONE ALCOHOL	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1148	DIACETONE ALCOHOL	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1149	DIBUTYL ETHERS	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1150	1,2-DICHLOROETHYLENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1152	DICHLOROPENTANES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1153	ETHYLENE GLYCOL DIETHYL ETHER	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1153	ETHYLENE GLYCOL DIETHYL ETHER	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1154	DIETHYLAMINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1155	DIETHYL ETHER (ETHYL ETHER)	3	F1	I	3		0	E3	**T**	PP, EX, A	VE01				1	
1156	DIETHYL KETONE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1157	DIISOBUTYL KETONE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1158	DIISOPROPYLAMINE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
1159	DIISOPROPYL ETHER	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1160	DIMETHYLAMINE AQUEOUS SOLUTION	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1161	DIMETHYL CARBONATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1162	DIMETHYLDICHLOROSILANE	3	FC	II	3+8		0	E0		PP, EP, EX, A	VE01				1	
1163	DIMETHYLHYDRAZINE, UNSYMMETRICAL	6.1	TFC	I	6.1+3+8	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1164	DIMETHYL SULPHIDE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1165	DIOXANE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1166	DIOXOLANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1167	DIVINYL ETHER, STABILIZED	3	F1	I	3	386	0	E3	**T**	PP, EX, A	VE01				1	
1169	EXTRACTS, AROMATIC, LIQUID (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	601 640C	5 L	E2		PP, EX, A	VE01				1	
1169	EXTRACTS, AROMATIC, LIQUID (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	601 640D	5 L	E2		PP, EX, A	VE01				1	
1169	EXTRACTS, AROMATIC, LIQUID	3	F1	III	3	601	5 L	E1		PP, EX, A	VE01				0	
1169	EXTRACTS, AROMATIC, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	601	5 L	E1		PP, EX, A	VE01				0	
1169	EXTRACTS, AROMATIC, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	601	5 L	E1		PP, EX, A	VE01				0	
1170	ETHANOL (ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)	3	F1	II	3	144 601	1 L	E2	**T**	PP, EX, A	VE01				1	
1170	ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)	3	F1	III	3	144 601	5 L	E1	**T**	PP, EX, A	VE01				0	
1171	ETHYLENE GLYCOL MONOETHYL ETHER	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1172	ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1173	ETHYL ACETATE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1175	ETHYLBENZENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1176	ETHYL BORATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1177	2-ETHYLBUTYL ACETATE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1178	2-ETHYLBUTYRALDEHYDE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1179	ETHYL BUTYL ETHER	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1180	ETHYL BUTYRATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1181	ETHYL CHLOROACETATE	6.1	TF1	II	6.1+3	802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1182	ETHYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1183	ETHYLDICHLOROSILANE	4.3	WFC	I	4.3+3+8		0	E0		PP, EP, EX, A	VE01		HA08		1	
1184	ETHYLENE DICHLORIDE	3	FT1	II	3+6.1	802	1 L	E2	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1185	ETHYLENEIMINE, STABILIZED	6.1	TF1	I	6.1+3	354 386 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1188	ETHYLENE GLYCOL MONOMETHYL ETHER	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1189	ETHYLENE GLYCOL MONOMETHYL ETHER ACETATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1190	ETHYL FORMATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1191	OCTYL ALDEHYDES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1192	ETHYL LACTATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1193	ETHYL METHYL KETONE (METHYL ETHYL KETONE)	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1194	ETHYL NITRITE SOLUTION	3	FT1	I	3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1195	ETHYL PROPIONATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1196	ETHYLTRICHLOROSILANE	3	FC	II	3+8		0	E0		PP, EP, EX, A	VE01				1	
1197	EXTRACTS, FLAVOURING, LIQUID (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	601 640C	5 L	E2		PP, EX, A	VE01				1	
1197	EXTRACTS, FLAVOURING, LIQUID (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	601 640D	5 L	E2		PP, EX, A	VE01				1	
1197	EXTRACTS, FLAVOURING, LIQUID	3	F1	III	3	601	5 L	E1		PP, EX, A	VE01				0	
1197	EXTRACTS, FLAVOURING, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	601	5 L	E1		PP, EX, A	VE01				0	
1197	EXTRACTS, FLAVOURING, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	601	5 L	E1		PP, EX, A	VE01				0	
1198	FORMALDEHYDE SOLUTION, FLAMMABLE	3	FC	III	3+8		5 L	E1	**T**	PP, EP, EX, A	VE01				0	
1199	FURALDEHYDES	6.1	TF1	II	6.1+3	802	100 ml	E4	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1201	FUSEL OIL	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1201	FUSEL OIL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1202	GAS OIL or DIESEL FUEL or HEATING OIL, LIGHT (flash-point not more than 60 °C)	3	F1	III	3	640K	5 L	E1	**T**	PP, EX, A	VE01				0	
1202	DIESEL FUEL complying with standard EN 590:2013 + A1:2017 or GAS OIL or HEATING OIL, LIGHT with a flash-point as specified in EN 590:2013 + A1:2017	3	F1	III	3	640L	5 L	E1	**T**	PP, EX, A	VE01				0	
1202	GAS OIL or DIESEL FUEL or HEATING OIL, LIGHT (flash-point more than 60 °C and not more than 100 °C)	3	F1	III	3	640M	5 L	E1	**T**	PP, EX, A	VE01				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1203	MOTOR SPIRIT or GASOLINE or PETROL	3	F1	II	3	243 534	1 L	E2	**T**	PP, EX, A	VE01				1	
1204	NITROGLYCERIN SOLUTION IN ALCOHOL with not more than 1% nitroglycerin	3	D	II	3	601	1 L	E0		PP, EX, A	VE01				1	
1206	HEPTANES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1207	HEXALDEHYDE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1208	HEXANES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable	3	F1	I	3	163 367	500 ml	E3		PP, EX, A	VE01				1	
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	163 367 640C	5 L	E2		PP, EX, A	VE01				1	
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	163 367 640D	5 L	E2		PP, EX, A	VE01				1	
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable	3	F1	III	3	163 367	5 L	E1		PP, EX, A	VE01				0	
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	163 367	5 L	E1		PP, EX, A	VE01				0	
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	163 367	5 L	E1		PP, EX, A	VE01				0	
1212	ISOBUTANOL (ISOBUTYL ALCOHOL)	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1213	ISOBUTYL ACETATE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1214	ISOBUTYLAMINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1216	ISOOCTENES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1218	ISOPRENE, STABILIZED	3	F1	I	3	386	0	E3	**T**	PP, EX, A	VE01				1	
1219	ISOPROPANOL (ISOPROPYL ALCOHOL)	3	F1	II	3	601	1 L	E2	**T**	PP, EX, A	VE01				1	
1220	ISOPROPYL ACETATE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1221	ISOPROPYLAMINE	3	FC	I	3+8		0	E0	**T**	PP, EP, EX, A	VE01				1	
1222	ISOPROPYL NITRATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1223	KEROSENE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1224	KETONES, LIQUID, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	274 640C	1 L	E2	**T**	PP, EX, A	VE01				1	
1224	KETONES, LIQUID, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	274 640D	1 L	E2	**T**	PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1224	KETONES, LIQUID, N.O.S.	3	F1	III	3	274	5 L	E1	**T**	PP, EX, A	VE01				0	
1228	MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274 802	1 L	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1228	MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
1229	MESITYL OXIDE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1230	METHANOL	3	FT1	II	3+6.1	279 802	1 L	E2	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1231	METHYL ACETATE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1233	METHYLAMYL ACETATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1234	METHYLAL	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1235	METHYLAMINE, AQUEOUS SOLUTION	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1237	METHYL BUTYRATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1238	METHYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1239	METHYL CHLOROMETHYL ETHER	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1242	METHYLDICHLOROSILANE	4.3	WFC	I	4.3+3+8		0	E0		PP, EP, EX, A	VE01		HA08		1	
1243	METHYL FORMATE	3	F1	I	3		0	E3	**T**	PP, EX, A	VE01				1	
1244	METHYLHYDRAZINE	6.1	TFC	I	6.1+3+8	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1245	METHYL ISOBUTYL KETONE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1246	METHYL ISOPROPENYL KETONE, STABILIZED	3	F1	II	3	386	1 L	E2		PP, EX, A	VE01				1	
1247	METHYL METHACRYLATE MONOMER, STABILIZED	3	F1	II	3	386	1 L	E2	**T**	PP, EX, A	VE01				1	
1248	METHYL PROPIONATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1249	METHYL PROPYL KETONE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1250	METHYLTRICHLOROSILANE	3	FC	II	3+8		0	E0		PP, EP, EX, A	VE01				1	
1251	METHYL VINYL KETONE, STABILIZED	6.1	TFC	I	6.1+3+8	354 386 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1259	NICKEL CARBONYL	6.1	TF1	I	6.1+3	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1261	NITROMETHANE	3	F1	II	3		1 L	E0		PP, EX, A	VE01				1	
1262	OCTANES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound)	3	F1	I	3	163 367 650	500 ml	E3		PP, EX, A	VE01				1	
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound) (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	163 367 640C 650	5 L	E2		PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	163 367 640D 650	5 L	E2		PP, EX, A	VE01				1	
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound)	3	F1	III	3	163 367 650	5 L	E1		PP, EX, A	VE01				0	
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound) (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	163 367 650	5 L	E1		PP, EX, A	VE01				0	
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound) (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	163 367 650	5 L	E1		PP, EX, A	VE01				0	
1264	PARALDEHYDE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1265	PENTANES, liquid	3	F1	I	3		0	E3	**T**	PP, EX, A	VE01				1	
1265	PENTANES, liquid	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1266	PERFUMERY PRODUCTS with flammable solvents (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	163 640C	5 L	E2		PP, EX, A	VE01				1	
1266	PERFUMERY PRODUCTS with flammable solvents (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	163 640D	5 L	E2		PP, EX, A	VE01				1	
1266	PERFUMERY PRODUCTS with flammable solvents	3	F1	III	3	163	5 L	E1		PP, EX, A	VE01				0	
1266	PERFUMERY PRODUCTS with flammable solvents (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	163	5 L	E1		PP, EX, A	VE01				0	
1266	PERFUMERY PRODUCTS with flammable solvents (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	163	5 L	E1		PP, EX, A	VE01				0	
1267	PETROLEUM CRUDE OIL	3	F1	I	3	357	500 ml	E3	**T**	PP, EX, A	VE01				1	
1267	PETROLEUM CRUDE OIL (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	357 640C	1 L	E2	**T**	PP, EX, A	VE01				1	
1267	PETROLEUM CRUDE OIL (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	357 640D	1 L	E2	**T**	PP, EX, A	VE01				1	
1267	PETROLEUM CRUDE OIL	3	F1	III	3	357	5 L	E1	**T**	PP, EX, A	VE01				0	
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	I	3		500 ml	E3	**T**	PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	1 L	E2	**T**	PP, EX, A	VE01				1	
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	1 L	E2	**T**	PP, EX, A	VE01				1	
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1272	PINE OIL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1274	n-PROPANOL (PROPYL ALCOHOL, NORMAL)	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1274	n-PROPANOL (PROPYL ALCOHOL, NORMAL)	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1275	PROPIONALDEHYDE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1276	n-PROPYL ACETATE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1277	PROPYLAMINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1278	1-CHLOROPROPANE	3	F1	II	3		1 L	E0	**T**	PP, EX, A	VE01				1	
1279	1,2-DICHLOROPROPANE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1280	PROPYLENE OXIDE	3	F1	I	3		0	E3	**T**	PP, EX, A	VE01				1	
1281	PROPYL FORMATES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1282	PYRIDINE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
1286	ROSIN OIL (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5 L	E2		PP, EX, A	VE01				1	
1286	ROSIN OIL (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5 L	E2		PP, EX, A	VE01				1	
1286	ROSIN OIL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1286	ROSIN OIL (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1286	ROSIN OIL (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1287	RUBBER SOLUTION (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5 L	E2		PP, EX, A	VE01				1	
1287	RUBBER SOLUTION (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5 L	E2		PP, EX, A	VE01				1	
1287	RUBBER SOLUTION	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1287	RUBBER SOLUTION (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1287	RUBBER SOLUTION (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1288	SHALE OIL	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1288	SHALE OIL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1289	SODIUM METHYLATE SOLUTION in alcohol	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
1289	SODIUM METHYLATE SOLUTION in alcohol	3	FC	III	3+8		5 L	E1	**T**	PP, EP, EX, A	VE01				0	
1292	TETRAETHYL SILICATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1293	TINCTURES, MEDICINAL	3	F1	II	3	601	1 L	E2		PP, EX, A	VE01				1	
1293	TINCTURES, MEDICINAL	3	F1	III	3	601	5 L	E1		PP, EX, A	VE01				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
1294	TOLUENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01		1	
1295	TRICHLOROSILANE	4.3	WFC	I	4.3+3+8		0	E0		PP, EP, EX, A	VE01	HA08	1	
1296	TRIETHYLAMINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01		1	
1297	TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	3	FC	I	3+8		0	E0		PP, EP, EX, A	VE01		1	
1297	TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01		1	
1297	TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	3	FC	III	3+8		5 L	E1		PP, EP, EX, A	VE01		0	
1298	TRIMETHYLCHLOROSILANE	3	FC	II	3+8		0	E0		PP, EP, EX, A	VE01		1	
1299	TURPENTINE	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
1300	TURPENTINE SUBSTITUTE	3	F1	II	3		1 L	E2		PP, EX, A	VE01		1	
1300	TURPENTINE SUBSTITUTE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01		0	
1301	VINYL ACETATE, STABILIZED	3	F1	II	3	386	1 L	E2	**T**	PP, EX, A	VE01		1	
1302	VINYL ETHYL ETHER, STABILIZED	3	F1	I	3	386	0	E3		PP, EX, A	VE01		1	
1303	VINYLIDENE CHLORIDE, STABILIZED	3	F1	I	3	386	0	E3		PP, EX, A	VE01		1	
1304	VINYL ISOBUTYL ETHER, STABILIZED	3	F1	II	3	386	1 L	E2		PP, EX, A	VE01		1	
1305	VINYLTRICHLOROSILANE, STABILIZED	3	FC	II	3+8		0	E0		PP, EP, EX, A	VE01		1	
1306	WOOD PRESERVATIVES, LIQUID (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5 L	E2		PP, EX, A	VE01		1	
1306	WOOD PRESERVATIVES, LIQUID (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5 L	E2		PP, EX, A	VE01		1	
1306	WOOD PRESERVATIVES, LIQUID	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
1306	WOOD PRESERVATIVES, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
1306	WOOD PRESERVATIVES, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
1307	XYLENES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01		1	
1307	XYLENES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01		0	
1308	ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID	3	F1	I	3		0	E0		PP, EX, A	VE01		1	
1308	ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	1 L	E2		PP, EX, A	VE01		1	
1308	ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	1 L	E2		PP, EX, A	VE01		1	
1308	ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
1309	ALUMINIUM POWDER, COATED	4.1	F3	II	4.1		1 kg	E2		PP			1	
1309	ALUMINIUM POWDER, COATED	4.1	F3	III	4.1		5 kg	E1		PP			0	
1310	AMMONIUM PICRATE, WETTED with not less than 10% water, by mass	4.1	D	I	4.1		0	E0		PP			1	
1312	BORNEOL	4.1	F1	III	4.1		5 kg	E1		PP			0	
1313	CALCIUM RESINATE	4.1	F3	III	4.1		5 kg	E1		PP			0	
1314	CALCIUM RESINATE, FUSED	4.1	F3	III	4.1		5 kg	E1		PP			0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1318	COBALT RESINATE, PRECIPITATED	4.1	F3	III	4.1		5 kg	E1		PP					0	
1320	DINITROPHENOL, WETTED with not less than 15% water, by mass	4.1	DT	I	4.1+6.1	802	0	E0		PP, EP					2	
1321	DINITROPHENOLATES, WETTED with not less than 15% water, by mass	4.1	DT	I	4.1+6.1	802	0	E0		PP, EP					2	
1322	DINITRORESORCINOL, WETTED with not less than 15% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1323	FERROCERIUM	4.1	F3	II	4.1	249	1 kg	E2		PP					1	
1324	FILMS, NITROCELLULOSE BASE, gelatin coated, except scrap	4.1	F1	III	4.1		5 kg	E1		PP					0	
1325	FLAMMABLE SOLID, ORGANIC, N.O.S.	4.1	F1	II	4.1	274	1 kg	E2		PP					1	
1325	FLAMMABLE SOLID, ORGANIC, N.O.S.	4.1	F1	III	4.1	274	5 kg	E1		PP					0	
1326	HAFNIUM POWDER, WETTED with not less than 25% water	4.1	F3	II	4.1	586	1 kg	E2		PP					1	
1327	Hay, Straw or Bhusa	4.1	F1	**NOT SUBJECT TO ADN**												
1328	HEXAMETHYLENETETRAMINE	4.1	F1	III	4.1		5 kg	E1		PP					0	
1330	MANGANESE RESINATE	4.1	F3	III	4.1		5 kg	E1		PP					0	
1331	MATCHES, 'STRIKE ANYWHERE'	4.1	F1	III	4.1	293	5 kg	E0		PP					0	
1332	METALDEHYDE	4.1	F1	III	4.1		5 kg	E1		PP					0	
1333	CERIUM, slabs, ingots or rods	4.1	F3	II	4.1		1 kg	E2		PP					1	
1334	NAPHTHALENE, CRUDE or NAPHTHALENE, REFINED	4.1	F1	III	4.1	501	5 kg	E1	**B**	PP		CO01			0	
1336	NITROGUANIDINE (PICRITE), WETTED with not less than 20% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1337	NITROSTARCH, WETTED with not less than 20% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1338	PHOSPHORUS, AMORPHOUS	4.1	F3	III	4.1		5 kg	E1		PP					0	
1339	PHOSPHORUS HEPTASULPHIDE, free from yellow and white phosphorus	4.1	F3	II	4.1	602	1 kg	E2		PP					1	
1340	PHOSPHORUS PENTASULPHIDE, free from yellow and white phosphorus	4.3	WF2	II	4.3+4.1	602	500 g	E2		PP, EX, A	VE01		HA08		1	
1341	PHOSPHORUS SESQUISULPHIDE, free from yellow and white phosphorus	4.1	F3	II	4.1	602	1 kg	E2		PP					1	
1343	PHOSPHORUS TRISULPHIDE, free from yellow and white phosphorus	4.1	F3	II	4.1	602	1 kg	E2		PP					1	
1344	TRINITROPHENOL (PICRIC ACID), WETTED with not less than 30% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1345	RUBBER SCRAP or RUBBER SHODDY, powdered or granulated	4.1	F1	II	4.1		1 kg	E2		PP					1	
1346	SILICON POWDER, AMORPHOUS	4.1	F3	III	4.1	32	5 kg	E1		PP					0	
1347	SILVER PICRATE, WETTED with not less than 30% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1348	SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 15% water, by mass	4.1	DT	I	4.1+6.1	802	0	E0		PP, EP					2	
1349	SODIUM PICRAMATE, WETTED with not less than 20% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1350	SULPHUR	4.1	F3	III	4.1	242	5 kg	E1	**B**	PP					0	
1352	TITANIUM POWDER, WETTED with not less than 25% water	4.1	F3	II	4.1	586	1 kg	E2		PP					1	
1353	FIBRES or FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	4.1	F1	III	4.1	502	5 kg	E1		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1354	TRINITROBENZENE, WETTED with not less than 30% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1355	TRINITROBENZOIC ACID, WETTED with not less than 30% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1356	TRINITROTOLUENE (TNT), WETTED with not less than 30% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
1357	UREA NITRATE, WETTED with not less than 20% water, by mass	4.1	D	I	4.1	227	0	E0		PP					1	
1358	ZIRCONIUM POWDER, WETTED with not less than 25% water	4.1	F3	II	4.1	586	1 kg	E2		PP					1	
1360	CALCIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
1361	CARBON, animal or vegetable origin	4.2	S2	II	4.2		0	E0		PP					0	
1361	CARBON, animal or vegetable origin	4.2	S2	III	4.2	665 803	0	E0		PP					0	
1362	CARBON, ACTIVATED	4.2	S2	III	4.2	646	0	E1		PP					0	
1363	COPRA	4.2	S2	III	4.2		0	E0	**B**	PP				IN01, IN02	0	IN01 and IN02 apply only when this substance is carried in bulk or without packaging
1364	COTTON WASTE, OILY	4.2	S2	III	4.2		0	E0	**B**	PP					0	
1365	COTTON, WET	4.2	S2	III	4.2		0	E0	**B**	PP					0	
1369	p-NITROSODIMETHYLANILINE	4.2	S2	II	4.2		0	E2		PP					0	
1372	Fibres, animal or fibres, vegetable burnt, wet or damp	4.2	S2	**NOT SUBJECT TO ADN**												
1373	FIBRES or FABRICS, ANIMAL or VEGETABLE or SYNTHETIC, N.O.S. with oil	4.2	S2	III	4.2		0	E0	**B**	PP					0	
1374	FISH MEAL (FISH SCRAP), UNSTABILIZED	4.2	S2	II	4.2	300	0	E2		PP					0	
1376	IRON OXIDE, SPENT or IRON SPONGE, SPENT obtained from coal gas purification	4.2	S4	III	4.2	592	0	E0	**B**	PP					0	
1378	METAL CATALYST, WETTED with a visible excess of liquid	4.2	S4	II	4.2	274	0	E0		PP					0	
1379	PAPER, UNSATURATED OIL TREATED, incompletely dried (including carbon paper)	4.2	S2	III	4.2		0	E0	**B**	PP					0	
1380	PENTABORANE	4.2	ST3	I	4.2+6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
1381	PHOSPHORUS, WHITE or YELLOW, UNDER WATER or IN SOLUTION	4.2	ST3	I	4.2+6.1	503 802	0	E0		PP, EP, TOX, A	VE02				2	
1381	PHOSPHORUS, WHITE or YELLOW, DRY	4.2	ST4	I	4.2+6.1	503 802	0	E0		PP, EP					2	
1382	POTASSIUM SULPHIDE, ANHYDROUS or POTASSIUM SULPHIDE with less than 30% water of crystallization	4.2	S4	II	4.2	504	0	E2		PP					0	
1383	PYROPHORIC METAL, N.O.S. or PYROPHORIC ALLOY, N.O.S.	4.2	S4	I	4.2	274	0	E0		PP					0	
1384	SODIUM DITHIONITE (SODIUM HYDROSULPHITE)	4.2	S4	II	4.2		0	E2		PP					0	
1385	SODIUM SULPHIDE, ANHYDROUS or SODIUM SULPHIDE with less than 30% water of crystallization	4.2	S4	II	4.2	504	0	E2		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1386	SEED CAKE with more than 1.5% oil and not more than 11% moisture	4.2	S2	III	4.2	800	0	E0	**B**	PP				IN01, IN02	0	IN01 and IN02 apply only when this substance is carried in bulk or without packaging
1387	Wool waste, wet	4.2	S2	**NOT SUBJECT TO ADN**												
1389	ALKALI METAL AMALGAM, LIQUID	4.3	W1	I	4.3	182	0	E0		PP, EX, A	VE01		HA08		0	
1390	ALKALI METAL AMIDES	4.3	W2	II	4.3	182 505	500 g	E2		PP, EX, A	VE01		HA08		0	
1391	ALKALI METAL DISPERSION or ALKALINE EARTH METAL DISPERSION	4.3	W1	I	4.3	182 183 506	0	E0		PP, EX, A	VE01		HA08		1	
1392	ALKALINE EARTH METAL AMALGAM, LIQUID	4.3	W1	I	4.3	183 506	0	E0		PP, EX, A	VE01		HA08		0	
1393	ALKALINE EARTH METAL ALLOY, N.O.S.	4.3	W2	II	4.3	183 506	500 g	E2		PP, EX, A	VE01		HA08		0	
1394	ALUMINIUM CARBIDE	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
1395	ALUMINIUM FERROSILICON POWDER	4.3	WT2	II	4.3+6.1	802	500 g	E2		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
1396	ALUMINIUM POWDER, UNCOATED	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
1396	ALUMINIUM POWDER, UNCOATED	4.3	W2	III	4.3		1 kg	E1		PP, EX, A	VE01		HA08		0	
1397	ALUMINIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1	507 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
1398	ALUMINIUM SILICON POWDER, UNCOATED	4.3	W2	III	4.3	37	1 kg	E1	**B**	PP, EX, A	VE01, VE03	LO03	HA07, HA08	IN01, IN03	0	VE03, LO03, HA07, IN01 and IN03 apply only when this substance is carried in bulk or without packaging
1400	BARIUM	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
1401	CALCIUM	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
1402	CALCIUM CARBIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1402	CALCIUM CARBIDE	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
1403	CALCIUM CYANAMIDE with more than 0.1% calcium carbide	4.3	W2	III	4.3	38	1 kg	E1		PP, EX, A	VE01		HA08		0	
1404	CALCIUM HYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1405	CALCIUM SILICIDE	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
1405	CALCIUM SILICIDE	4.3	W2	III	4.3		1 kg	E1		PP, EX, A	VE01		HA08		0	
1407	CAESIUM	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1408	FERROSILICON with 30% or more but less than 90% silicon	4.3	WT2	III	4.3+6.1	39 801	1 kg	E1	**B**	PP, EP, EX, TOX, A	VE01, VE02, VE03	LO03	HA07, HA08	IN01, IN02, IN03	0	VE03, LO03, HA07, IN01, IN02 and IN03 apply only when this substance is carried in bulk or without packaging
1409	METAL HYDRIDES, WATER-REACTIVE, N.O.S.	4.3	W2	I	4.3	274 508	0	E0		PP, EX, A	VE01		HA08		0	
1409	METAL HYDRIDES, WATER-REACTIVE, N.O.S.	4.3	W2	II	4.3	274 508	500 g	E2		PP, EX, A	VE01		HA08		0	
1410	LITHIUM ALUMINIUM HYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1411	LITHIUM ALUMINIUM HYDRIDE, ETHEREAL	4.3	WF1	I	4.3+3		0	E0		PP, EX, A	VE01		HA08		1	
1413	LITHIUM BOROHYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1414	LITHIUM HYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1415	LITHIUM	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1417	LITHIUM SILICON	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
1418	MAGNESIUM POWDER or MAGNESIUM ALLOYS POWDER	4.3	WS	I	4.3+4.2		0	E0		PP, EX, A	VE01		HA08		0	
1418	MAGNESIUM POWDER or MAGNESIUM ALLOYS POWDER	4.3	WS	II	4.3+4.2		0	E2		PP, EX, A	VE01		HA08		0	
1418	MAGNESIUM POWDER or MAGNESIUM ALLOYS POWDER	4.3	WS	III	4.3+4.2		0	E1		PP, EX, A	VE01		HA08		0	
1419	MAGNESIUM ALUMINIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
1420	POTASSIUM METAL ALLOYS, LIQUID	4.3	W1	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1421	ALKALI METAL ALLOY, LIQUID, N.O.S.	4.3	W1	I	4.3	182	0	E0		PP, EX, A	VE01		HA08		0	
1422	POTASSIUM SODIUM ALLOYS, LIQUID	4.3	W1	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1423	RUBIDIUM	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1426	SODIUM BOROHYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1427	SODIUM HYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1428	SODIUM	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1431	SODIUM METHYLATE	4.2	SC4	II	4.2+8		0	E2		PP, EP					0	
1432	SODIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
1433	STANNIC PHOSPHIDES	4.3	WT2	I	4.3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
1435	ZINC ASHES	4.3	W2	III	4.3		1 kg	E1	**B**	PP, EX, A	VE01, VE03	LO03	HA07, HA08	IN01, IN03	0	VE03, LO03, HA07, IN01 and IN03 apply only when this substance is carried in bulk or without packaging
1436	ZINC POWDER or ZINC DUST	4.3	WS	I	4.3+4.2		0	E0		PP, EX, A	VE01		HA08		0	
1436	ZINC POWDER or ZINC DUST	4.3	WS	II	4.3+4.2		0	E2		PP, EX, A	VE01		HA08		0	
1436	ZINC POWDER or ZINC DUST	4.3	WS	III	4.3+4.2		0	E1		PP, EX, A	VE01		HA08		0	
1437	ZIRCONIUM HYDRIDE	4.1	F3	II	4.1		1 kg	E2		PP					1	
1438	ALUMINIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1439	AMMONIUM DICHROMATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1442	AMMONIUM PERCHLORATE	5.1	O2	II	5.1	152	1 kg	E2		PP					0	
1444	AMMONIUM PERSULPHATE	5.1	O2	III	5.1		5 kg	E1		PP					0	
1445	BARIUM CHLORATE, SOLID	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
1446	BARIUM NITRATE	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
1447	BARIUM PERCHLORATE, SOLID	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
1448	BARIUM PERMANGANATE	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
1449	BARIUM PEROXIDE	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
1450	BROMATES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 350	1 kg	E2		PP					0	
1451	CAESIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1452	CALCIUM CHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1453	CALCIUM CHLORITE	5.1	O2	II	5.1		1 kg	E2		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1454	CALCIUM NITRATE	5.1	O2	III	5.1	208	5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1455	CALCIUM PERCHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1456	CALCIUM PERMANGANATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1457	CALCIUM PEROXIDE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1458	CHLORATE AND BORATE MIXTURE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1458	CHLORATE AND BORATE MIXTURE	5.1	O2	III	5.1		5 kg	E1		PP					0	
1459	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE, SOLID	5.1	O2	II	5.1		1 kg	E2		PP					0	
1459	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE, SOLID	5.1	O2	III	5.1		5 kg	E1		PP					0	
1461	CHLORATES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 351	1 kg	E2		PP					0	
1462	CHLORITES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 352 509	1 kg	E2		PP					0	
1463	CHROMIUM TRIOXIDE, ANHYDROUS	5.1	OTC	II	5.1+6.1+8	510	1 kg	E2		PP, EP					2	
1465	DIDYMIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1466	FERRIC NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1467	GUANIDINE NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1469	LEAD NITRATE	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
1470	LEAD PERCHLORATE, SOLID	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
1471	LITHIUM HYPOCHLORITE, DRY or LITHIUM HYPOCHLORITE MIXTURE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1471	LITHIUM HYPOCHLORITE, DRY or LITHIUM HYPOCHLORITE MIXTURE	5.1	O2	III	5.1		5 kg	E1		PP					0	
1472	LITHIUM PEROXIDE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1473	MAGNESIUM BROMATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1474	MAGNESIUM NITRATE	5.1	O2	III	5.1	332	5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1475	MAGNESIUM PERCHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1476	MAGNESIUM PEROXIDE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1477	NITRATES, INORGANIC, N.O.S.	5.1	O2	II	5.1	511	1 kg	E2		PP					0	
1477	NITRATES, INORGANIC, N.O.S.	5.1	O2	III	5.1	511	5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1479	OXIDIZING SOLID, N.O.S.	5.1	O2	I	5.1	274	0	E0		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1479	OXIDIZING SOLID, N.O.S.	5.1	O2	II	5.1	274	1 kg	E2		PP					0	
1479	OXIDIZING SOLID, N.O.S.	5.1	O2	III	5.1	274	5 kg	E1		PP					0	
1481	PERCHLORATES, INORGANIC, N.O.S.	5.1	O2	II	5.1		1 kg	E2		PP					0	
1481	PERCHLORATES, INORGANIC, N.O.S.	5.1	O2	III	5.1		5 kg	E1		PP					0	
1482	PERMANGANATES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 353	1 kg	E2		PP					0	
1482	PERMANGANATES, INORGANIC, N.O.S.	5.1	O2	III	5.1	274 353	5 kg	E1		PP					0	
1483	PEROXIDES, INORGANIC, N.O.S.	5.1	O2	II	5.1		1 kg	E2		PP					0	
1483	PEROXIDES, INORGANIC, N.O.S.	5.1	O2	III	5.1		5 kg	E1		PP					0	
1484	POTASSIUM BROMATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1485	POTASSIUM CHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1486	POTASSIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1487	POTASSIUM NITRATE AND SODIUM NITRITE MIXTURE	5.1	O2	II	5.1	607	1 kg	E2		PP					0	
1488	POTASSIUM NITRITE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1489	POTASSIUM PERCHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1490	POTASSIUM PERMANGANATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1491	POTASSIUM PEROXIDE	5.1	O2	I	5.1		0	E0		PP					0	
1492	POTASSIUM PERSULPHATE	5.1	O2	III	5.1		5 kg	E1		PP					0	
1493	SILVER NITRATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1494	SODIUM BROMATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1495	SODIUM CHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1496	SODIUM CHLORITE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1498	SODIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1499	SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1500	SODIUM NITRITE	5.1	OT2	III	5.1+6.1	802	5 kg	E1		PP, EP					0	
1502	SODIUM PERCHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1503	SODIUM PERMANGANATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1504	SODIUM PEROXIDE	5.1	O2	I	5.1		0	E0		PP					0	
1505	SODIUM PERSULPHATE	5.1	O2	III	5.1		5 kg	E1		PP					0	
1506	STRONTIUM CHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1507	STRONTIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
1508	STRONTIUM PERCHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1509	STRONTIUM PEROXIDE	5.1	O2	II	5.1		1 kg	E2		PP					0	
1510	TETRANITROMETHANE	6.1	TO1	I	6.1+5.1	354 609 802	0	E0		PP, EP, TOX, A	VE02				2	
1511	UREA HYDROGEN PEROXIDE	5.1	OC2	III	5.1+8		5 kg	E1		PP, EP					0	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
1512	ZINC AMMONIUM NITRITE	5.1	O2	II	5.1		1 kg	E2		PP			0	
1513	ZINC CHLORATE	5.1	O2	II	5.1		1 kg	E2		PP			0	
1514	ZINC NITRATE	5.1	O2	II	5.1		1 kg	E2		PP			0	
1515	ZINC PERMANGANATE	5.1	O2	II	5.1		1 kg	E2		PP			0	
1516	ZINC PEROXIDE	5.1	O2	II	5.1		1 kg	E2		PP			0	
1517	ZIRCONIUM PICRAMATE, WETTED with not less than 20% water, by mass	4.1	D	I	4.1		0	E0		PP			1	
1541	ACETONE CYANOHYDRIN, STABILIZED	6.1	T1	I	6.1	354 802	0	E0	**T**	PP, EP, TOX, A	VE02		2	
1544	ALKALOIDS, SOLID, N.O.S. or ALKALOID SALTS, SOLID, N.O.S.	6.1	T2	I	6.1	43 274 802	0	E5		PP, EP			2	
1544	ALKALOIDS, SOLID, N.O.S. or ALKALOID SALTS, SOLID, N.O.S.	6.1	T2	II	6.1	43 274 802	500 g	E4		PP, EP			2	
1544	ALKALOIDS, SOLID, N.O.S. or ALKALOID SALTS, SOLID, N.O.S.	6.1	T2	III	6.1	43 274 802	5 kg	E1		PP, EP			0	
1545	ALLYL ISOTHIOCYANATE, STABILIZED	6.1	TF1	II	6.1+3	386 802	100 ml	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02		2	
1546	AMMONIUM ARSENATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
1547	ANILINE	6.1	T1	II	6.1	279 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02		2	
1548	ANILINE HYDROCHLORIDE	6.1	T2	III	6.1	802	5 kg	E1		PP, EP			0	
1549	ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S.	6.1	T5	III	6.1	45 274 512 802	5 kg	E1		PP, EP			0	
1550	ANTIMONY LACTATE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP			0	
1551	ANTIMONY POTASSIUM TARTRATE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP			0	
1553	ARSENIC ACID, LIQUID	6.1	T4	I	6.1	802	0	E5		PP, EP, TOX, A	VE02		2	
1554	ARSENIC ACID, SOLID	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
1555	ARSENIC BROMIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
1556	ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1	T4	I	6.1	43 274 802	0	E5		PP, EP, TOX, A	VE02		2	
1556	ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1	T4	II	6.1	43 274 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
1556	ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1	T4	III	6.1	43 274 802	5 L	E1		PP, EP, TOX, A	VE02		0	
1557	ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1	T5	I	6.1	43 274 802	0	E5		PP, EP			2	
1557	ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1	T5	II	6.1	43 274 802	500 g	E4		PP, EP			2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1557	ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1	T5	III	6.1	43 274 802	5 kg	E1		PP, EP					0	
1558	ARSENIC	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1559	ARSENIC PENTOXIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1560	ARSENIC TRICHLORIDE	6.1	T4	I	6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
1561	ARSENIC TRIOXIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1562	ARSENICAL DUST	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1564	BARIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	177 274 513 587 802	500 g	E4		PP, EP					2	
1564	BARIUM COMPOUND, N.O.S.	6.1	T5	III	6.1	177 274 513 587 802	5 kg	E1		PP, EP					0	
1565	BARIUM CYANIDE	6.1	T5	I	6.1	802	0	E5		PP, EP					2	
1566	BERYLLIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	274 514 802	500 g	E4		PP, EP					2	
1566	BERYLLIUM COMPOUND, N.O.S.	6.1	T5	III	6.1	274 514 802	5 kg	E1		PP, EP					0	
1567	BERYLLIUM POWDER	6.1	TF3	II	6.1+4.1	802	500 g	E4		PP, EP					2	
1569	BROMOACETONE	6.1	TF1	II	6.1+3	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1570	BRUCINE	6.1	T2	I	6.1	43 802	0	E5		PP, EP					2	
1571	BARIUM AZIDE, WETTED with not less than 50% water, by mass	4.1	DT	I	4.1+6.1	568 802	0	E0		PP, EP					2	
1572	CACODYLIC ACID	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1573	CALCIUM ARSENATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1574	CALCIUM ARSENATE AND CALCIUM ARSENITE MIXTURE, SOLID	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1575	CALCIUM CYANIDE	6.1	T5	I	6.1	802	0	E5		PP, EP					2	
1577	CHLORODINITROBENZENES, LIQUID	6.1	T1	II	6.1	279 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1578	CHLORONITROBENZENES, SOLID	6.1	T2	II	6.1	279 802	500 g	E4	**T**	PP, EP, TOX, A	VE02				2	
1579	4-CHLORO-o-TOLUIDINE HYDROCHLORIDE, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
1580	CHLOROPICRIN	6.1	T1	I	6.1	354 802	0	E0		PP, EP, TOX, A	VE02				2	
1581	CHLOROPICRIN AND METHYL BROMIDE MIXTURE with more than 2% chloropicrin	2	2T		2.3		0	E0		PP, EP, TOX, A	VE02				2	
1582	CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	2	2T		2.3		0	E0		PP, EP, TOX, A	VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
1583	CHLOROPICRIN MIXTURE, N.O.S.	6.1	T1	I	6.1	274 315 515 802	0	E0		PP, EP, TOX, A	VE02		2	
1583	CHLOROPICRIN MIXTURE, N.O.S.	6.1	T1	II	6.1	274 515 802	100 ml	E0		PP, EP, TOX, A	VE02		2	
1583	CHLOROPICRIN MIXTURE, N.O.S.	6.1	T1	III	6.1	274 515 802	5 L	E0		PP, EP, TOX, A	VE02		0	
1585	COPPER ACETOARSENITE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
1586	COPPER ARSENITE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
1587	COPPER CYANIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
1588	CYANIDES, INORGANIC, SOLID, N.O.S.	6.1	T5	I	6.1	47 274 802	0	E5		PP, EP			2	
1588	CYANIDES, INORGANIC, SOLID, N.O.S.	6.1	T5	II	6.1	47 274 802	500 g	E4		PP, EP			2	
1588	CYANIDES, INORGANIC, SOLID, N.O.S.	6.1	T5	III	6.1	47 274 802	5 kg	E1		PP, EP			0	
1589	CYANOGEN CHLORIDE, STABILIZED	2	2TC		2.3+8	386	0	E0		PP, EP, TOX, A	VE02		2	
1590	DICHLOROANILINES, LIQUID	6.1	T1	II	6.1	279 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
1591	o-DICHLOROBENZENE	6.1	T1	III	6.1	279 802	5 L	E1	**T**	PP, EP, TOX, A	VE02		0	
1593	DICHLOROMETHANE	6.1	T1	III	6.1	516 802	5 L	E1	**T**	PP, EP, TOX, A	VE02		0	
1594	DIETHYL SULPHATE	6.1	T1	II	6.1	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02		2	
1595	DIMETHYL SULPHATE	6.1	TC1	I	6.1+8	354 802	0	E0	**T**	PP, EP, TOX, A	VE02		2	
1596	DINITROANILINES	6.1	T2	II	6.1	802	500 g	E4		PP, EP			2	
1597	DINITROBENZENES, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
1597	DINITROBENZENES, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
1598	DINITRO-o-CRESOL	6.1	T2	II	6.1	43 802	500 g	E4		PP, EP			2	
1599	DINITROPHENOL SOLUTION	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, A			2	
1599	DINITROPHENOL SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, A			0	
1600	DINITROTOLUENES, MOLTEN	6.1	T1	II	6.1	802	0	E0		PP, EP, TOX, A	VE02		2	
1601	DISINFECTANT, SOLID, TOXIC, N.O.S.	6.1	T2	I	6.1	274 802	0	E5		PP, EP			2	
1601	DISINFECTANT, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	274 802	500 g	E4		PP, EP			2	
1601	DISINFECTANT, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	274 802	5 kg	E1		PP, EP			0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1602	DYE, LIQUID, TOXIC, N.O.S. or DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	6.1	T1	I	6.1	274 802	0	E5		PP, EP, TOX, A	VE02				2	
1602	DYE, LIQUID, TOXIC, N.O.S. or DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1602	DYE, LIQUID, TOXIC, N.O.S. or DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	274 802	5 L	E1		PP, EP, TOX, A	VE02				0	
1603	ETHYL BROMOACETATE	6.1	TF1	II	6.1+3	802	100 ml	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1604	ETHYLENEDIAMINE	8	CF1	II	8+3		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1605	ETHYLENE DIBROMIDE	6.1	T1	I	6.1	354 802	0	E0	**T**	PP, EP, TOX, A	VE02				2	
1606	FERRIC ARSENATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1607	FERRIC ARSENITE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1608	FERROUS ARSENATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1611	HEXAETHYL TETRAPHOSPHATE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1612	HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	2	1T		2.3		0	E0		PP, EP, TOX, A	VE02				2	
1613	HYDROCYANIC ACID, AQUEOUS SOLUTION (HYDROGEN CYANIDE, AQUEOUS SOLUTION) with not more than 20% hydrogen cyanide	6.1	TF1	I	6.1+3	48 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1614	HYDROGEN CYANIDE, STABILIZED, containing less than 3% water and absorbed in a porous inert material	6.1	TF1	I	6.1+3	386 603 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1616	LEAD ACETATE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP					0	
1617	LEAD ARSENATES	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1618	LEAD ARSENITES	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1620	LEAD CYANIDE	6.1	T5	II	6.1	802	500g	E4		PP, EP					2	
1621	LONDON PURPLE	6.1	T5	II	6.1	43 802	500 g	E4		PP, EP					2	
1622	MAGNESIUM ARSENATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1623	MERCURIC ARSENATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1624	MERCURIC CHLORIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1625	MERCURIC NITRATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1626	MERCURIC POTASSIUM CYANIDE	6.1	T5	I	6.1	802	0	E5		PP, EP					2	
1627	MERCUROUS NITRATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1629	MERCURY ACETATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1630	MERCURY AMMONIUM CHLORIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1631	MERCURY BENZOATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1634	MERCURY BROMIDES	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1636	MERCURY CYANIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1637	MERCURY GLUCONATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1638	MERCURY IODIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1639	MERCURY NUCLEATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1640	MERCURY OLEATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1641	MERCURY OXIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1642	MERCURY OXYCYANIDE, DESENSITIZED	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1643	MERCURY POTASSIUM IODIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1644	MERCURY SALICYLATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1645	MERCURY SULPHATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
1646	MERCURY THIOCYANATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
1647	METHYL BROMIDE AND ETHYLENE DIBROMIDE MIXTURE, LIQUID	6.1	T1	I	6.1	354 802	0	E0		PP, EP, TOX, A	VE02		2	
1648	ACETONITRILE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01		1	
1649	MOTOR FUEL ANTI-KNOCK MIXTURE	6.1	T3	I	6.1	802	0	E0		PP, EP, TOX, A	VE02		2	
1650	beta-NAPHTHYLAMINE, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP			2	
1651	NAPHTHYLTHIOUREA	6.1	T2	II	6.1	43 802	500 g	E4		PP, EP			2	
1652	NAPHTHYLUREA	6.1	T2	II	6.1	802	500 g	E4		PP, EP			2	
1653	NICKEL CYANIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
1654	NICOTINE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
1655	NICOTINE COMPOUND, SOLID, N.O.S. or NICOTINE PREPARATION, SOLID, N.O.S.	6.1	T2	I	6.1	43 274 802	0	E5		PP, EP			2	
1655	NICOTINE COMPOUND, SOLID, N.O.S. or NICOTINE PREPARATION, SOLID, N.O.S.	6.1	T2	II	6.1	43 274 802	500 g	E4		PP, EP			2	
1655	NICOTINE COMPOUND, SOLID, N.O.S. or NICOTINE PREPARATION, SOLID, N.O.S.	6.1	T2	III	6.1	43 274 802	5 kg	E1		PP, EP			0	
1656	NICOTINE HYDROCHLORIDE, LIQUID or SOLUTION	6.1	T1	II	6.1	43 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
1656	NICOTINE HYDROCHLORIDE, LIQUID or SOLUTION	6.1	T1	III	6.1	43 802	5 L	E1		PP, EP, TOX, A	VE02		0	
1657	NICOTINE SALICYLATE	6.1	T2	II	6.1	802	500 g	E4		PP, EP			2	
1658	NICOTINE SULPHATE, SOLUTION	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
1658	NICOTINE SULPHATE, SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
1659	NICOTINE TARTRATE	6.1	T2	II	6.1	802	500 g	E4		PP, EP			2	
1660	NITRIC OXIDE, COMPRESSED	2	1TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02		2	
1661	NITROANILINES (o-, m-, p-)	6.1	T2	II	6.1	279 802	500 g	E4		PP, EP			2	
1662	NITROBENZENE	6.1	T1	II	6.1	279 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02		2	
1663	NITROPHENOLS (o-, m-, p-)	6.1	T2	III	6.1	279 802	5 kg	E1	**T**	PP, EP			0	
1664	NITROTOLUENES, LIQUID	6.1	T1	II	6.1	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02		2	
1665	NITROXYLENES, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
1669	PENTACHLOROETHANE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
1670	PERCHLOROMETHYL MERCAPTAN	6.1	T1	I	6.1	354 802	0	E0		PP, EP, TOX, A	VE02		2	
1671	PHENOL, SOLID	6.1	T2	II	6.1	279 802	500 g	E4		PP, EP			2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1672	PHENYLCARBYLAMINE CHLORIDE	6.1	T1	I	6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
1673	PHENYLENEDIAMINES (o-, m-, p-)	6.1	T2	III	6.1	279 802	5 kg	E1		PP, EP					0	
1674	PHENYLMERCURIC ACETATE	6.1	T3	II	6.1	43 802	500 g	E4		PP, EP, TOX, A	VE02				2	
1677	POTASSIUM ARSENATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1678	POTASSIUM ARSENITE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1679	POTASSIUM CUPROCYANIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1680	POTASSIUM CYANIDE, SOLID	6.1	T5	I	6.1	802	0	E5		PP, EP					2	
1683	SILVER ARSENITE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1684	SILVER CYANIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1685	SODIUM ARSENATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1686	SODIUM ARSENITE, AQUEOUS SOLUTION	6.1	T4	II	6.1	43 802	100 ml	E4		PP, EP					2	
1686	SODIUM ARSENITE, AQUEOUS SOLUTION	6.1	T4	III	6.1	43 802	5 L	E1		PP, EP					0	
1687	SODIUM AZIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1688	SODIUM CACODYLATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1689	SODIUM CYANIDE, SOLID	6.1	T5	I	6.1	802	0	E5		PP, EP					2	
1690	SODIUM FLUORIDE, SOLID	6.1	T5	III	6.1	802	5 kg	E1	**B**	PP, EP					0	
1691	STRONTIUM ARSENITE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1692	STRYCHNINE or STRYCHNINE SALTS	6.1	T2	I	6.1	802	0	E5		PP, EP					2	
1693	TEAR GAS SUBSTANCE, LIQUID, N.O.S.	6.1	T1	I	6.1	274 802	0	E0		PP, EP, TOX, A	VE02				2	
1693	TEAR GAS SUBSTANCE, LIQUID, N.O.S.	6.1	T1	II	6.1	274 802	0	E0		PP, EP, TOX, A	VE02				2	
1694	BROMOBENZYL CYANIDES, LIQUID	6.1	T1	I	6.1	138 302	0	E0		PP, EP, TOX, A	VE02				2	
1695	CHLOROACETONE, STABILIZED	6.1	TFC	I	6.1+3+8	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1697	CHLOROACETOPHENONE, SOLID	6.1	T2	II	6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
1698	DIPHENYLAMINECHLOROARSINE	6.1	T3	I	6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
1699	DIPHENYLCHLOROARSINE, LIQUID	6.1	T3	I	6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
1700	TEAR GAS CANDLES	6.1	TF3		6.1+4.1	802	0	E0		PP, EP					2	
1701	XYLYL BROMIDE, LIQUID	6.1	T1	II	6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
1702	1,1,2,2-TETRACHLOROETHANE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1704	TETRAETHYL DITHIOPYROPHOSPHATE	6.1	T1	II	6.1	43 802	100 ml	E4		PP, EP					2	
1707	THALLIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	43 274 802	500 g	E4		PP, EP					2	
1708	TOLUIDINES, LIQUID	6.1	T1	II	6.1	279 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
1709	2,4-TOLUYLENEDIAMINE, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1710	TRICHLOROETHYLENE	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
1711	XYLIDINES, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1712	ZINC ARSENATE, ZINC ARSENITE or ZINC ARSENATE AND ZINC ARSENITE MIXTURE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
1713	ZINC CYANIDE	6.1	T5	I	6.1	802	0	E5		PP, EP					2	
1714	ZINC PHOSPHIDE	4.3	WT2	I	4.3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
1715	ACETIC ANHYDRIDE	8	CF1	II	8+3		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1716	ACETYL BROMIDE	8	C3	II	8		1 L	E2		PP, EP					0	
1717	ACETYL CHLORIDE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1718	BUTYL ACID PHOSPHATE	8	C3	III	8		5 L	E1	**T**	PP, EP					0	
1719	CAUSTIC ALKALI LIQUID, N.O.S.	8	C5	II	8	274	1 L	E2	**T**	PP, EP					0	
1719	CAUSTIC ALKALI LIQUID, N.O.S.	8	C5	III	8	274	5 L	E1	**T**	PP, EP					0	
1722	ALLYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1723	ALLYL IODIDE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
1724	ALLYLTRICHLOROSILANE, STABILIZED	8	CF1	II	8+3	386	0	E0		PP, EP, EX, A	VE01				1	
1725	ALUMINIUM BROMIDE, ANHYDROUS	8	C2	II	8	588	1 kg	E2		PP, EP					0	
1726	ALUMINIUM CHLORIDE, ANHYDROUS	8	C2	II	8	588	1 kg	E2		PP, EP					0	
1727	AMMONIUM HYDROGENDIFLUORIDE, SOLID	8	C2	II	8		1 kg	E2		PP, EP					0	
1728	AMYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
1729	ANISOYL CHLORIDE	8	C4	II	8		1 kg	E2		PP, EP					0	
1730	ANTIMONY PENTACHLORIDE, LIQUID	8	C1	II	8		1 L	E2		PP, EP					0	
1731	ANTIMONY PENTACHLORIDE SOLUTION	8	C1	II	8		1 L	E2		PP, EP					0	
1731	ANTIMONY PENTACHLORIDE SOLUTION	8	C1	III	8		5 L	E1		PP, EP					0	
1732	ANTIMONY PENTAFLUORIDE	8	CT1	II	8+6.1	802	1 L	E0		PP, EP, TOX, A	VE02				2	
1733	ANTIMONY TRICHLORIDE	8	C2	II	8		1 kg	E2		PP, EP					0	
1736	BENZOYL CHLORIDE	8	C3	II	8		1 L	E2		PP, EP					0	
1737	BENZYL BROMIDE	6.1	TC1	II	6.1+8	802	0	E4		PP, EP, TOX, A	VE02				2	
1738	BENZYL CHLORIDE	6.1	TC1	II	6.1+8	802	0	E4	**T**	PP, EP, TOX, A	VE02				2	
1739	BENZYL CHLOROFORMATE	8	C9	I	8		0	E0		PP, EP					0	
1740	HYDROGENDIFLUORIDES, SOLID, N.O.S.	8	C2	II	8	517	1 kg	E2		PP, EP					0	
1740	HYDROGENDIFLUORIDES, SOLID, N.O.S.	8	C2	III	8	517	5 kg	E1		PP, EP					0	
1741	BORON TRICHLORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
1742	BORON TRIFLUORIDE ACETIC ACID COMPLEX, LIQUID	8	C3	II	8		1 L	E2	**T**	PP, EP					0	
1743	BORON TRIFLUORIDE PROPIONIC ACID COMPLEX, LIQUID	8	C3	II	8		1 L	E2		PP, EP					0	
1744	BROMINE or BROMINE SOLUTION	8	CT1	I	8+6.1	802	0	E0		PP, EP, TOX, A	VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1745	BROMINE PENTAFLUORIDE	5.1	OTC	I	5.1+6.1+8	802	0	E0		PP, EP, TOX, A	VE02				2	
1746	BROMINE TRIFLUORIDE	5.1	OTC	I	5.1+6.1+8	802	0	E0		PP, EP, TOX, A	VE02				2	
1747	BUTYLTRICHLOROSILANE	8	CF1	II	8+3		0	E0		PP, EP, EX, A	VE01				1	
1748	CALCIUM HYPOCHLORITE, DRY or CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	5.1	O2	II	5.1	314	1 kg	E2		PP					0	
1748	CALCIUM HYPOCHLORITE, DRY or CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	5.1	O2	III	5.1	316	5 kg	E1		PP					0	
1749	CHLORINE TRIFLUORIDE	2	2TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02				2	
1750	CHLOROACETIC ACID SOLUTION	6.1	TC1	II	6.1+8	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
1751	CHLOROACETIC ACID, SOLID	6.1	TC2	II	6.1+8	802	500 g	E4		PP, EP					2	
1752	CHLOROACETYL CHLORIDE	6.1	TC1	I	6.1+8	354 802	0	E0		PP, EP, TOX, A	VE02				2	
1753	CHLOROPHENYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
1754	CHLOROSULPHONIC ACID (with or without sulphur trioxide)	8	C1	I	8		0	E0		PP, EP					0	
1755	CHROMIC ACID SOLUTION	8	C1	II	8	518	1 L	E2		PP, EP					0	
1755	CHROMIC ACID SOLUTION	8	C1	III	8	518	5 L	E1		PP, EP					0	
1756	CHROMIC FLUORIDE, SOLID	8	C2	II	8		1 kg	E2		PP, EP					0	
1757	CHROMIC FLUORIDE SOLUTION	8	C1	II	8		1 L	E2		PP, EP					0	
1757	CHROMIC FLUORIDE SOLUTION	8	C1	III	8		5 L	E1		PP, EP					0	
1758	CHROMIUM OXYCHLORIDE	8	C1	I	8		0	E0		PP, EP					0	
1759	CORROSIVE SOLID, N.O.S.	8	C10	I	8	274	0	E0		PP, EP					0	
1759	CORROSIVE SOLID, N.O.S.	8	C10	II	8	274	1 kg	E2		PP, EP					0	
1759	CORROSIVE SOLID, N.O.S.	8	C10	III	8	274	5 kg	E1		PP, EP					0	
1760	CORROSIVE LIQUID, N.O.S.	8	C9	I	8	274	0	E0	**T**	PP, EP					0	
1760	CORROSIVE LIQUID, N.O.S.	8	C9	II	8	274	1 L	E2	**T**	PP, EP					0	
1760	CORROSIVE LIQUID, N.O.S.	8	C9	III	8	274	5 L	E1	**T**	PP, EP					0	
1761	CUPRIETHYLENEDIAMINE SOLUTION	8	CT1	II	8+6.1	802	1 L	E2		PP, EP, A					2	
1761	CUPRIETHYLENEDIAMINE SOLUTION	8	CT1	III	8+6.1	802	5 L	E1		PP, EP, A					0	
1762	CYCLOHEXENYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
1763	CYCLOHEXYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
1764	DICHLOROACETIC ACID	8	C3	II	8		1 L	E2	**T**	PP, EP					0	
1765	DICHLOROACETYL CHLORIDE	8	C3	II	8		1 L	E2		PP, EP					0	
1766	DICHLOROPHENYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
1767	DIETHYLDICHLOROSILANE	8	CF1	II	8+3		0	E0		PP, EP, EX, A	VE01				1	
1768	DIFLUOROPHOSPHORIC ACID, ANHYDROUS	8	C1	II	8		1 L	E2		PP, EP					0	
1769	DIPHENYLDICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
1770	DIPHENYLMETHYL BROMIDE	8	C10	II	8		1 kg	E2		PP, EP					0	
1771	DODECYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
1773	FERRIC CHLORIDE, ANHYDROUS	8	C2	III	8	590	5 kg	E1		PP, EP					0	
1774	FIRE EXTINGUISHER CHARGES, corrosive liquid	8	C11	II	8		1 L	E0		PP, EP					0	
1775	FLUOROBORIC ACID	8	C1	II	8		1 L	E2		PP, EP					0	
1776	FLUOROPHOSPHORIC ACID, ANHYDROUS	8	C1	II	8		1 L	E2		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
1777	FLUOROSULPHONIC ACID	8	C1	I	8		0	E0		PP, EP			0	
1778	FLUOROSILICIC ACID	8	C1	II	8		1 L	E2	**T**	PP, EP			0	
1779	FORMIC ACID with more than 85% acid by mass	8	CF1	II	8+3		1 L	E2	**T**	PP, EP, EX, A	VE01		1	
1780	FUMARYL CHLORIDE	8	C3	II	8		1 L	E2	**T**	PP, EP			0	
1781	HEXADECYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP			0	
1782	HEXAFLUOROPHOSPHORIC ACID	8	C1	II	8		1 L	E2		PP, EP			0	
1783	HEXAMETHYLENEDIAMINE SOLUTION	8	C7	II	8		1 L	E2	**T**	PP, EP			0	
1783	HEXAMETHYLENEDIAMINE SOLUTION	8	C7	III	8		5 L	E1	**T**	PP, EP			0	
1784	HEXYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP			0	
1786	HYDROFLUORIC ACID AND SULPHURIC ACID MIXTURE	8	CT1	I	8+6.1	802	0	E0		PP, EP, TOX, A	VE02		2	
1787	HYDRIODIC ACID	8	C1	II	8		1 L	E2		PP, EP			0	
1787	HYDRIODIC ACID	8	C1	III	8		5 L	E1		PP, EP			0	
1788	HYDROBROMIC ACID	8	C1	II	8	519	1 L	E2		PP, EP			0	
1788	HYDROBROMIC ACID	8	C1	III	8	519	5 L	E1		PP, EP			0	
1789	HYDROCHLORIC ACID	8	C1	II	8	520	1 L	E2	**T**	PP, EP			0	
1789	HYDROCHLORIC ACID	8	C1	III	8	520	5 L	E1	**T**	PP, EP			0	
1790	HYDROFLUORIC ACID with more than 85% hydrofluoric acid	8	CT1	I	8+6.1	640I 802	0	E0		PP, EP, TOX, A	VE02		2	
1790	HYDROFLUORIC ACID with more than 60% but not more than 85% hydrofluoric acid	8	CT1	I	8+6.1	640J 802	0	E0		PP, EP, TOX, A	VE02		2	
1790	HYDROFLUORIC ACID with not more than 60% hydrofluoric acid	8	CT1	II	8+6.1	802	1 L	E2		PP, EP, TOX, A	VE02		2	
1791	HYPOCHLORITE SOLUTION	8	C9	II	8	521	1 L	E2		PP, EP			0	
1791	HYPOCHLORITE SOLUTION	8	C9	III	8	521	5 L	E1		PP, EP			0	
1792	IODINE MONOCHLORIDE, SOLID	8	C2	II	8		1 kg	E0		PP, EP			0	
1793	ISOPROPYL ACID PHOSPHATE	8	C3	III	8		5 L	E1		PP, EP			0	
1794	LEAD SULPHATE with more than 3% free acid	8	C2	II	8	591	1 kg	E2		PP, EP			0	
1796	NITRATING ACID MIXTURE with more than 50% nitric acid	8	CO1	I	8+5.1		0	E0		PP, EP			0	
1796	NITRATING ACID MIXTURE with not more than 50% nitric acid	8	C1	II	8		1 L	E0		PP, EP			0	
1798	NITROHYDROCHLORIC ACID	8	COT	**CARRIAGE PROHIBITED**										
1799	NONYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP			0	
1800	OCTADECYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP			0	
1801	OCTYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP			0	
1802	PERCHLORIC ACID with not more than 50% acid, by mass	8	CO1	II	8+5.1	522	1 L	E0		PP, EP			0	
1803	PHENOLSULPHONIC ACID, LIQUID	8	C3	II	8		1 L	E2		PP, EP			0	
1804	PHENYLTRICHLOROSILANE	8	C3	II	8		0	E0		PP, EP			0	
1805	PHOSPHORIC ACID, SOLUTION	8	C1	III	8		5 L	E1	**T**	PP, EP			0	
1806	PHOSPHORUS PENTACHLORIDE	8	C2	II	8		1 kg	E0		PP, EP			0	
1807	PHOSPHORUS PENTOXIDE	8	C2	II	8		1 kg	E2		PP, EP			0	
1808	PHOSPHORUS TRIBROMIDE	8	C1	II	8		1 L	E0		PP, EP			0	
1809	PHOSPHORUS TRICHLORIDE	6.1	TC3	I	6.1+8	354 802	0	E0		PP, EP, TOX, A	VE02		2	
1810	PHOSPHORUS OXYCHLORIDE	6.1	TC3	I	6.1+8	354	0	E0		PP, EP, TOX, A	VE02		2	
1811	POTASSIUM HYDROGENDIFLUORIDE, SOLID	8	CT2	II	8+6.1	802	1 kg	E2		PP, EP			2	
1812	POTASSIUM FLUORIDE, SOLID	6.1	T5	III	6.1	802	5 kg	E1	**B**	PP, EP			0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1813	POTASSIUM HYDROXIDE, SOLID	8	C6	II	8		1 kg	E2		PP, EP					0	
1814	POTASSIUM HYDROXIDE SOLUTION	8	C5	II	8		1 L	E2	**T**	PP, EP					0	
1814	POTASSIUM HYDROXIDE SOLUTION	8	C5	III	8		5 L	E1	**T**	PP, EP					0	
1815	PROPIONYL CHLORIDE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
1816	PROPYLTRICHLOROSILANE	8	CF1	II	8+3		0	E0		PP, EP, EX, A	VE01				1	
1817	PYROSULPHURYL CHLORIDE	8	C1	II	8		1 L	E2		PP, EP					0	
1818	SILICON TETRACHLORIDE	8	C1	II	8		0	E0		PP, EP					0	
1819	SODIUM ALUMINATE SOLUTION	8	C5	II	8		1 L	E2		PP, EP					0	
1819	SODIUM ALUMINATE SOLUTION	8	C5	III	8		5 L	E1		PP, EP					0	
1823	SODIUM HYDROXIDE, SOLID	8	C6	II	8		1 kg	E2	**T**	PP, EP					0	
1824	SODIUM HYDROXIDE SOLUTION	8	C5	II	8		1 L	E2	**T**	PP, EP					0	
1824	SODIUM HYDROXIDE SOLUTION	8	C5	III	8		5 L	E1	**T**	PP, EP					0	
1825	SODIUM MONOXIDE	8	C6	II	8		1 kg	E2		PP, EP					0	
1826	NITRATING ACID MIXTURE, SPENT, with more than 50% nitric acid	8	CO1	I	8+5.1	113	0	E0		PP, EP					0	
1826	NITRATING ACID MIXTURE, SPENT, with not more than 50% nitric acid	8	C1	II	8	113	1 L	E0		PP, EP					0	
1827	STANNIC CHLORIDE, ANHYDROUS	8	C1	II	8		1 L	E2		PP, EP					0	
1828	SULPHUR CHLORIDES	8	C1	I	8		0	E0		PP, EP					0	
1829	SULPHUR TRIOXIDE, STABILIZED	8	C1	I	8	386 623	0	E0		PP, EP					0	
1830	SULPHURIC ACID with more than 51% acid	8	C1	II	8		1 L	E2	**T**	PP, EP					0	
1831	SULPHURIC ACID, FUMING	8	CT1	I	8+6.1	802	0	E0	**T**	PP, EP, TOX, A	VE02				2	
1832	SULPHURIC ACID, SPENT	8	C1	II	8	113	1 L	E0	**T**	PP, EP					0	
1833	SULPHUROUS ACID	8	C1	II	8		1 L	E2		PP, EP					0	
1834	SULPHURYL CHLORIDE	6.1	TC3	I	6.1+8	354	0	E0		PP, EP, TOX, A	VE02				2	
1835	TETRAMETHYL AMMONIUM HYDROXIDE, SOLUTION	8	C7	II	8		1 L	E2		PP, EP					0	
1835	TETRAMETHYL AMMONIUM HYDROXIDE SOLUTION	8	C7	III	8		5 L	E1		PP, EP					0	
1836	THIONYL CHLORIDE	8	C1	I	8		0	E0		PP, EP					0	
1837	THIOPHOSPHORYL CHLORIDE	8	C1	II	8		1 L	E0		PP, EP					0	
1838	TITANIUM TETRACHLORIDE	6.1	TC3	I	6.1+8	354	0	E0		PP, EP, TOX, A	VE02				2	
1839	TRICHLOROACETIC ACID	8	C4	II	8		1 kg	E2		PP, EP					0	
1840	ZINC CHLORIDE SOLUTION	8	C1	III	8		5 L	E1		PP, EP					0	
1841	ACETALDEHYDE AMMONIA	9	M11	III	9		5 kg	E1		PP					0	
1843	AMMONIUM DINITRO-o-CRESOLATE, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
1845	Carbon dioxide, solid (Dry ice)	9	M11	**NOT SUBJECT TO ADN except for 5.5.3**												
1846	CARBON TETRACHLORIDE	6.1	T1	II	6.1	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
1847	POTASSIUM SULPHIDE, HYDRATED with not less than 30% water of crystallization	8	C6	II	8	523	1 kg	E2		PP, EP					0	
1848	PROPIONIC ACID with not less than 10% and less than 90% acid by mass	8	C3	III	8		5 L	E1	**T**	PP, EP					0	
1849	SODIUM SULPHIDE, HYDRATED with not less than 30% water	8	C6	II	8	523	1 kg	E2		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1851	MEDICINE, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	221 601 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1851	MEDICINE, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	221 601 802	5 L	E1		PP, EP, TOX, A	VE02				0	
1854	BARIUM ALLOYS, PYROPHORIC	4.2	S4	I	4.2		0	E0		PP					0	
1855	CALCIUM, PYROPHORIC or CALCIUM ALLOYS, PYROPHORIC	4.2	S4	I	4.2		0	E0		PP					0	
1856	Rags, oily	4.2	S2	**NOT SUBJECT TO ADN**												
1857	Textile waste, wet	4.2	S2	**NOT SUBJECT TO ADN**												
1858	HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	2	2A		2.2	662	120 ml	E1		PP					0	
1859	SILICON TETRAFLUORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
1860	VINYL FLUORIDE, STABILIZED	2	2F		2.1	386 662	0	E0		PP, EX, A	VE01				1	
1862	ETHYL CROTONATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	I	3		500 ml	E3	**T**	PP, EX, A	VE01				1	
1863	FUEL, AVIATION, TURBINE ENGINE (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	1 L	E2	**T**	PP, EX, A	VE01				1	
1863	FUEL, AVIATION, TURBINE ENGINE (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	1 L	E2	**T**	PP, EX, A	VE01				1	
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1865	n-PROPYL NITRATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
1866	RESIN SOLUTION, flammable	3	F1	I	3		500 ml	E3		PP, EX, A	VE01				1	
1866	RESIN SOLUTION, flammable (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5 L	E2		PP, EX, A	VE01				1	
1866	RESIN SOLUTION, flammable (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5 L	E2		PP, EX, A	VE01				1	
1866	RESIN SOLUTION, flammable	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1866	RESIN SOLUTION, flammable (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1866	RESIN SOLUTION, flammable (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1868	DECABORANE	4.1	FT2	II	4.1+6.1	802	1 kg	E0		PP, EP					2	
1869	MAGNESIUM or MAGNESIUM ALLOYS with more than 50% magnesium in pellets, turnings or ribbons	4.1	F3	III	4.1	59	5 kg	E1		PP					0	
1870	POTASSIUM BOROHYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
1871	TITANIUM HYDRIDE	4.1	F3	II	4.1		1 kg	E2		PP					1	
1872	LEAD DIOXIDE	5.1	OT2	III	5.1+6.1	802	5 kg	E1		PP, EP					0	
1873	PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass	5.1	OC1	I	5.1+8	60	0	E0		PP, EP					0	
1884	BARIUM OXIDE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP					0	
1885	BENZIDINE	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
1886	BENZYLIDENE CHLORIDE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1887	BROMOCHLOROMETHANE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1888	CHLOROFORM	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
1889	CYANOGEN BROMIDE	6.1	TC2	I	6.1+8	802	0	E0		PP, EP					2	
1891	ETHYL BROMIDE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1892	ETHYLDICHLOROARSINE	6.1	T3	I	6.1	354 802	0	E0		PP, EP, TOX, A	VE02				2	
1894	PHENYLMERCURIC HYDROXIDE	6.1	T3	II	6.1	802	500 g	E4		PP, EP, TOX, A	VE02				2	
1895	PHENYLMERCURIC NITRATE	6.1	T3	II	6.1	802	500 g	E4		PP, EP, TOX, A	VE02				2	
1897	TETRACHLOROETHYLENE	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
1898	ACETYL IODIDE	8	C3	II	8		1 L	E2		PP, EP					0	
1902	DIISOOCTYL ACID PHOSPHATE	8	C3	III	8		5 L	E1		PP, EP					0	
1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	8	C9	I	8	274	0	E0		PP, EP					0	
1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	8	C9	II	8	274	1 L	E2		PP, EP					0	
1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	8	C9	III	8	274	5 L	E1		PP, EP					0	
1905	SELENIC ACID	8	C2	I	8		0	E0		PP, EP					0	
1906	SLUDGE ACID	8	C1	II	8		1 L	E0		PP, EP					0	
1907	SODA LIME with more than 4% sodium hydroxide	8	C6	III	8	62	5 kg	E1		PP, EP					0	
1908	CHLORITE SOLUTION	8	C9	II	8	521	1 L	E2		PP, EP					0	
1908	CHLORITE SOLUTION	8	C9	III	8	521	5 L	E1		PP, EP					0	
1910	Calcium oxide	8	C6	**NOT SUBJECT TO ADN**												
1911	DIBORANE	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1912	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2	2F		2.1	228 662	0	E0	**T**	PP, EX, A	VE01				1	
1913	NEON, REFRIGERATED LIQUID	2	3A		2.2	593	120 ml	E1		PP					0	
1914	BUTYL PROPIONATES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1915	CYCLOHEXANONE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1916	2,2'-DICHLORODIETHYL ETHER	6.1	TF1	II	6.1+3	802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
1917	ETHYL ACRYLATE, STABILIZED	3	F1	II	3	386	1 L	E2	**T**	PP, EX, A	VE01				1	
1918	ISOPROPYLBENZENE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1919	METHYL ACRYLATE, STABILIZED	3	F1	II	3	386	1 L	E2	**T**	PP, EX, A	VE01				1	
1920	NONANES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
1921	PROPYLENEIMINE, STABILIZED	3	FT1	I	3+6.1	386 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1922	PYRROLIDINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
1923	CALCIUM DITHIONITE (CALCIUM HYDROSULPHITE)	4.2	S4	II	4.2		0	E2		PP					0	
1928	METHYL MAGNESIUM BROMIDE IN ETHYL ETHER	4.3	WF1	I	4.3+3		0	E0		PP, EX, A	VE01		HA08		1	
1929	POTASSIUM DITHIONITE (POTASSIUM HYDROSULPHITE)	4.2	S4	II	4.2		0	E2		PP					0	
1931	ZINC DITHIONITE (ZINC HYDROSULPHITE)	9	M11	III	9		5 kg	E1		PP					0	
1932	ZIRCONIUM SCRAP	4.2	S4	III	4.2	524 592	0	E0		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1935	CYANIDE SOLUTION, N.O.S.	6.1	T4	I	6.1	274 525 802	0	E5		PP, EP, TOX, A	VE02				2	
1935	CYANIDE SOLUTION, N.O.S.	6.1	T4	II	6.1	274 525 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
1935	CYANIDE SOLUTION, N.O.S.	6.1	T4	III	6.1	274 525 802	5 L	E1		PP, EP, TOX, A	VE02				0	
1938	BROMOACETIC ACID, SOLUTION	8	C3	II	8		1 L	E2		PP, EP					0	
1938	BROMOACETIC ACID SOLUTION	8	C3	III	8		5 L	E1		PP, EP					0	
1939	PHOSPHORUS OXYBROMIDE	8	C2	II	8		1 kg	E0		PP, EP					0	
1940	THIOGLYCOLIC ACID	8	C3	II	8		1 L	E2		PP, EP					0	
1941	DIBROMODIFLUOROMETHANE	9	M11	III	9		5 L	E1		PP					0	
1942	AMMONIUM NITRATE with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance	5.1	O2	III	5.1	306 611	5 kg	E1	**B**	PP		ST01, CO02, LO04	HA09		0	CO02 and HA09 apply only when this substance is carried in bulk or without packaging
1944	MATCHES, SAFETY (book, card or strike on box)	4.1	F1	III	4.1	293	5 kg	E1		PP					0	
1945	MATCHES, WAX 'VESTA'	4.1	F1	III	4.1	293	5 kg	E1		PP					0	
1950	AEROSOLS, asphyxiant	2	5A		2.2	190 327 344 625	1 L	E0		PP	VE04				0	
1950	AEROSOLS, corrosive	2	5C		2.2+8	190 327 344 625	1 L	E0		PP, EP	VE04				0	
1950	AEROSOLS, corrosive, oxidizing	2	5CO		2.2+5.1+8	190 327 344 625	1 L	E0		PP, EP	VE04				0	
1950	AEROSOLS, flammable	2	5F		2.1	190 327 344 625	1 L	E0		PP, EX, A	VE01, VE04				1	
1950	AEROSOLS, flammable, corrosive	2	5FC		2.1+8	190 327 344 625	1 L	E0		PP, EP, EX, A	VE01, VE04				1	
1950	AEROSOLS, oxidizing	2	5O		2.2+5.1	190 327 344 625	1 L	E0		PP	VE04				0	
1950	AEROSOLS, toxic	2	5T		2.2+6.1	190 327 344 625	120 ml	E0		PP, EP, TOX, A	VE02, VE04				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1950	AEROSOLS, toxic, corrosive	2	5TC		2.2+6.1+8	190 327 344 625	120 ml	E0		PP, EP, TOX, A	VE02, VE04				2	
1950	AEROSOLS, toxic, flammable	2	5TF		2.1+6.1	190 327 344 625	120 ml	E0		PP, EP, EX, TOX, A	VE01, VE02, VE04				2	
1950	AEROSOLS, toxic, flammable, corrosive	2	5TFC		2.1+6.1+8	190 327 344 625	120 ml	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1950	AEROSOLS, toxic, oxidizing	2	5TO		2.2+5.1+6.1	190 327 344 625	120 ml	E0		PP, EP, TOX, A	VE02, VE04				2	
1950	AEROSOLS, toxic, oxidizing, corrosive	2	5TOC		2.2+5.1+6.1 +8	190 327 344 625	120 ml	E0		PP, EP, TOX, A	VE02, VE04				2	
1951	ARGON, REFRIGERATED LIQUID	2	3A		2.2	593	120 ml	E1		PP					0	
1952	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	2	2A		2.2	660 662	120 ml	E1		PP					0	
1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	2	1TF		2.3+2.1	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2	1F		2.1	274 392 662	0	E0		PP, EX, A	VE01				1	
1955	COMPRESSED GAS, TOXIC, N.O.S.	2	1T		2.3	274	0	E0		PP, EP, TOX, A	VE02				2	
1956	COMPRESSED GAS, N.O.S.	2	1A		2.2	274 378 655 660 662	120 ml	E1		PP					0	
1957	DEUTERIUM, COMPRESSED	2	1F		2.1	662	0	E0		PP, EX, A	VE01				1	
1958	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114)	2	2A		2.2	662	120 ml	E1		PP					0	
1959	1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
1961	ETHANE, REFRIGERATED LIQUID	2	3F		2.1		0	E0		PP, EX, A	VE01				1	
1962	ETHYLENE	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
1963	HELIUM, REFRIGERATED LIQUID	2	3A		2.2	593	120 ml	E1		PP					0	
1964	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	2	1F		2.1	274 662	0	E0		PP, EX, A	VE01				1	
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S. such as mixtures A, A01, A02, A0, A1, B1, B2, B or C	2	2F		2.1	274 392 583 662 674	0	E0	**T**	PP, EX, A	VE01				1	
1966	HYDROGEN, REFRIGERATED LIQUID	2	3F		2.1		0	E0		PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1967	INSECTICIDE GAS, TOXIC, N.O.S.	2	2T		2.3	274	0	E0		PP, EP, TOX, A	VE02				2	
1968	INSECTICIDE GAS, N.O.S.	2	2A		2.2	274 662	120 ml	E1		PP					0	
1969	ISOBUTANE	2	2F		2.1	392 657 662 674	0	E0	**T**	PP, EX, A	VE01				1	
1970	KRYPTON, REFRIGERATED LIQUID	2	3A		2.2	593	120 ml	E1		PP					0	
1971	METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content	2	1F		2.1	392 662	0	E0		PP, EX, A	VE01				1	
1972	METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID with high methane content	2	3F		2.1	392	0	E0	**T**	PP, EX, A	VE01				1	
1973	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2	2A		2.2	662	120 ml	E1		PP					0	
1974	CHLORODIFLUOROBROMOMETHANE (REFRIGERANT GAS R 12B1)	2	2A		2.2	662	120 ml	E1		PP					0	
1975	NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE)	2	2TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02				2	
1976	OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318)	2	2A		2.2	662	120 ml	E1		PP					0	
1977	NITROGEN, REFRIGERATED LIQUID	2	3A		2.2	345 346 593	120 ml	E1		PP					0	
1978	PROPANE	2	2F		2.1	392 657 662 674	0	E0	**T**	PP, EX, A	VE01				1	
1982	TETRAFLUOROMETHANE (REFRIGERANT GAS R 14)	2	2A		2.2	662	120 ml	E1		PP					0	
1983	1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)	2	2A		2.2	662	120 ml	E1		PP					0	
1984	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	2	2A		2.2	662	120 ml	E1		PP					0	
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1	274 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274 802	1 L	E2	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	274 802	5 L	E1	**T**	PP, EP, EX, TOX, A	VE01, VE02				0	
1987	ALCOHOLS, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	274 601 640C	1 L	E2	**T**	PP, EX, A	VE01				1	
1987	ALCOHOLS, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	274 601 640D	1 L	E2	**T**	PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1987	ALCOHOLS, N.O.S.	3	F1	III	3	274 601	5 L	E1	**T**	PP, EX, A	VE01				0	
1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1	274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
1989	ALDEHYDES, N.O.S.	3	F1	I	3	274	0	E3		PP, EX, A	VE01				1	
1989	ALDEHYDES, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	274 640C	1 L	E2	**T**	PP, EX, A	VE01				1	
1989	ALDEHYDES, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	274 640D	1 L	E2	**T**	PP, EX, A	VE01				1	
1989	ALDEHYDES, N.O.S.	3	F1	III	3	274	5 L	E1	**T**	PP, EX, A	VE01				0	
1990	BENZALDEHYDE	9	M11	III	9		5 L	E1		PP					0	
1991	CHLOROPRENE, STABILIZED	3	FT1	I	3+6.1	386 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	FT1	I	3+6.1	274 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	FT1	II	3+6.1	274 802	1 L	E2	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	FT1	III	3+6.1	274 802	5 L	E1	**T**	PP, EP, EX, TOX, A	VE01, VE02				0	
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	I	3	274	0	E3	**T**	PP, EX, A	VE01				1	
1993	FLAMMABLE LIQUID, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	274 601 640C	1 L	E2	**T**	PP, EX, A	VE01				1	
1993	FLAMMABLE LIQUID, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	274 601 640D	1 L	E2	**T**	PP, EX, A	VE01				1	
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	III	3	274 601	5 L	E1	**T**	PP, EX, A	VE01				0	
1993	FLAMMABLE LIQUID, N.O.S. (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	274 601	5 L	E1	**T**	PP, EX, A	VE01				0	
1993	FLAMMABLE LIQUID, N.O.S. (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	274 601	5 L	E1	**T**	PP, EX, A	VE01				0	
1994	IRON PENTACARBONYL	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
1999	TARS, LIQUID, including road oils, and cutback bitumens (vapour pressure at 50°C more than 110 kPa)	3	F1	II	3	640C	5 L	E2		PP, EX, A	VE01				1	
1999	TARS, LIQUID, including road oils, and cutback bitumens (vapour pressure at 50°C not more than 110 kPa)	3	F1	II	3	640D	5 L	E2		PP, EX, A	VE01				1	
1999	TARS, LIQUID, including road asphalt and oils, bitumen and cut backs	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
1999	TARS, LIQUID, including road oils, and cutback bitumens (having a flash-point below 23°C and viscous according to 2.2.3.1.4) (vapour pressure at 50°C more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
1999	TARS, LIQUID, including road oils, and cutback bitumens (having a flash-point below 23°C and viscous according to 2.2.3.1.4) (vapour pressure at 50°C not more than 110 kPa)	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2000	CELLULOID in block, rods, rolls, sheets, tubes, etc., except scrap	4.1	F1	III	4.1	383 502	5 kg	E1		PP					0	
2001	COBALT NAPHTHENATES, POWDER	4.1	F3	III	4.1		5 kg	E1		PP					0	
2002	CELLULOID, SCRAP	4.2	S2	III	4.2	526 592	0	E0		PP					0	
2004	MAGNESIUM DIAMIDE	4.2	S4	II	4.2		0	E2		PP					0	
2006	PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.	4.2	S2	III	4.2	274 528	0	E0		PP					0	
2008	ZIRCONIUM POWDER, DRY	4.2	S4	I	4.2	524 540	0	E0		PP					0	
2008	ZIRCONIUM POWDER, DRY	4.2	S4	II	4.2	524 540	0	E2		PP					0	
2008	ZIRCONIUM POWDER, DRY	4.2	S4	III	4.2	524 540	0	E1		PP					0	
2009	ZIRCONIUM, DRY, finished sheets, strip or coiled wire	4.2	S4	III	4.2	524 592	0	E1		PP					0	
2010	MAGNESIUM HYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
2011	MAGNESIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
2012	POTASSIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
2013	STRONTIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
2014	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)	5.1	OC1	II	5.1+8		1 L	E2	**T**	PP, EP					0	
2015	HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED with more than 70% hydrogen peroxide	5.1	OC1	I	5.1+8	640N	0	E0		PP, EP					0	
2015	HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED with more than 60% hydrogen peroxide and not more than 70% hydrogen peroxide	5.1	OC1	I	5.1+8	640O	0	E0		PP, EP					0	
2016	AMMUNITION, TOXIC, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	6.1	T2		6.1	802	0	E0		PP, EP					2	
2017	AMMUNITION, TEAR-PRODUCING, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	6.1	TC2		6.1+8	802	0	E0		PP, EP					2	
2018	CHLOROANILINES, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2019	CHLOROANILINES, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2020	CHLOROPHENOLS, SOLID	6.1	T2	III	6.1	205 802	5 kg	E1		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2021	CHLOROPHENOLS, LIQUID	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
2022	CRESYLIC ACID	6.1	TC1	II	6.1+8	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
2023	EPICHLOROHYDRIN	6.1	TF1	II	6.1+3	279 802	100 ml	E4	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2024	MERCURY COMPOUND, LIQUID, N.O.S.	6.1	T4	I	6.1	43 274 802	0	E5		PP, EP, TOX, A	VE02				2	
2024	MERCURY COMPOUND, LIQUID, N.O.S.	6.1	T4	II	6.1	43 274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2024	MERCURY COMPOUND, LIQUID, N.O.S.	6.1	T4	III	6.1	43 274 802	5 L	E1		PP, EP, TOX, A	VE02				0	
2025	MERCURY COMPOUND, SOLID, N.O.S.	6.1	T5	I	6.1	43 66 274 529 802	0	E5		PP, EP					2	
2025	MERCURY COMPOUND, SOLID, N.O.S.	6.1	T5	II	6.1	43 66 274 529 802	500 g	E4		PP, EP					2	
2025	MERCURY COMPOUND, SOLID, N.O.S.	6.1	T5	III	6.1	43 66 274 529 802	5 kg	E1		PP, EP					0	
2026	PHENYLMERCURIC COMPOUND, N.O.S.	6.1	T3	I	6.1	43 274 802	0	E5		PP, EP, TOX, A	VE02				2	
2026	PHENYLMERCURIC COMPOUND, N.O.S.	6.1	T3	II	6.1	43 274 802	500 g	E4		PP, EP, TOX, A	VE02				2	
2026	PHENYLMERCURIC COMPOUND, N.O.S.	6.1	T3	III	6.1	43 274 802	5 kg	E1		PP, EP, TOX, A	VE02				0	
2027	SODIUM ARSENITE, SOLID	6.1	T5	II	6.1	43 802	500 g	E4		PP, EP					2	
2028	BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device	8	C11	II	8		0	E0		PP, EP					0	
2029	HYDRAZINE, ANHYDROUS	8	CFT	I	8+3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2030	HYDRAZINE AQUEOUS SOLUTION, with more than 37% hydrazine by mass	8	CT1	I	8+6.1	530 802	0	E0		PP, EP, TOX, A	VE02				2	
2030	HYDRAZINE AQUEOUS SOLUTION, with more than 37% hydrazine by mass	8	CT1	II	8+6.1	530 802	1 L	E0		PP, EP, TOX, A	VE02				2	
2030	HYDRAZINE AQUEOUS SOLUTION, with more than 37% hydrazine by mass	8	CT1	III	8+6.1	530 802	5 L	E1		PP, EP, TOX, A	VE02				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
2031	NITRIC ACID, other than red fuming, with more than 70% nitric acid	8	CO1	I	8+5.1		0	E0	**T**	PP, EP			0	
2031	NITRIC ACID, other than red fuming, with at least 65%, but not more than 70% nitric acid	8	CO1	II	8+5.1		1 L	E2	**T**	PP, EP			0	
2031	NITRIC ACID, other than red fuming, with less than 65% nitric acid	8	C1	II	8		1 L	E2	**T**	PP,EP			0	
2032	NITRIC ACID, RED FUMING	8	COT	I	8+5.1+6.1	802	0	E0	**T**	PP, EP, TOX, A	VE02		2	
2033	POTASSIUM MONOXIDE	8	C6	II	8		1 kg	E2		PP, EP			0	
2034	HYDROGEN AND METHANE MIXTURE, COMPRESSED	2	1F		2.1	662	0	E0		PP, EX, A	VE01		1	
2035	1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
2036	XENON	2	2A		2.2	378 660 662	120 ml	E1		PP			0	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5A		2.2	191 303 344	1 L	E0		PP			0	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5F		2.1	191 303 344	1 L	E0		PP, EX, A	VE01		1	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5O		2.2+5.1	191 303 344	1 L	E0		PP			0	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5T		2.3	303 344	120 ml	E0		PP, EP, TOX, A	VE02		2	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5TC		2.3+8	303 344	120 ml	E0		PP, EP, TOX, A	VE02		2	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5TF		2.3+2.1	303 344	120 ml	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5TFC		2.3+2.1+8	303 344	120 ml	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5TO		2.3+5.1	303 344	120 ml	E0		PP, EP, TOX, A	VE02		2	
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2	5TOC		2.3+5.1+8	303 344	120 ml	E0		PP, EP, TOX, A	VE02		2	
2038	DINITROTOLUENES, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2044	2,2-DIMETHYLPROPANE	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
2045	ISOBUTYRALDEHYDE (ISOBUTYL ALDEHYDE)	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01		1	
2046	CYMENES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01		0	
2047	DICHLOROPROPENES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01		1	
2047	DICHLOROPROPENES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01		0	
2048	DICYCLOPENTADIENE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01		0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2049	DIETHYLBENZENE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2050	DIISOBUTYLENE, ISOMERIC COMPOUNDS	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2051	2-DIMETHYLAMINOETHANOL	8	CF1	II	8+3		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2052	DIPENTENE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2053	METHYL ISOBUTYL CARBINOL	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2054	MORPHOLINE	8	CF1	I	8+3		0	E0	**T**	PP, EP, EX, A	VE01				1	
2055	STYRENE MONOMER, STABILIZED	3	F1	III	3	386	5 L	E1	**T**	PP, EX, A	VE01				0	
2056	TETRAHYDROFURAN	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2057	TRIPROPYLENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2057	TRIPROPYLENE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2058	VALERALDEHYDE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3	D	I	3	198 531	0	E0		PP, EX, A	VE01				1	
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose (vapour pressure at 50 °C more than 110 kPa)	3	D	II	3	198 531 640C	1 L	E0		PP, EX, A	VE01				1	
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose (vapour pressure at 50 °C not more than 110 kPa)	3	D	II	3	198 531 640D	1 L	E0		PP, EX, A	VE01				1	
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3	D	III	3	198 531	5 L	E0		PP, EX, A	VE01				0	
2067	AMMONIUM NITRATE BASED FERTILIZER	5.1	O2	III	5.1	306 307	5 kg	E1	**B**	PP		CO02, ST01, LO04	HA09		0	CO02, LO04 and HA09 apply only when this substance is carried in bulk or without packaging
2071	AMMONIUM NITRATE BASED FERTILIZER	9	M11			193			**B**	PP		CO02, ST02	HA09		0	Dangerous only in bulk or without packaging. CO02, ST02 and HA09 apply only when this substance is carried in bulk or without packaging
2073	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 35% but not more than 50% ammonia	2	4A		2.2	532	120 ml	E0		PP					0	
2074	ACRYLAMIDE, SOLID	6.1	T2	III	6.1	802	5 kg	E1	**T**	PP, EP					0	
2075	CHLORAL, ANHYDROUS, STABILIZED	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2076	CRESOLS, LIQUID	6.1	TC1	II	6.1+8	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2077	alpha-NAPHTHYLAMINE	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2078	TOLUENE DIISOCYANATE	6.1	T1	II	6.1	279 802	100 ml	E4	**T***	PP, EP, TOX, A	VE02				2	* only for 2,4 TOLUENE DIISOCYANATE
2079	DIETHYLENETRIAMINE	8	C7	II	8		1 L	E2	**T**	PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2186	HYDROGEN CHLORIDE, REFRIGERATED LIQUID	2	3TC	CARRIAGE PROHIBITED												
2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2	3A		2.2		120 ml	E1	**T**	PP					0	
2188	ARSINE	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2189	DICHLOROSILANE	2	2TFC		2.3+2.1+8		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2190	OXYGEN DIFLUORIDE, COMPRESSED	2	1TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02				2	
2191	SULPHURYL FLUORIDE	2	2T		2.3		0	E0		PP, EP, TOX, A	VE02				2	
2192	GERMANE	2	2TF		2.3+2.1	632	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2193	HEXAFLUOROETHANE (REFRIGERANT GAS R 116)	2	2A		2.2	662	120 ml	E1		PP					0	
2194	SELENIUM HEXAFLUORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
2195	TELLURIUM HEXAFLUORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
2196	TUNGSTEN HEXAFLUORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
2197	HYDROGEN IODIDE, ANHYDROUS	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
2198	PHOSPHORUS PENTAFLUORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
2199	PHOSPHINE	2	2TF		2.3+2.1	632	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2200	PROPADIENE, STABILIZED	2	2F		2.1	386 662	0	E0		PP, EX, A	VE01				1	
2201	NITROUS OXIDE, REFRIGERATED LIQUID	2	3O		2.2+5.1		0	E0		PP					0	
2202	HYDROGEN SELENIDE, ANHYDROUS	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2203	SILANE	2	2F		2.1	632 662	0	E0		PP, EX, A	VE01				1	
2204	CARBONYL SULPHIDE	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2205	ADIPONITRILE	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
2206	ISOCYANATES, TOXIC, N.O.S. or ISOCYANATE SOLUTION, TOXIC, N.O.S.	6.1	T1	II	6.1	274 551 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
2206	ISOCYANATES, TOXIC, N.O.S. or ISOCYANATE SOLUTION, TOXIC, N.O.S.	6.1	T1	III	6.1	274 551 802	5 L	E1		PP, EP, TOX, A	VE02				0	
2208	CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 10% but not more than 39% available chlorine	5.1	O2	III	5.1	314	5 kg	E1		PP					0	
2209	FORMALDEHYDE SOLUTION with not less than 25% formaldehyde	8	C9	III	8	533	5 L	E1	**T**	PP, EP					0	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2210	MANEB or MANEB PREPARATION with not less than 60% maneb	4.2	SW	III	4.2+4.3	273	0	E1	**B**	PP, EX, A	VE01, VE03			IN01, IN03	0	VE03, IN01 and IN03 apply only when this substance is carried in bulk or without packaging
2211	POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour	9	M3	III	none	382 633	5 kg	E1	**B**	PP, EX, EP, A	VE01, VE03			IN01	0	VE03 and IN01 apply only when this substance is carried in bulk or without packaging
2212	ASBESTOS, AMPHIBOLE (amosite, tremolite, actinolite, anthophyllite, crocidolite)	9	M1	II	9	168 274 542 802	1 kg	E0		PP					0	
2213	PARAFORMALDEHYDE	4.1	F1	III	4.1		5 kg	E1		PP					0	
2214	PHTHALIC ANHYDRIDE with more than 0.05% of maleic anhydride	8	C4	III	8	169	5 kg	E1		PP, EP					0	
2215	MALEIC ANHYDRIDE, MOLTEN	8	C3	III	8		0	E0	**T**	PP, EP					0	
2215	MALEIC ANHYDRIDE	8	C4	III	8		5 kg	E1		PP, EP					0	
2216	FISH MEAL, STABILISED or FISH SCRAP, STABILISED	9	M11						**B**	PP					0	
2217	SEED CAKE with not more than 1.5% oil and not more than 11% moisture	4.2	S2	III	4.2	142 800	0	E0	**B**	PP				IN01	0	IN01 applies only when this substance is carried in bulk or without packaging
2218	ACRYLIC ACID, STABILIZED	8	CF1	II	8+3	386	1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2219	ALLYL GLYCIDYL ETHER	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2222	ANISOLE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2224	BENZONITRILE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2225	BENZENESULPHONYL CHLORIDE	8	C3	III	8		5 L	E1		PP, EP					0	
2226	BENZOTRICHLORIDE	8	C9	II	8		1 L	E2		PP, EP					0	
2227	n-BUTYL METHACRYLATE, STABILIZED	3	F1	III	3	386	5 L	E1	**T**	PP, EX, A	VE01				0	
2232	2-CHLOROETHANAL	6.1	T1	I	6.1	354 802	0	E0		PP, EP, TOX, A	VE02				2	
2233	CHLOROANISIDINES	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2234	CHLOROBENZOTRIFLUORIDES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2235	CHLOROBENZYL CHLORIDES, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2236	3-CHLORO-4-METHYLPHENYL ISOCYANATE, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2237	CHLORONITROANILINES	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2238	CHLOROTOLUENES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2239	CHLOROTOLUIDINES, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2240	CHROMOSULPHURIC ACID	8	C1	I	8		0	E0		PP, EP					0	
2241	CYCLOHEPTANE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2242	CYCLOHEPTENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2243	CYCLOHEXYL ACETATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2244	CYCLOPENTANOL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2245	CYCLOPENTANONE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2246	CYCLOPENTENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2247	n-DECANE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2248	DI-n-BUTYLAMINE	8	CF1	II	8+3		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2249	DICHLORODIMETHYL ETHER, SYMMETRICAL	6.1	TF1	**CARRIAGE PROHIBITED**												
2250	DICHLOROPHENYL ISOCYANATES	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2251	BICYCLO[2.2.1]HEPTA-2,5-DIENE, STABILIZED (2,5-NORBORNADIENE, STABILIZED)	3	F1	II	3	386	1 L	E2		PP, EX, A	VE01				1	
2252	1,2-DIMETHOXYETHANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2253	N,N-DIMETHYLANILINE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2254	MATCHES, FUSEE	4.1	F1	III	4.1	293	5 kg	E0		PP					0	
2256	CYCLOHEXENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2257	POTASSIUM	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
2258	1,2-PROPYLENEDIAMINE	8	CF1	II	8+3		1 L	E2		PP, EP, EX, A	VE01				1	
2259	TRIETHYLENETETRAMINE	8	C7	II	8		1 L	E2	**T**	PP, EP					0	
2260	TRIPROPYLAMINE	3	FC	III	3+8		5 L	E1		PP, EP, EX, A	VE01				0	
2261	XYLENOLS, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2262	DIMETHYLCARBAMOYL CHLORIDE	8	C3	II	8		1 L	E2		PP, EP					0	
2263	DIMETHYLCYCLOHEXANES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2264	N,N-DIMETHYLCYCLOHEXYLAMINE	8	CF1	II	8+3		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2265	N,N-DIMETHYLFORMAMIDE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2266	DIMETHYL-N-PROPYLAMINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2267	DIMETHYLTHIOPHOSPHORYL CHLORIDE	6.1	TC1	II	6.1+8	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2269	3,3'-IMINODIPROPYLAMINE	8	C7	III	8		5 L	E1		PP, EP					0	
2270	ETHYLAMINE, AQUEOUS SOLUTION with not less than 50% but not more than 70% ethylamine	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
2271	ETHYL AMYL KETONE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2272	N-ETHYLANILINE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2273	2-ETHYLANILINE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2274	N-ETHYL-N-BENZYLANILINE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2275	2-ETHYLBUTANOL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2276	2-ETHYLHEXYLAMINE	3	FC	III	3+8		5 L	E1	**T**	PP, EP, EX, A	VE01				0	
2277	ETHYL METHACRYLATE, STABILIZED	3	F1	II	3	386	1 L	E2		PP, EX, A	VE01				1	
2278	n-HEPTENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2279	HEXACHLOROBUTADIENE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2280	HEXAMETHYLENEDIAMINE, SOLID	8	C8	III	8		5 kg	E1	**T**	PP, EP					0	
2281	HEXAMETHYLENE DIISOCYANATE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2282	HEXANOLS	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2283	ISOBUTYL METHACRYLATE, STABILIZED	3	F1	III	3	386	5 L	E1		PP, EX, A	VE01				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2284	ISOBUTYRONITRILE	3	FT1	II	3+6.1	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2285	ISOCYANATOBENZO-TRIFLUORIDES	6.1	TF1	II	6.1+3	802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
2286	PENTAMETHYLHEPTANE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2287	ISOHEPTENES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2288	ISOHEXENES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2289	ISOPHORONEDIAMINE	8	C7	III	8		5 L	E1	**T**	PP, EP					0	
2290	ISOPHORONE DIISOCYANATE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2291	LEAD COMPOUND, SOLUBLE, N.O.S.	6.1	T5	III	6.1	199 274 535 802	5 kg	E1	**B**	PP, EP, A					0	
2293	4-METHOXY-4-METHYLPENTAN-2-ONE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2294	N-METHYLANILINE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2295	METHYL CHLOROACETATE	6.1	TF1	I	6.1+3	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2296	METHYLCYCLOHEXANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2297	METHYLCYCLOHEXANONE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2298	METHYLCYCLOPENTANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2299	METHYL DICHLOROACETATE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2300	2-METHYL-5-ETHYLPYRIDINE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2301	2-METHYLFURAN	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2302	5-METHYLHEXAN-2-ONE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2303	ISOPROPENYLBENZENE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2304	NAPHTHALENE, MOLTEN	4.1	F2	III	4.1	536	0	E0		PP					0	
2305	NITROBENZENESULPHONIC ACID	8	C4	II	8		1 kg	E2		PP, EP					0	
2306	NITROBENZOTRIFLUORIDES, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2307	3-NITRO-4-CHLORO-BENZOTRIFLUORIDE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2308	NITROSYLSULPHURIC ACID, LIQUID	8	C1	II	8		1 L	E2		PP, EP					0	
2309	OCTADIENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2310	PENTANE-2,4-DIONE	3	FT1	III	3+6.1	802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
2311	PHENETIDINES	6.1	T1	III	6.1	279 802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
2312	PHENOL, MOLTEN	6.1	T1	II	6.1	802	0	E0	**T**	PP, EP, TOX, A	VE02				2	
2313	PICOLINES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2315	POLYCHLORINATED BIPHENYLS, LIQUID	9	M2	II	9	305 802	1 L	E2		PP, EP					0	
2316	SODIUM CUPROCYANIDE, SOLID	6.1	T5	I	6.1	802	0	E5		PP, EP					2	
2317	SODIUM CUPROCYANIDE SOLUTION	6.1	T4	I	6.1	802	0	E5		PP, EP					2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2318	SODIUM HYDROSULPHIDE with less than 25% water of crystallization	4.2	S4	II	4.2	504	0	E2		PP					0	
2319	TERPENE HYDROCARBONS, N.O.S.	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2320	TETRAETHYLENEPENTAMINE	8	C7	III	8		5 L	E1	**T**	PP, EP					0	
2321	TRICHLOROBENZENES, LIQUID	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
2322	TRICHLOROBUTENE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2323	TRIETHYL PHOSPHITE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2324	TRIISOBUTYLENE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2325	1,3,5-TRIMETHYLBENZENE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2326	TRIMETHYLCYCLOHEXYLAMINE	8	C7	III	8		5 L	E1		PP, EP					0	
2327	TRIMETHYLHEXAMETHYLENEDIAMINES	8	C7	III	8		5 L	E1		PP, EP					0	
2328	TRIMETHYLHEXAMETHYLENE DIISOCYANATE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2329	TRIMETHYL PHOSPHITE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2330	UNDECANE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2331	ZINC CHLORIDE, ANHYDROUS	8	C2	III	8		5 kg	E1		PP, EP					0	
2332	ACETALDEHYDE OXIME	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2333	ALLYL ACETATE	3	FT1	II	3+6.1	802	1 L	E2	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2334	ALLYLAMINE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2335	ALLYL ETHYL ETHER	3	FT1	II	3+6.1	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2336	ALLYL FORMATE	3	FT1	I	3+6.1	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2337	PHENYL MERCAPTAN	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2338	BENZOTRIFLUORIDE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2339	2-BROMOBUTANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2340	2-BROMOETHYL ETHYL ETHER	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2341	1-BROMO-3-METHYLBUTANE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2342	BROMOMETHYLPROPANES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2343	2-BROMOPENTANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2344	BROMOPROPANES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2344	BROMOPROPANES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2345	3-BROMOPROPYNE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2346	BUTANEDIONE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2347	BUTYL MERCAPTAN	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2348	BUTYL ACRYLATES, STABILIZED	3	F1	III	3	386	5 L	E1	**T**	PP, EX, A	VE01				0	
2350	BUTYL METHYL ETHER	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2351	BUTYL NITRITES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2351	BUTYL NITRITES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2352	BUTYL VINYL ETHER, STABILIZED	3	F1	II	3	386	1 L	E2		PP, EX, A	VE01				1	
2353	BUTYRYL CHLORIDE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
2354	CHLOROMETHYL ETHYL ETHER	3	FT1	II	3+6.1	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2356	2-CHLOROPROPANE	3	F1	I	3		0	E3	**T**	PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2357	CYCLOHEXYLAMINE	8	CF1	II	8+3		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2358	CYCLOOCTATETRAENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2359	DIALLYLAMINE	3	FTC	II	3+6.1+8	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2360	DIALLYL ETHER	3	FT1	II	3+6.1	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2361	DIISOBUTYLAMINE	3	FC	III	3+8		5 L	E1		PP, EP, EX, A	VE01				0	
2362	1,1-DICHLOROETHANE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2363	ETHYL MERCAPTAN	3	F1	I	3		0	E0		PP, EX, A	VE01				1	
2364	n-PROPYLBENZENE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2366	DIETHYL CARBONATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2367	alpha-METHYLVALERALDEHYDE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2368	alpha-PINENE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2370	1-HEXENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2371	ISOPENTENES	3	F1	I	3		0	E3		PP, EX, A	VE01				1	
2372	1,2-DI-(DIMETHYLAMINO) ETHANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2373	DIETHOXYMETHANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2374	3,3-DIETHOXYPROPENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2375	DIETHYL SULPHIDE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2376	2,3-DIHYDROPYRAN	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2377	1,1-DIMETHOXYETHANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2378	2-DIMETHYLAMINOACETONITRILE	3	FT1	II	3+6.1	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2379	1,3-DIMETHYLBUTYLAMINE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
2380	DIMETHYLDIETHOXYSILANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2381	DIMETHYL DISULPHIDE	3	FT1	II	3+6.1		1 L	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2382	DIMETHYLHYDRAZINE, SYMMETRICAL	6.1	TF1	I	6.1+3	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2383	DIPROPYLAMINE	3	FC	II	3+8	386	1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2384	DI-n-PROPYL ETHER	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2385	ETHYL ISOBUTYRATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2386	1-ETHYLPIPERIDINE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
2387	FLUOROBENZENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2388	FLUOROTOLUENES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2389	FURAN	3	F1	I	3		0	E3		PP, EX, A	VE01				1	
2390	2-IODOBUTANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2391	IODOMETHYLPROPANES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2392	IODOPROPANES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2393	ISOBUTYL FORMATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2394	ISOBUTYL PROPIONATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2395	ISOBUTYRYL CHLORIDE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
2396	METHACRYLALDEHYDE, STABILIZED	3	FT1	II	3+6.1	386 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2397	3-METHYLBUTAN-2-ONE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2398	METHYL tert-BUTYL ETHER	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2399	1-METHYLPIPERIDINE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
2400	METHYL ISOVALERATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2401	PIPERIDINE	8	CF1	I	8+3		0	E0		PP, EP, EX, A	VE01				1	
2402	PROPANETHIOLS	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2403	ISOPROPENYL ACETATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2404	PROPIONITRILE	3	FT1	II	3+6.1	802	1 L	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2405	ISOPROPYL BUTYRATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2406	ISOPROPYL ISOBUTYRATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2407	ISOPROPYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2409	ISOPROPYL PROPIONATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2410	1,2,3,6-TETRAHYDROPYRIDINE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2411	BUTYRONITRILE	3	FT1	II	3+6.1	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2412	TETRAHYDROTHIOPHENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2413	TETRAPROPYL ORTHOTITANATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2414	THIOPHENE	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2416	TRIMETHYL BORATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2417	CARBONYL FLUORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
2418	SULPHUR TETRAFLUORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
2419	BROMOTRIFLUOROETHYLENE	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
2420	HEXAFLUOROACETONE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
2421	NITROGEN TRIOXIDE	2	2TOC	**CARRIAGE PROHIBITED**												
2422	OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	2	2A		2.2	662	120 ml	E1		PP					0	
2424	OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	2	2A		2.2	662	120 ml	E1		PP					0	
2426	AMMONIUM NITRATE, LIQUID, hot concentrated solution, in a concentration of more than 80% but not more than 93%	5.1	O1		5.1	252 644	0	E0		PP					0	
2427	POTASSIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	II	5.1		1 L	E2		PP					0	
2427	POTASSIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	III	5.1		5 L	E1		PP					0	
2428	SODIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	II	5.1		1 L	E2		PP					0	
2428	SODIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	III	5.1		5 L	E1		PP					0	
2429	CALCIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	II	5.1		1 L	E2		PP					0	
2429	CALCIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	III	5.1		5 L	E1		PP					0	
2430	ALKYLPHENOLS, SOLID, N.O.S. (including C_2-C_{12} homologues)	8	C4	I	8		0	E0		PP, EP					0	
2430	ALKYLPHENOLS, SOLID, N.O.S. (including C_2-C_{12} homologues)	8	C4	II	8		1 kg	E2	**T**	PP, EP					0	
2430	ALKYLPHENOLS, SOLID, N.O.S. (including C_2-C_{12} homologues)	8	C4	III	8		5 kg	E1		PP, EP					0	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2431	ANISIDINES	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2432	N,N-DIETHYLANILINE	6.1	T1	III	6.1	279 802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
2433	CHLORONITROTOLUENES, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2434	DIBENZYLDICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
2435	ETHYLPHENYLDICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
2436	THIOACETIC ACID	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2437	METHYLPHENYLDICHLOROSILANE	8	C3	II	8		0	E0		PP, EP					0	
2438	TRIMETHYLACETYL CHLORIDE	6.1	TFC	I	6.1+3+8	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2439	SODIUM HYDROGENDIFLUORIDE	8	C2	II	8		1 kg	E2		PP, EP					0	
2440	STANNIC CHLORIDE PENTAHYDRATE	8	C2	III	8		5 kg	E1		PP, EP					0	
2441	TITANIUM TRICHLORIDE, PYROPHORIC or TITANIUM TRICHLORIDE MIXTURE, PYROPHORIC	4.2	SC4	I	4.2+8	537	0	E0		PP, EP					0	
2442	TRICHLOROACETYL CHLORIDE	8	C3	II	8		0	E0		PP, EP					0	
2443	VANADIUM OXYTRICHLORIDE	8	C1	II	8		1 L	E0		PP, EP					0	
2444	VANADIUM TETRACHLORIDE	8	C1	I	8		0	E0		PP, EP					0	
2446	NITROCRESOLS, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2447	PHOSPHORUS, WHITE, MOLTEN	4.2	ST3	I	4.2+6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
2448	SULPHUR, MOLTEN	4.1	F3	III	4.1	538	0	E0	**T**	PP					0	
2451	NITROGEN TRIFLUORIDE	2	2O		2.2+5.1	662	0	E0		PP					0	
2452	ETHYLACETYLENE, STABILIZED	2	2F		2.1	386 662	0	E0		PP, EX, A	VE01				1	
2453	ETHYL FLUORIDE (REFRIGERANT GAS R 161)	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
2454	METHYL FLUORIDE (REFRIGERANT GAS R 41)	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
2455	METHYL NITRITE	2	2A	**CARRIAGE PROHIBITED**												
2456	2-CHLOROPROPENE	3	F1	I	3		0	E3		PP, EX, A	VE01				1	
2457	2,3-DIMETHYLBUTANE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2458	HEXADIENES	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2459	2-METHYL-1-BUTENE	3	F1	I	3		0	E3		PP, EX, A	VE01				1	
2460	2-METHYL-2-BUTENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2461	METHYLPENTADIENE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2463	ALUMINIUM HYDRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
2464	BERYLLIUM NITRATE	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
2465	DICHLOROISOCYANURIC ACID, DRY or DICHLOROISOCYANURIC ACID SALTS	5.1	O2	II	5.1	135	1 kg	E2		PP					0	
2466	POTASSIUM SUPEROXIDE	5.1	O2	I	5.1		0	E0		PP					0	
2468	TRICHLOROISOCYANURIC ACID, DRY	5.1	O2	II	5.1		1 kg	E2		PP					0	
2469	ZINC BROMATE	5.1	O2	III	5.1		5 kg	E1		PP					0	
2470	PHENYLACETONITRILE, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2471	OSMIUM TETROXIDE	6.1	T5	I	6.1	802	0	E5		PP, EP					2	
2473	SODIUM ARSANILATE	6.1	T3	III	6.1	802	5 kg	E1		PP, EP, TOX, A	VE02				0	
2474	THIOPHOSGENE	6.1	T1	I	6.1	279 354 802	0	E0		PP, EP, TOX, A	VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2475	VANADIUM TRICHLORIDE	8	C2	III	8		5 kg	E1		PP, EP					0	
2477	METHYL ISOTHIOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2478	ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274 539 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2478	ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
2480	METHYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2481	ETHYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2482	n-PROPYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2483	ISOPROPYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2484	tert-BUTYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2485	n-BUTYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2486	ISOBUTYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2487	PHENYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2488	CYCLOHEXYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2490	DICHLOROISOPROPYL ETHER	6.1	T1	II	6.1	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
2491	ETHANOLAMINE or ETHANOLAMINE SOLUTION	8	C7	III	8		5 L	E1	**T**	PP, EP					0	
2493	HEXAMETHYLENEIMINE	3	FC	II	3+8		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2495	IODINE PENTAFLUORIDE	5.1	OTC	I	5.1+6.1+8	802	0	E0		PP, EP, TOX, A	VE02				2	
2496	PROPIONIC ANHYDRIDE	8	C3	III	8		5 L	E1	**T**	PP, EP					0	
2498	1,2,3,6-TETRAHYDROBENZALDEHYDE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2501	TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2501	TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2502	VALERYL CHLORIDE	8	CF1	II	8+3		1 L	E2		PP, EP, EX, A	VE01				1	
2503	ZIRCONIUM TETRACHLORIDE	8	C2	III	8		5 kg	E1		PP, EP					0	
2504	TETRABROMOETHANE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2505	AMMONIUM FLUORIDE	6.1	T5	III	6.1	802	5 kg	E1	**B**	PP, EP					0	
2506	AMMONIUM HYDROGEN SULPHATE	8	C2	II	8		1 kg	E2	**B**	PP, EP		CO03			0	CO03 applies only when this substance is carried in bulk or without packaging

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
2507	CHLOROPLATINIC ACID, SOLID	8	C2	III	8		5 kg	E1		PP, EP			0	
2508	MOLYBDENUM PENTACHLORIDE	8	C2	III	8		5 kg	E1		PP, EP			0	
2509	POTASSIUM HYDROGEN SULPHATE	8	C2	II	8		1 kg	E2	**B**	PP, EP		CO03	0	CO03 applies only when this substance is carried in bulk or without packaging
2511	2-CHLOROPROPIONIC ACID	8	C3	III	8		5 L	E1		PP, EP			0	
2512	AMINOPHENOLS (o-, m-, p-)	6.1	T2	III	6.1	279 802	5 kg	E1		PP, EP			0	
2513	BROMOACETYL BROMIDE	8	C3	II	8		1 L	E2		PP, EP			0	
2514	BROMOBENZENE	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
2515	BROMOFORM	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2516	CARBON TETRABROMIDE	6.1	T2	III	6.1	802	5 kg	E1		PP, EP			0	
2517	1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	2	2F		2.1	662	0	E0		PP, EX, A	VE01		1	
2518	1,5,9-CYCLODODECATRIENE	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02		0	
2520	CYCLOOCTADIENES	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
2521	DIKETENE, STABILIZED	6.1	TF1	I	6.1+3	354 386 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
2522	2-DIMETHYLAMINOETHYL METHACRYLATE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2524	ETHYL ORTHOFORMATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
2525	ETHYL OXALATE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2526	FURFURYLAMINE	3	FC	III	3+8		5 L	E1		PP, EP, EX, A	VE01		0	
2527	ISOBUTYL ACRYLATE, STABILIZED	3	F1	III	3	386	5 L	E1	**T**	PP, EX, A	VE01		0	
2528	ISOBUTYL ISOBUTYRATE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01		0	
2529	ISOBUTYRIC ACID	3	FC	III	3+8		5 L	E1		PP, EP, EX, A	VE01		0	
2531	METHACRYLIC ACID, STABILIZED	8	C3	II	8	386	1 L	E2	**T**	PP, EP			0	
2533	METHYL TRICHLOROACETATE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2534	METHYLCHLOROSILANE	2	2TFC		2.3+2.1+8		0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
2535	4-METHYLMORPHOLINE (N-METHYLMORPHOLINE)	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01		1	
2536	METHYLTETRAHYDROFURAN	3	F1	II	3		1 L	E2		PP, EX, A	VE01		1	
2538	NITRONAPHTHALENE	4.1	F1	III	4.1		5 kg	E1		PP			0	
2541	TERPINOLENE	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
2542	TRIBUTYLAMINE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2545	HAFNIUM POWDER, DRY	4.2	S4	I	4.2	540	0	E0		PP			0	
2545	HAFNIUM POWDER, DRY	4.2	S4	II	4.2	540	0	E2		PP			0	
2545	HAFNIUM POWDER, DRY	4.2	S4	III	4.2	540	0	E1		PP			0	
2546	TITANIUM POWDER, DRY	4.2	S4	I	4.2	540	0	E0		PP			0	
2546	TITANIUM POWDER, DRY	4.2	S4	II	4.2	540	0	E2		PP			0	
2546	TITANIUM POWDER, DRY	4.2	S4	III	4.2	540	0	E1		PP			0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2547	SODIUM SUPEROXIDE	5.1	O2	I	5.1		0	E0		PP					0	
2548	CHLORINE PENTAFLUORIDE	2	2TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02				2	
2552	HEXAFLUOROACETONE HYDRATE, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2554	METHYLALLYL CHLORIDE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2555	NITROCELLULOSE WITH WATER (not less than 25% water, by mass)	4.1	D	II	4.1	541	0	E0		PP					0	
2556	NITROCELLULOSE WITH ALCOHOL (not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass)	4.1	D	II	4.1	541	0	E0		PP					0	
2557	NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH or WITHOUT PLASTICIZER, WITH or WITHOUT PIGMENT	4.1	D	II	4.1	241 541	0	E0		PP					0	
2558	EPIBROMOHYDRIN	6.1	TF1	I	6.1+3	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2560	2-METHYLPENTAN-2-OL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2561	3-METHYL-1-BUTENE	3	F1	I	3		0	E3		PP, EX, A	VE01				1	
2564	TRICHLOROACETIC ACID SOLUTION	8	C3	II	8		1 L	E2	**T**	PP, EP					0	
2564	TRICHLOROACETIC ACID SOLUTION	8	C3	III	8		5 L	E1	**T**	PP, EP					0	
2565	DICYCLOHEXYLAMINE	8	C7	III	8		5 L	E1		PP, EP					0	
2567	SODIUM PENTACHLOROPHENATE	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2570	CADMIUM COMPOUND	6.1	T5	I	6.1	274 596 802	0	E5		PP, EP					2	
2570	CADMIUM COMPOUND	6.1	T5	II	6.1	274 596 802	500 g	E4		PP, EP					2	
2570	CADMIUM COMPOUND	6.1	T5	III	6.1	274 596 802	5 kg	E1		PP, EP					0	
2571	ALKYLSULPHURIC ACIDS	8	C3	II	8		1 L	E2		PP, EP					0	
2572	PHENYLHYDRAZINE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2573	THALLIUM CHLORATE	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
2574	TRICRESYL PHOSPHATE with more than 3% ortho isomer	6.1	T1	II	6.1	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
2576	PHOSPHORUS OXYBROMIDE, MOLTEN	8	C1	II	8		0	E0		PP, EP					0	
2577	PHENYLACETYL CHLORIDE	8	C3	II	8		1 L	E2		PP, EP					0	
2578	PHOSPHORUS TRIOXIDE	8	C2	III	8		5 kg	E1		PP, EP					0	
2579	PIPERAZINE	8	C8	III	8		5 kg	E1	**T**	PP, EP					0	
2580	ALUMINIUM BROMIDE SOLUTION	8	C1	III	8		5 L	E1		PP, EP					0	
2581	ALUMINIUM CHLORIDE SOLUTION	8	C1	III	8		5 L	E1		PP, EP					0	
2582	FERRIC CHLORIDE SOLUTION	8	C1	III	8		5 L	E1		PP, EP					0	
2583	ALKYLSULPHONIC ACIDS, SOLID or ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid	8	C2	II	8		1 kg	E2		PP, EP					0	
2584	ALKYLSULPHONIC ACIDS, LIQUID or ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid	8	C1	II	8		1 L	E2		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2585	ALKYLSULPHONIC ACIDS, SOLID or ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid	8	C4	III	8		5 kg	E1		PP, EP					0	
2586	ALKYLSULPHONIC ACIDS, LIQUID or ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	8	C3	III	8		5 L	E1	**T**	PP, EP					0	
2587	BENZOQUINONE	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2588	PESTICIDE, SOLID, TOXIC, N.O.S.	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2588	PESTICIDE, SOLID, TOXIC, N.O.S.	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2588	PESTICIDE, SOLID, TOXIC, N.O.S.	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2589	VINYL CHLOROACETATE	6.1	TF1	II	6.1+3	802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
2590	ASBESTOS, CHRYSOTILE	9	M1	III	9	168 802	5 kg	E1		PP					0	
2591	XENON, REFRIGERATED LIQUID	2	3A		2.2	593	120 ml	E1		PP					0	
2599	CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane (REFRIGERANT GAS R 503)	2	2A		2.2	662	120 ml	E1		PP					0	
2601	CYCLOBUTANE	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
2602	DICHLORODIFLUOROMETHANE AND 1,1-DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500)	2	2A		2.2	662	120 ml	E1		PP					0	
2603	CYCLOHEPTATRIENE	3	FT1	II	3+6.1	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2604	BORON TRIFLUORIDE DIETHYL ETHERATE	8	CF1	I	8+3		0	E0		PP, EP, EX, A	VE01				1	
2605	METHOXYMETHYL ISOCYANATE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2606	METHYL ORTHOSILICATE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2607	ACROLEIN DIMER, STABILIZED	3	F1	III	3	386	5 L	E1		PP, EX, A	VE01				0	
2608	NITROPROPANES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2609	TRIALLYL BORATE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2610	TRIALLYLAMINE	3	FC	III	3+8		5 L	E1		PP, EP, EX, A	VE01				0	
2611	PROPYLENE CHLOROHYDRIN	6.1	TF1	II	6.1+3	802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
2612	METHYL PROPYL ETHER	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2614	METHALLYL ALCOHOL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2615	ETHYL PROPYL ETHER	3	F1	II	3		1 L	E2	**T**	PP, EX, A	VE01				1	
2616	TRIISOPROPYL BORATE	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2616	TRIISOPROPYL BORATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2617	METHYLCYCLOHEXANOLS, flammable	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2618	VINYLTOLUENES, STABILIZED	3	F1	III	3	386	5 L	E1	**T**	PP, EX, A	VE01				0	
2619	BENZYLDIMETHYLAMINE	8	CF1	II	8+3		1 L	E2		PP, EP, EX, A	VE01				1	
2620	AMYL BUTYRATES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2621	ACETYL METHYL CARBINOL	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2622	GLYCIDALDEHYDE	3	FT1	II	3+6.1	802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2623	FIRELIGHTERS, SOLID with flammable liquid	4.1	F1	III	4.1		5 kg	E1		PP					0	
2624	MAGNESIUM SILICIDE	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
2626	CHLORIC ACID, AQUEOUS SOLUTION with not more than 10% chloric acid	5.1	O1	II	5.1	613	1 L	E0		PP					0	
2627	NITRITES, INORGANIC, N.O.S.	5.1	O2	II	5.1	103 274	1 kg	E2		PP					0	
2628	POTASSIUM FLUOROACETATE	6.1	T2	I	6.1	802	0	E5		PP, EP					2	
2629	SODIUM FLUOROACETATE	6.1	T2	I	6.1	802	0	E5		PP, EP					2	
2630	SELENATES or SELENITES	6.1	T5	I	6.1	274 802	0	E5		PP, EP					2	
2642	FLUOROACETIC ACID	6.1	T2	I	6.1	802	0	E5		PP, EP					2	
2643	METHYL BROMOACETATE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2644	METHYL IODIDE	6.1	T1	I	6.1	354 802	0	E0		PP, EP, TOX, A	VE02				2	
2645	PHENACYL BROMIDE	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2646	HEXACHLOROCYCLOPENTADIENE	6.1	T1	I	6.1	354 802	0	E0		PP, EP, TOX, A	VE02				2	
2647	MALONONITRILE	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2648	1,2-DIBROMOBUTAN-3-ONE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2649	1,3-DICHLOROACETONE	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2650	1,1-DICHLORO-1-NITROETHANE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2651	4,4'-DIAMINODIPHENYL-METHANE	6.1	T2	III	6.1	802	5 kg	E1	**T**	PP, EP					0	
2653	BENZYL IODIDE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2655	POTASSIUM FLUOROSILICATE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP					0	
2656	QUINOLINE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2657	SELENIUM DISULPHIDE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
2659	SODIUM CHLOROACETATE	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2660	NITROTOLUIDINES (MONO)	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2661	HEXACHLOROACETONE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2664	DIBROMOMETHANE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2667	BUTYLTOLUENES	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2668	CHLOROACETONITRILE	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2669	CHLOROCRESOLS, SOLUTION	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2669	CHLOROCRESOLS, SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2670	CYANURIC CHLORIDE	8	C4	II	8		1 kg	E2		PP, EP					0	
2671	AMINOPYRIDINES (o-, m-, p-)	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2672	AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia	8	C5	III	8	543	5 L	E1	**T**	PP, EP					0	
2673	2-AMINO-4-CHLOROPHENOL	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
2674	SODIUM FLUOROSILICATE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP					0	
2676	STIBINE	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2677	RUBIDIUM HYDROXIDE SOLUTION	8	C5	II	8		1 L	E2		PP, EP					0	
2677	RUBIDIUM HYDROXIDE SOLUTION	8	C5	III	8		5 L	E1		PP, EP					0	
2678	RUBIDIUM HYDROXIDE	8	C6	II	8		1 kg	E2		PP, EP					0	
2679	LITHIUM HYDROXIDE SOLUTION	8	C5	II	8		1 L	E2		PP, EP					0	
2679	LITHIUM HYDROXIDE SOLUTION	8	C5	III	8		5 L	E1		PP, EP					0	
2680	LITHIUM HYDROXIDE	8	C6	II	8		1 kg	E2		PP, EP					0	
2681	CAESIUM HYDROXIDE SOLUTION	8	C5	II	8		1 L	E2		PP, EP					0	
2681	CAESIUM HYDROXIDE SOLUTION	8	C5	III	8		5 L	E1		PP, EP					0	
2682	CAESIUM HYDROXIDE	8	C6	II	8		1 kg	E2		PP, EP					0	
2683	AMMONIUM SULPHIDE SOLUTION	8	CFT	II	8+3+6.1	802	1 L	E2	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2684	3-DIETHYLAMINOPROPYLAMINE	3	FC	III	3+8		5 L	E1		PP, EP, EX, A	VE01				0	
2685	N,N-DIETHYLETHYLENEDIAMINE	8	CF1	II	8+3		1 L	E2		PP, EP, EX, A	VE01				1	
2686	2-DIETHYLAMINOETHANOL	8	CF1	II	8+3		1 L	E2		PP, EP, EX, A	VE01				1	
2687	DICYCLOHEXYLAMMONIUM NITRITE	4.1	F3	III	4.1		5 kg	E1		PP					0	
2688	1-BROMO-3-CHLOROPROPANE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2689	GLYCEROL alpha-MONOCHLOROHYDRIN	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2690	N,n-BUTYLIMIDAZOLE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2691	PHOSPHORUS PENTABROMIDE	8	C2	II	8		1 kg	E0		PP, EP					0	
2692	BORON TRIBROMIDE	8	C1	I	8		0	E0		PP, EP					0	
2693	BISULPHITES, AQUEOUS SOLUTION, N.O.S.	8	C1	III	8	274	5 L	E1	**T**	PP, EP					0	
2698	TETRAHYDROPHTHALIC ANHYDRIDES with more than 0.05% of maleic anhydride	8	C4	III	8	169	5 kg	E1		PP, EP					0	
2699	TRIFLUOROACETIC ACID	8	C3	I	8		0	E0		PP, EP					0	
2705	1-PENTOL	8	C9	II	8		1 L	E2		PP, EP					0	
2707	DIMETHYLDIOXANES	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
2707	DIMETHYLDIOXANES	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2709	BUTYLBENZENES	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2710	DIPROPYL KETONE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2713	ACRIDINE	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2714	ZINC RESINATE	4.1	F3	III	4.1		5 kg	E1		PP					0	
2715	ALUMINIUM RESINATE	4.1	F3	III	4.1		5 kg	E1		PP					0	
2716	1,4-BUTYNEDIOL	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2717	CAMPHOR, synthetic	4.1	F1	III	4.1		5 kg	E1		PP					0	
2719	BARIUM BROMATE	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP					2	
2720	CHROMIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
2721	COPPER CHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
2722	LITHIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
2723	MAGNESIUM CHLORATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
2724	MANGANESE NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
2725	NICKEL NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
2726	NICKEL NITRITE	5.1	O2	III	5.1		5 kg	E1		PP					0	
2727	THALLIUM NITRATE	6.1	TO2	II	6.1+5.1	802	500 g	E4		PP, EP					2	
2728	ZIRCONIUM NITRATE	5.1	O2	III	5.1		5 kg	E1	**B**	PP		CO02, LO04			0	CO02 and LO04 apply only when this substance is carried in bulk or without packaging
2729	HEXACHLOROBENZENE	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
2730	NITROANISOLES, LIQUID	6.1	T1	III	6.1	279 802	5 L	E1		PP, EP, TOX, A	VE02				0	
2732	NITROBROMOBENZENES, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	3	FC	I	3+8	274 544	0	E0		PP, EP, EX, A	VE01				1	
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	3	FC	II	3+8	274 544	1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	3	FC	III	3+8	274 544	5 L	E1		PP, EP, EX, A	VE01				0	
2734	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	8	CF1	I	8+3	274	0	E0		PP, EP, EX, A	VE01				1	
2734	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	8	CF1	II	8+3	274	1 L	E2		PP, EP, EX, A	VE01				1	
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	I	8	274	0	E0	**T**	PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	II	8	274	1 L	E2	**T**	PP, EP			0	
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	III	8	274	5 L	E1	**T**	PP, EP			0	
2738	N-BUTYLANILINE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2739	BUTYRIC ANHYDRIDE	8	C3	III	8		5 L	E1		PP, EP			0	
2740	n-PROPYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
2741	BARIUM HYPOCHLORITE with more than 22% available chlorine	5.1	OT2	II	5.1+6.1	802	1 kg	E2		PP, EP			2	
2742	CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	TFC	II	6.1+3+8	274 561 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02		2	
2743	n-BUTYL CHLOROFORMATE	6.1	TFC	II	6.1+3+8	802	100 ml	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
2744	CYCLOBUTYL CHLOROFORMATE	6.1	TFC	II	6.1+3+8	802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02		2	
2745	CHLOROMETHYL CHLOROFORMATE	6.1	TC1	II	6.1+8	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2746	PHENYL CHLOROFORMATE	6.1	TC1	II	6.1+8	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2747	tert-BUTYLCYCLOHEXYL CHLOROFORMATE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2748	2-ETHYLHEXYL CHLOROFORMATE	6.1	TC1	II	6.1+8	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2749	TETRAMETHYLSILANE	3	F1	I	3		0	E0		PP, EX, A	VE01		1	
2750	1,3-DICHLOROPROPANOL-2	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2751	DIETHYLTHIOPHOSPHORYL CHLORIDE	8	C3	II	8		1 L	E2		PP, EP			0	
2752	1,2-EPOXY-3-ETHOXYPROPANE	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
2753	N-ETHYLBENZYLTOLUIDINES, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2754	N-ETHYLTOLUIDINES	6.1	T1	II	6.1	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02		2	
2757	CARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP			2	
2757	CARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP			2	
2757	CARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP			0	
2758	CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2758	CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2759	ARSENICAL PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2759	ARSENICAL PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2759	ARSENICAL PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2760	ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2760	ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2762	ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2762	ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2763	TRIAZINE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2763	TRIAZINE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2763	TRIAZINE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2764	TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2764	TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2772	THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2772	THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2775	COPPER BASED PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2775	COPPER BASED PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2775	COPPER BASED PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2776	COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2776	COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2777	MERCURY BASED PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2777	MERCURY BASED PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2777	MERCURY BASED PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2778	MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2778	MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2780	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2780	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2782	BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2782	BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2784	ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2784	ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2785	4-THIAPENTANAL	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2786	ORGANOTIN PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
2786	ORGANOTIN PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
2786	ORGANOTIN PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
2787	ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
2787	ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.	6.1	T3	I	6.1	43 274 802	0	E5		PP, EP, TOX, A	VE02				2	
2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.	6.1	T3	II	6.1	43 274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.	6.1	T3	III	6.1	43 274 802	5 L	E1		PP, EP, TOX, A	VE02				0	
2789	ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass	8	CF1	II	8+3		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2790	ACETIC ACID SOLUTION, not less than 50% but not more than 80% acid, by mass	8	C3	II	8		1 L	E2	**T**	PP, EP					0	
2790	ACETIC ACID SOLUTION, more than 10% and less than 50% acid, by mass	8	C3	III	8	597 647	5 L	E1	**T**	PP, EP					0	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2793	FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS in a form liable to self-heating	4.2	S4	III	4.2	592	0	E1	**B**	PP		LO02			0	LO02 applies only when this substance is carried in bulk or without packaging
2794	BATTERIES, WET, FILLED WITH ACID, electric storage	8	C11		8	295 598	1 L	E0		PP, EP					0	
2795	BATTERIES, WET, FILLED WITH ALKALI, electric storage	8	C11		8	295 598	1 L	E0		PP, EP					0	
2796	SULPHURIC ACID with not more than 51% acid or BATTERY FLUID, ACID	8	C1	II	8		1 L	E2	**T**	PP, EP					0	
2797	BATTERY FLUID, ALKALI	8	C5	II	8		1 L	E2	**T**	PP, EP					0	
2798	PHENYLPHOSPHORUS DICHLORIDE	8	C3	II	8		1 L	E0		PP, EP					0	
2799	PHENYLPHOSPHORUS THIODICHLORIDE	8	C3	II	8		1 L	E0		PP, EP					0	
2800	BATTERIES, WET, NON-SPILLABLE, electric storage	8	C11		8	238 295 598	1 L	E0		PP, EP					0	
2801	DYE, LIQUID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	8	C9	I	8	274	0	E0		PP, EP					0	
2801	DYE, LIQUID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	8	C9	II	8	274	1 L	E2		PP, EP					0	
2801	DYE, LIQUID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	8	C9	III	8	274	5 L	E1		PP, EP					0	
2802	COPPER CHLORIDE	8	C2	III	8		5 kg	E1		PP, EP					0	
2803	GALLIUM	8	C10	III	8		5 kg	E0		PP, EP					0	
2805	LITHIUM HYDRIDE, FUSED SOLID	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01		HA08		0	
2806	LITHIUM NITRIDE	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01		HA08		0	
2807	Magnetized material	9	M11	**NOT SUBJECT TO ADN**												
2809	MERCURY	8	CT1	III	8+6.1	365	5 kg	E0		PP, EP, EX, TOX, A	VE02				0	
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	I	6.1	274 315 614 802	0	E5	**T**	PP, EP, TOX, A	VE02				2	
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	II	6.1	274 614 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	III	6.1	274 614 802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
2811	TOXIC SOLID, ORGANIC, N.O.S.	6.1	T2	I	6.1	274 614 802	0	E5		PP, EP					2	
2811	TOXIC SOLID, ORGANIC, N.O.S.	6.1	T2	II	6.1	274 614 802	500 g	E4		PP, EP					2	
2811	TOXIC SOLID, ORGANIC, N.O.S.	6.1	T2	III	6.1	274 614 802	5 kg	E1	**T**	PP, EP					0	
2812	Sodium aluminate, solid	8	C6	**NOT SUBJECT TO ADN**												
2813	WATER-REACTIVE SOLID, N.O.S.	4.3	W2	I	4.3	274	0	E0		PP, EX, A	VE01		HA08		0	
2813	WATER-REACTIVE SOLID, N.O.S.	4.3	W2	II	4.3	274	500 g	E2		PP, EX, A	VE01		HA08		0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
2813	WATER-REACTIVE SOLID, N.O.S.	4.3	W2	III	4.3	274	1 kg	E1		PP, EX, A	VE01	HA08	0	
2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS	6.2	I1		6.2	318 802	0	E0		PP			0	
2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS, in refrigerated liquid nitrogen	6.2	I1		6.2 +2.2	318 802	0	E0		PP			0	
2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS (animal material only)	6.2	I1		6.2	318 802	0	E0		PP			0	
2815	N-AMINOETHYLPIPERAZINE	8	CT1	III	8+6.1		5 L	E1	**T**	PP, EP			0	
2817	AMMONIUM HYDROGENDIFLUORIDE SOLUTION	8	CT1	II	8+6.1	802	1 L	E2		PP, EP			2	
2817	AMMONIUM HYDROGENDIFLUORIDE SOLUTION	8	CT1	III	8+6.1	802	5 L	E1		PP, EP			0	
2818	AMMONIUM POLYSULPHIDE SOLUTION	8	CT1	II	8+6.1	802	1 L	E2		PP, EP			2	
2818	AMMONIUM POLYSULPHIDE SOLUTION	8	CT1	III	8+6.1	802	5 L	E1		PP, EP			0	
2819	AMYL ACID PHOSPHATE	8	C3	III	8		5 L	E1		PP, EP			0	
2820	BUTYRIC ACID	8	C3	III	8		5 L	E1	**T**	PP, EP			0	
2821	PHENOL SOLUTION	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2821	PHENOL SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2822	2-CHLOROPYRIDINE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2823	CROTONIC ACID, SOLID	8	C4	III	8		5 kg	E1		PP, EP			0	
2826	ETHYL CHLOROTHIOFORMATE	8	CF1	II	8+3		0	E0		PP, EP, EX, A	VE01		1	
2829	CAPROIC ACID	8	C3	III	8		5 L	E1	**T**	PP, EP			0	
2830	LITHIUM FERROSILICON	4.3	W2	II	4.3		500 g	E2		PP, EX, A	VE01	HA08	0	
2831	1,1,1-TRICHLOROETHANE	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02		0	
2834	PHOSPHOROUS ACID	8	C2	III	8		5 kg	E1		PP, EP			0	
2835	SODIUM ALUMINIUM HYDRIDE	4.3	W2	II	4.3		500 g	E0		PP, EX, A	VE01	HA08	0	
2837	BISULPHATES, AQUEOUS SOLUTION	8	C1	II	8		1 L	E2		PP, EP			0	
2837	BISULPHATES, AQUEOUS SOLUTION	8	C1	III	8		5 L	E1		PP, EP			0	
2838	VINYL BUTYRATE, STABILIZED	3	F1	II	3	386	1 L	E2		PP, EX, A	VE01		1	
2839	ALDOL	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2840	BUTYRALDOXIME	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
2841	DI-n-AMYLAMINE	3	FT1	III	3+6.1	802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02		2	
2842	NITROETHANE	3	F1	III	3		5 L	E1		PP, EX, A	VE01		0	
2844	CALCIUM MANGANESE SILICON	4.3	W2	III	4.3		1 kg	E1		PP, EX, A	VE01	HA08	0	
2845	PYROPHORIC LIQUID, ORGANIC, N.O.S.	4.2	S1	I	4.2	274	0	E0		PP			0	
2846	PYROPHORIC SOLID, ORGANIC, N.O.S.	4.2	S2	I	4.2	274	0	E0		PP			0	
2849	3-CHLOROPROPANOL-1	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2850	PROPYLENE TETRAMER	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01		0	
2851	BORON TRIFLUORIDE DIHYDRATE	8	C1	II	8		1 L	E2		PP, EP			0	
2852	DIPICRYL SULPHIDE, WETTED with not less than 10% water, by mass	4.1	D	I	4.1	545	0	E0		PP			1	
2853	MAGNESIUM FLUOROSILICATE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP			0	
2854	AMMONIUM FLUOROSILICATE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP			0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
2855	ZINC FLUOROSILICATE	6.1	T5	III	6.1	802	5 kg	E1		PP, EP			0	
2856	FLUOROSILICATES, N.O.S.	6.1	T5	III	6.1	274 802	5 kg	E1		PP, EP			0	
2857	REFRIGERATING MACHINES containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)	2	6A		2.2	119	0	E0		PP			0	
2858	ZIRCONIUM, DRY, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)	4.1	F3	III	4.1	546	5 kg	E1		PP			0	
2859	AMMONIUM METAVANADATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
2861	AMMONIUM POLYVANADATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
2862	VANADIUM PENTOXIDE, non-fused form	6.1	T5	III	6.1	600 802	5 kg	E1		PP, EP			0	
2863	SODIUM AMMONIUM VANADATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
2864	POTASSIUM METAVANADATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP			2	
2865	HYDROXYLAMINE SULPHATE	8	C2	III	8		5 kg	E1		PP, EP			0	
2869	TITANIUM TRICHLORIDE MIXTURE	8	C2	II	8		1 kg	E2		PP, EP			0	
2869	TITANIUM TRICHLORIDE MIXTURE	8	C2	III	8		5 kg	E1		PP, EP			0	
2870	ALUMINIUM BOROHYDRIDE	4.2	SW	I	4.2+4.3		0	E0		PP, EX, A	VE01		0	
2870	ALUMINIUM BOROHYDRIDE IN DEVICES	4.2	SW	I	4.2+4.3		0	E0		PP, EX, A	VE01		0	
2871	ANTIMONY POWDER	6.1	T5	III	6.1	802	5 kg	E1		PP, EP			0	
2872	DIBROMOCHLOROPROPANES	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
2872	DIBROMOCHLOROPROPANES	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2873	DIBUTYLAMINOETHANOL	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
2874	FURFURYL ALCOHOL	6.1	T1	III	6.1	802	5 L	E1	**T**	PP, EP, TOX, A	VE02		0	
2875	HEXACHLOROPHENE	6.1	T2	III	6.1	802	5 kg	E1		PP, EP			0	
2876	RESORCINOL	6.1	T2	III	6.1	802	5 kg	E1		PP, EP			0	
2878	TITANIUM SPONGE GRANULES or TITANIUM SPONGE POWDERS	4.1	F3	III	4.1		5 kg	E1		PP			0	
2879	SELENIUM OXYCHLORIDE	8	CT1	I	8+6.1	802	0	E0		PP, EP, TOX, A	VE02		2	
2880	CALCIUM HYPOCHLORITE, HYDRATED, or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, with not less than 5.5% but not more than 16% water	5.1	O2	II	5.1	314 322	1 kg	E2		PP			0	
2880	CALCIUM HYPOCHLORITE, HYDRATED or CALCIUM HYPOCHLORITE HYDRATED MIXTURE, with not less than 5.5% but not more than 16% water	5.1	O2	III	5.1	314	5 kg	E1		PP			0	
2881	METAL CATALYST, DRY	4.2	S4	I	4.2	274	0	E0		PP			0	
2881	METAL CATALYST, DRY	4.2	S4	II	4.2	274	0	E0		PP			0	
2881	METAL CATALYST, DRY	4.2	S4	III	4.2	274	0	E1		PP			0	
2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only	6.2	I2		6.2	318 802	0	E0		PP			0	
2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only, in refrigerated liquid nitrogen	6.2	I2		6.2 +2.2	318 802	0	E0		PP			0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only (animal material only)	6.2	I2		6.2	318 802	0	E0		PP					0	
2901	BROMINE CHLORIDE	2	2TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02				2	
2902	PESTICIDE, LIQUID, TOXIC, N.O.S.	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
2902	PESTICIDE, LIQUID, TOXIC, N.O.S.	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2902	PESTICIDE, LIQUID, TOXIC, N.O.S.	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
2904	CHLOROPHENOLATES, LIQUID or PHENOLATES, LIQUID	8	C9	III	8		5 L	E1	**T** *	PP, EP					0	* applies only to phenolates but not to chlorophenolates
2905	CHLOROPHENOLATES, SOLID or PHENOLATES, SOLID	8	C10	III	8		5 kg	E1		PP, EP					0	
2907	ISOSORBIDE DINITRATE MIXTURE with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	4.1	D	II	4.1	127	0	E0		PP					0	
2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING	7				290 368	0	E0		PP					0	
2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM	7				290	0	E0		PP					0	
2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL	7				290 368	0	E0		PP					0	
2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES	7				290	0	E0		PP					0	
2912	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non fissile or fissile-excepted	7			7X	172 317 325	0	E0	**B**	PP				RA01	2	
2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), non fissile or fissile-excepted	7			7X	172 317 325	0	E0	**B**	PP				RA02	2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non fissile or fissile-excepted	7			7X	172 317 325	0	E0		PP					2	
2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non fissile or fissile-excepted	7			7X	172 317 325 337	0	E0		PP					2	
2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non fissile or fissile-excepted	7			7X	172 317 325 337	0	E0		PP					2	
2919	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non fissile or fissile-excepted	7			7X	172 325 317	0	E0		PP					2	
2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S.	8	CF1	I	8+3	274	0	E0		PP, EP, EX, A	VE01				1	
2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S.	8	CF1	II	8+3	274	1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2921	CORROSIVE SOLID, FLAMMABLE, N.O.S.	8	CF2	I	8+4.1	274	0	E0		PP, EP					1	
2921	CORROSIVE SOLID, FLAMMABLE, N.O.S.	8	CF2	II	8+4.1	274	1 kg	E2		PP, EP					1	
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	I	8+6.1	274 802	0	E0	**T**	PP, EP, TOX, A	VE02				2	
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	II	8+6.1	274 802	1 L	E2	**T**	PP, EP, TOX, A	VE02				2	
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	III	8+6.1	274 802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
2923	CORROSIVE SOLID, TOXIC, N.O.S.	8	CT2	I	8+6.1	274 802	0	E0		PP, EP					2	
2923	CORROSIVE SOLID, TOXIC, N.O.S.	8	CT2	II	8+6.1	274 802	1 kg	E2		PP, EP					2	
2923	CORROSIVE SOLID, TOXIC, N.O.S.	8	CT2	III	8+6.1	274 802	5 kg	E1		PP, EP					0	
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	I	3+8	274	0	E0	**T**	PP, EP, EX, A	VE01				1	
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	II	3+8	274	1 L	E2	**T**	PP, EP, EX, A	VE01				1	
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	III	3+8	274	5 L	E1	**T**	PP, EP, EX, A	VE01				0	
2925	FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	4.1	FC1	II	4.1+8	274	1 kg	E2		PP, EP					1	
2925	FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	4.1	FC1	III	4.1+8	274	5 kg	E1		PP, EP					0	
2926	FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	4.1	FT1	II	4.1+6.1	274 802	1 kg	E2		PP, EP					2	
2926	FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	4.1	FT1	III	4.1+6.1	274 802	5 kg	E1		PP, EP					0	
2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC1	I	6.1+8	274 315 802	0	E5	**T**	PP, EP, TOX, A	VE02				2	
2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC1	II	6.1+8	274 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2928	TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC2	I	6.1+8	274 802	0	E5		PP, EP					2	
2928	TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC2	II	6.1+8	274 802	500 g	E4		PP, EP					2	
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF1	I	6.1+3	274 315 802	0	E5	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF1	II	6.1+3	274 802	100 ml	E4	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2930	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF3	I	6.1+4.1	274 802	0	E5		PP, EP					2	
2930	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF3	II	6.1+4.1	274 802	500 g	E4		PP, EP					2	
2931	VANADYL SULPHATE	6.1	T5	II	6.1	802	500 g	E4		PP, EP					2	
2933	METHYL 2-CHLOROPROPIONATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2934	ISOPROPYL 2-CHLOROPROPIONATE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2935	ETHYL 2-CHLOROPROPIONATE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2936	THIOLACTIC ACID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2937	alpha-METHYLBENZYL ALCOHOL, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2940	9-PHOSPHABICYCLONONANES (CYCLOOCTADIENE PHOSPHINES)	4.2	S2	II	4.2		0	E2		PP					0	
2941	FLUOROANILINES	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2942	2-TRIFLUOROMETHYLANILINE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2943	TETRAHYDROFURFURYLAMINE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
2945	N-METHYLBUTYLAMINE	3	FC	II	3+8		1 L	E2		PP, EP, EX, A	VE01				1	
2946	2-AMINO-5-DIETHYLAMINOPENTANE	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
2947	ISOPROPYL CHLOROACETATE	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
2948	3-TRIFLUOROMETHYLANILINE	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2949	SODIUM HYDROSULPHIDE, HYDRATED with not less than 25% water of crystallization	8	C6	II	8	523	1 kg	E2		PP, EP					0	
2950	MAGNESIUM GRANULES, COATED, particle size not less than 149 microns	4.3	W2	III	4.3		1 kg	E1		PP, EX, A	VE01		HA08		0	
2956	5-tert-BUTYL-2,4,6-TRINITRO-m-XYLENE (MUSK XYLENE)	4.1	SR1	III	4.1	638	5 kg	E0		PP					0	
2965	BORON TRIFLUORIDE DIMETHYL ETHERATE	4.3	WFC	I	4.3+3+8		0	E0		PP, EP, EX, A	VE01		HA08		1	
2966	THIOGLYCOL	6.1	T1	II	6.1	802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
2967	SULPHAMIC ACID	8	C2	III	8		5 kg	E1		PP, EP					0	
2968	MANEB, STABILIZED or MANEB PREPARATION, STABILIZED against self-heating	4.3	W2	III	4.3	547	1 kg	E1		PP, EX, A	VE01		HA08		0	
2969	CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or CASTOR FLAKE	9	M11	II	9	141	5 kg	E2	**B**	PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2977	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE	7			7X+7E +6.1+8		0	E0		PP, EP					2	
2978	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non fissile or fissile-excepted	7			7X+6.1+8	317	0	E0		PP, EP					2	
2983	ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide	3	FT1	I	3+6.1	802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
2984	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)	5.1	O1	III	5.1	65	5 L	E1		PP					0	
2985	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	3	FC	II	3+8	548	0	E0		PP, EP, EX, A	VE01				1	
2986	CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	8	CF1	II	8+3	548	0	E0		PP, EP, EX, A	VE01				1	
2987	CHLOROSILANES, CORROSIVE, N.O.S.	8	C3	II	8	548	0	E0		PP, EP					0	
2988	CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	4.3	WFC	I	4.3+3+8	549	0	E0		PP, EP, EX, A	VE01		HA08		1	
2989	LEAD PHOSPHITE, DIBASIC	4.1	F3	II	4.1		1 kg	E2		PP					1	
2989	LEAD PHOSPHITE, DIBASIC	4.1	F3	III	4.1		5 kg	E1		PP					0	
2990	LIFE-SAVING APPLIANCES, SELF-INFLATING	9	M5		9	296 635	0	E0		PP					0	
2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
2992	CARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
2992	CARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2992	CARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2994	ARSENICAL PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
2994	ARSENICAL PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2994	ARSENICAL PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
2998	TRIAZINE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
2998	TRIAZINE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
2998	TRIAZINE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3010	COPPER BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3010	COPPER BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3010	COPPER BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3021	PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S., flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3021	PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S., flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
3022	1,2-BUTYLENE OXIDE, STABILIZED	3	F1	II	3	386	1 L	E2		PP, EX, A	VE01				1	
3023	2-METHYL-2-HEPTANETHIOL	6.1	TF1	I	6.1+3	354 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3024	COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3024	COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
3028	BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	8	C11		8	295 304 598	2 kg	E0		PP, EP					0	
3048	ALUMINIUM PHOSPHIDE PESTICIDE	6.1	T7	I	6.1	153 648 802	0	E0		PP, EP					2	
3054	CYCLOHEXYL MERCAPTAN	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
3055	2-(2-AMINOETHOXY)ETHANOL	8	C7	III	8		5 L	E1		PP, EP					0	
3056	n-HEPTALDEHYDE	3	F1	III	3		5 L	E1		PP, EX, A	VE01				0	
3057	TRIFLUOROACETYL CHLORIDE	2	2TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
3064	NITROGLYCERIN, SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin	3	D	II	3	359	0	E0		PP, EX, A	VE01				1	
3065	ALCOHOLIC BEVERAGES, with more than 70% alcohol by volume	3	F1	II	3		5 L	E2		PP, EX, A	VE01				1	
3065	ALCOHOLIC BEVERAGES, with more than 24% but not more than 70% alcohol by volume	3	F1	III	3	144 145 247	5 L	E1		PP, EX, A	VE01				0	
3066	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound)	8	C9	II	8	163 367	1 L	E2		PP, EP					0	
3066	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound)	8	C9	III	8	163 367	5 L	E1		PP, EP					0	
3070	ETHYLENE OXIDE AND DICHLORODIFLUORO-METHANE MIXTURE with not more than 12.5% ethylene oxide	2	2A		2.2	660 662	120 ml	E1		PP					0	
3071	MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	II	6.1+3	274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3072	LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment	9	M5		9	296 635	0	E0		PP					0	
3073	VINYLPYRIDINES, STABILIZED	6.1	TFC	II	6.1+3+8	386 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	9	M7	III	9	274 335 375 601	5 kg	E1	T* B**	PP, A***					0	* Only in the molten state. ** For carriage in bulk see also 7.1.4.1. ** * Only in the case of transport in bulk.
3078	CERIUM, turnings or gritty powder	4.3	W2	II	4.3	550	500 g	E2		PP, EX, A	VE01		HA08		0	
3079	METHACRYLONITRILE, STABILIZED	6.1	TF1	I	6.1+3	354 386 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3080	ISOCYANATES, TOXIC, FLAMMABLE, N.O.S. or ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	II	6.1+3	274 551 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9	M6	III	9	274 335 375 601	5 L	E1	**T**	PP					0	
3083	PERCHLORYL FLUORIDE	2	2TO		2.3+5.1		0	E0		PP, EP, TOX, A	VE02				2	
3084	CORROSIVE SOLID, OXIDIZING, N.O.S.	8	CO2	I	8+5.1	274	0	E0		PP, EP					0	
3084	CORROSIVE SOLID, OXIDIZING, N.O.S.	8	CO2	II	8+5.1	274	1 kg	E2		PP, EP					0	
3085	OXIDIZING SOLID, CORROSIVE, N.O.S.	5.1	OC2	I	5.1+8	274	0	E0		PP, EP					0	
3085	OXIDIZING SOLID, CORROSIVE, N.O.S.	5.1	OC2	II	5.1+8	274	1 kg	E2		PP, EP					0	
3085	OXIDIZING SOLID, CORROSIVE, N.O.S.	5.1	OC2	III	5.1+8	274	5 kg	E1		PP, EP					0	
3086	TOXIC SOLID, OXIDIZING, N.O.S.	6.1	TO2	I	6.1+5.1	274 802	0	E5		PP, EP					2	
3086	TOXIC SOLID, OXIDIZING, N.O.S.	6.1	TO2	II	6.1+5.1	274 802	500 g	E4		PP, EP					2	
3087	OXIDIZING SOLID, TOXIC, N.O.S.	5.1	OT2	I	5.1+6.1	274 802	0	E0		PP, EP					2	
3087	OXIDIZING SOLID, TOXIC, N.O.S.	5.1	OT2	II	5.1+6.1	274 802	1 kg	E2		PP, EP					2	
3087	OXIDIZING SOLID, TOXIC, N.O.S.	5.1	OT2	III	5.1+6.1	274 802	5 kg	E1		PP, EP					0	
3088	SELF-HEATING SOLID, ORGANIC, N.O.S.	4.2	S2	II	4.2	274	0	E2		PP					0	
3088	SELF-HEATING SOLID, ORGANIC, N.O.S.	4.2	S2	III	4.2	274 665	0	E1		PP					0	
3089	METAL POWDER, FLAMMABLE, N.O.S.	4.1	F3	II	4.1	552	1 kg	E2		PP					1	
3089	METAL POWDER, FLAMMABLE, N.O.S.	4.1	F3	III	4.1	552	5 kg	E1		PP					0	
3090	LITHIUM METAL BATTERIES (including lithium alloy batteries)	9A	M4		9	188 230 310 376 377 387 636	0	E0		PP					0	
3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)	9A	M4		9	188 230 310 360 376 377 387 670	0	E0		PP					0	
3092	1-METHOXY-2-PROPANOL	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	
3093	CORROSIVE LIQUID, OXIDIZING, N.O.S.	8	CO1	I	8+5.1	274	0	E0		PP, EP					0	
3093	CORROSIVE LIQUID, OXIDIZING, N.O.S.	8	CO1	II	8+5.1	274	1 L	E2		PP, EP					0	
3094	CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	8	CW1	I	8+4.3	274	0	E0		PP, EP					0	
3094	CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	8	CW1	II	8+4.3	274	1 L	E2		PP, EP					0	
3095	CORROSIVE SOLID, SELF-HEATING, N.O.S.	8	CS2	I	8+4.2	274	0	E0		PP, EP					0	
3095	CORROSIVE SOLID, SELF-HEATING, N.O.S.	8	CS2	II	8+4.2	274	1 kg	E2		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3096	CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	8	CW2	I	8+4.3	274	0	E0		PP, EP					0	
3096	CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	8	CW2	II	8+4.3	274	1 kg	E2		PP, EP					0	
3097	FLAMMABLE SOLID, OXIDIZING, N.O.S.	4.1	FO	**CARRIAGE PROHIBITED**												
3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.	5.1	OC1	I	5.1+8	274	0	E0		PP, EP					0	
3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.	5.1	OC1	II	5.1+8	274	1 L	E2		PP, EP					0	
3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.	5.1	OC1	III	5.1+8	274	5 L	E1		PP, EP					0	
3099	OXIDIZING LIQUID, TOXIC, N.O.S.	5.1	OT1	I	5.1+6.1	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3099	OXIDIZING LIQUID, TOXIC, N.O.S.	5.1	OT1	II	5.1+6.1	274 802	1 L	E2		PP, EP, TOX, A	VE02				2	
3099	OXIDIZING LIQUID, TOXIC, N.O.S.	5.1	OT1	III	5.1+6.1	274 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3100	OXIDIZING SOLID, SELF-HEATING, N.O.S.	5.1	OS	**CARRIAGE PROHIBITED**												
3101	ORGANIC PEROXIDE TYPE B, LIQUID	5.2	P1		5.2+1	122 181 274	25 ml	E0		PP, EX, A	VE01		HA01, HA10		3	
3102	ORGANIC PEROXIDE TYPE B, SOLID	5.2	P1		5.2+1	122 181 274	100 g	E0		PP, EX, A	VE01		HA01, HA10		3	
3103	ORGANIC PEROXIDE TYPE C, LIQUID	5.2	P1		5.2	122 274	25 ml	E0		PP, EX, A	VE01				0	
3104	ORGANIC PEROXIDE TYPE C, SOLID	5.2	P1		5.2	122 274	100 g	E0		PP, EX, A	VE01				0	
3105	ORGANIC PEROXIDE TYPE D, LIQUID	5.2	P1		5.2	122 274	125 ml	E0		PP, EX, A	VE01				0	
3106	ORGANIC PEROXIDE TYPE D, SOLID	5.2	P1		5.2	122 274	500 g	E0		PP, EX, A	VE01				0	
3107	ORGANIC PEROXIDE TYPE E, LIQUID	5.2	P1		5.2	122 274	125 ml	E0		PP, EX, A	VE01				0	
3108	ORGANIC PEROXIDE TYPE E, SOLID	5.2	P1		5.2	122 274	500 g	E0		PP, EX, A	VE01				0	
3109	ORGANIC PEROXIDE TYPE F, LIQUID	5.2	P1		5.2	122 274	125 ml	E0		PP, EX, A	VE01				0	
3110	ORGANIC PEROXIDE TYPE F, SOLID	5.2	P1		5.2	122 274	500 g	E0		PP, EX, A	VE01				0	
3111	ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED	5.2	P2		5.2+1	122 181 274	0	E0		PP, EX, A	VE01		HA01, HA10		3	
3112	ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED	5.2	P2		5.2+1	122 181 274	0	E0		PP, EX, A	VE01		HA01, HA10		3	
3113	ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED	5.2	P2		5.2	122 274	0	E0		PP, EX, A	VE01				0	
3114	ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED	5.2	P2		5.2	122 274	0	E0		PP, EX, A	VE01				0	
3115	ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED	5.2	P2		5.2	122 274	0	E0		PP, EX, A	VE01				0	
3116	ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED	5.2	P2		5.2	122 274	0	E0		PP, EX, A	VE01				0	
3117	ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED	5.2	P2		5.2	122 274	0	E0		PP, EX, A	VE01				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3118	ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED	5.2	P2		5.2	122 274	0	E0		PP, EX, A	VE01				0	
3119	ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED	5.2	P2		5.2	122 274	0	E0		PP, EX, A	VE01				0	
3120	ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED	5.2	P2		5.2	122 274	0	E0		PP, EX, A	VE01				0	
3121	OXIDIZING SOLID, WATER-REACTIVE, N.O.S.	5.1	OW	**CARRIAGE PROHIBITED**												
3122	TOXIC LIQUID, OXIDIZING, N.O.S.	6.1	TO1	I	6.1+5.1	274 315 802	0	E0		PP, EP, TOX, A	VE02				2	
3122	TOXIC LIQUID, OXIDIZING, N.O.S.	6.1	TO1	II	6.1+5.1	274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3123	TOXIC LIQUID, WATER-REACTIVE, N.O.S.	6.1	TW1	I	6.1+4.3	274 315 802	0	E0		PP, EP, TOX, A	VE02				2	
3123	TOXIC LIQUID, WATER-REACTIVE, N.O.S.	6.1	TW1	II	6.1+4.3	274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3124	TOXIC SOLID, SELF-HEATING, N.O.S.	6.1	TS	I	6.1+4.2	274 802	0	E5		PP, EP					2	
3124	TOXIC SOLID, SELF-HEATING, N.O.S.	6.1	TS	II	6.1+4.2	274 802	0	E4		PP, EP					2	
3125	TOXIC SOLID, WATER-REACTIVE, N.O.S.	6.1	TW2	I	6.1+4.3	274 802	0	E5		PP, EP					2	
3125	TOXIC SOLID, WATER-REACTIVE, N.O.S.	6.1	TW2	II	6.1+4.3	274 802	500 g	E4		PP, EP					2	
3126	SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	4.2	SC2	II	4.2+8	274	0	E2		PP, EP					0	
3126	SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	4.2	SC2	III	4.2+8	274	0	E1		PP, EP					0	
3127	SELF-HEATING SOLID, OXIDIZING, N.O.S	4.2	SO	**CARRIAGE PROHIBITED**												
3128	SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.	4.2	ST2	II	4.2+6.1	274 802	0	E2		PP, EP					2	
3128	SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.	4.2	ST2	III	4.2+6.1	274 802	0	E1		PP, EP					0	
3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	WC1	I	4.3+8	274	0	E0		PP, EP, EX, A	VE01		HA08		0	
3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	WC1	II	4.3+8	274	500 ml	E0		PP, EP, EX, A	VE01		HA08		0	
3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	WC1	III	4.3+8	274	1 L	E1		PP, EP, EX, A	VE01		HA08		0	
3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	WT1	I	4.3+6.1	274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	WT1	II	4.3+6.1	274 802	500 ml	E0		PP, EP, EX, TOX, A	VE01, VE02		HA08		2	
3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	WT1	III	4.3+6.1	274 802	1 L	E1		PP, EP, EX, TOX, A	VE01, VE02		HA08		0	
3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	4.3	WC2	I	4.3+8	274	0	E0		PP, EP, EX, A	VE01		HA08		0	
3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	4.3	WC2	II	4.3+8	274	500 g	E2		PP, EP, EX, A	VE01		HA08		0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	4.3	WC2	III	4.3+8	274	1 kg	E1		PP, EP, EX, A	VE01	HA08	0	
3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	4.3	WF2	I	4.3 + 4.1	274	0	E0		PP,EX,A	VE01	HA08	1	
3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	4.3	WF2	II	4.3 + 4.1	274	500 g	E2		PP,EX,A	VE01	HA08	1	
3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	4.3	WF2	III	4.3 + 4.1	274	1 kg	E1		PP,EX,A	VE01	HA08	0	
3133	WATER-REACTIVE SOLID, OXIDIZING, N.O.S.	4.3	WO	**CARRIAGE PROHIBITED**										
3134	WATER-REACTIVE SOLID, TOXIC, N.O.S.	4.3	WT2	I	4.3+6.1	274 802	0	E0		PP, EP, EX, TOX, A	VE01	HA08	2	
3134	WATER-REACTIVE SOLID, TOXIC, N.O.S.	4.3	WT2	II	4.3+6.1	274 802	500 g	E2		PP, EP, EX, TOX, A	VE01	HA08	2	
3134	WATER-REACTIVE SOLID, TOXIC, N.O.S.	4.3	WT2	III	4.3+6.1	274 802	1 kg	E1		PP, EP, EX, TOX, A	VE01	HA08	0	
3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	4.3	WS	I	4.3 + 4.2	274	0	E0		PP,EX,A	VE01	HA08	0	
3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	4.3	WS	II	4.3 + 4.2	274	0	E2		PP,EX,A	VE01	HA08	0	
3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	4.3	WS	III	4.3 + 4.2	274	0	E1		PP,EX,A	VE01	HA08	0	
3136	TRIFLUOROMETHANE, REFRIGERATED LIQUID	2	3A		2.2	593	120 ml	E1		PP			0	
3137	OXIDIZING SOLID, FLAMMABLE, N.O.S.	5.1	OF	**CARRIAGE PROHIBITED**										
3138	ETHYLENE, ACETYLENE AND PROPYLENE MIXTURE, REFRIGERATED LIQUID containing at least 71.5% ethylene with not more than 22.5% acetylene and not more than 6% propylene	2	3F		2.1		0	E0		PP, EX, A	VE01		1	
3139	OXIDIZING LIQUID, N.O.S.	5.1	O1	I	5.1	274	0	E0		PP			0	
3139	OXIDIZING LIQUID, N.O.S.	5.1	O1	II	5.1	274	1 L	E2		PP			0	
3139	OXIDIZING LIQUID, N.O.S.	5.1	O1	III	5.1	274	5 L	E1		PP			0	
3140	ALKALOIDS, LIQUID, N.O.S. or ALKALOID SALTS, LIQUID, N.O.S.	6.1	T1	I	6.1	43 274 802	0	E5		PP, EP, TOX, A	VE02		2	
3140	ALKALOIDS, LIQUID, N.O.S. or ALKALOID SALTS, LIQUID, N.O.S.	6.1	T1	II	6.1	43 274 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3140	ALKALOIDS, LIQUID, N.O.S. or ALKALOID SALTS, LIQUID, N.O.S.	6.1	T1	III	6.1	43 274 802	5 L	E1		PP, EP, TOX, A	VE02		0	
3141	ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S.	6.1	T4	III	6.1	45 274 512 802	5 L	E1		PP, EP, TOX, A	VE02		0	
3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.	6.1	T1	I	6.1	274 802	0	E5		PP, EP, TOX, A	VE02		2	
3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	274 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	274 802	5 L	E1		PP, EP, TOX, A	VE02		0	
3143	DYE, SOLID, TOXIC, N.O.S. or DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	6.1	T2	I	6.1	274 802	0	E5		PP, EP			2	
3143	DYE, SOLID, TOXIC, N.O.S. or DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	274 802	500 g	E4		PP, EP			2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3143	DYE, SOLID, TOXIC, N.O.S. or DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	274 802	5 kg	E1		PP, EP					0	
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	T1	I	6.1	43 274 802	0	E5		PP, EP, TOX, A	VE02				2	
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	T1	II	6.1	43 274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	T1	III	6.1	43 274 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C_2-C_{12} homologues)	8	C3	I	8		0	E0		PP, EP					0	
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C_2-C_{12} homologues)	8	C3	II	8		1 L	E2	**T**	PP, EP					0	
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C_2-C_{12} homologues)	8	C3	III	8		5 L	E1	**T**	PP, EP					0	
3146	ORGANOTIN COMPOUND, SOLID, N.O.S.	6.1	T3	I	6.1	43 274 802	0	E5		PP, EP					2	
3146	ORGANOTIN COMPOUND, SOLID, N.O.S.	6.1	T3	II	6.1	43 274 802	500 g	E4		PP, EP					2	
3146	ORGANOTIN COMPOUND, SOLID, N.O.S.	6.1	T3	III	6.1	43 274 802	5 kg	E1		PP, EP					0	
3147	DYE, SOLID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	8	C10	I	8	274	0	E0		PP, EP					0	
3147	DYE, SOLID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	8	C10	II	8	274	1 kg	E2		PP, EP					0	
3147	DYE, SOLID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	8	C10	III	8	274	5 kg	E1		PP, EP					0	
3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	W1	I	4.3	274	0	E0		PP, EX, A	VE01		HA08		0	
3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	W1	II	4.3	274	500 ml	E2		PP, EX, A	VE01		HA08		0	
3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	W1	III	4.3	274	1 L	E1		PP, EX, A	VE01		HA08		0	
3149	HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE with acid(s), water and not more than 5% peroxyacetic acid, STABILIZED	5.1	OC1	II	5.1+8	196 553	1 L	E2		PP, EP					0	
3150	DEVICES, SMALL, HYDROCARBON GAS POWERED or HYDROCARBON GAS REFILLS FOR SMALL DEVICES with release device	2	6F		2.1		0	E0		PP, EX, A	VE01				1	
3151	POLYHALOGENATED BIPHENYLS, LIQUID or HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUID or POLYHALOGENATED TERPHENYLS, LIQUID	9	M2	II	9	203 305 802	1 L	E2		PP, EP					0	
3152	POLYHALOGENATED BIPHENYLS, SOLID or HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or POLYHALOGENATED TERPHENYLS, SOLID	9	M2	II	9	203 305 802	1 kg	E2		PP, EP					0	
3153	PERFLUORO(METHYL VINYL ETHER)	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3154	PERFLUORO(ETHYL VINYL ETHER)	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
3155	PENTACHLOROPHENOL	6.1	T2	II	6.1	43 802	500 g	E4		PP, EP					2	
3156	COMPRESSED GAS, OXIDIZING, N.O.S.	2	1O		2.2+5.1	274 655 662	0	E0		PP					0	
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.	2	2O		2.2+5.1	274 662	0	E0		PP					0	
3158	GAS, REFRIGERATED LIQUID, N.O.S.	2	3A		2.2	274 593	120 ml	E1		PP					0	
3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	2	2A		2.2	662	120 ml	E1		PP					0	
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	2	2TF		2.3+2.1	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.	2	2F		2.1	274 662	0	E0		PP, EX, A	VE01				1	
3162	LIQUEFIED GAS, TOXIC, N.O.S.	2	2T		2.3	274	0	E0		PP, EP, TOX, A	VE02				2	
3163	LIQUEFIED GAS, N.O.S.	2	2A		2.2	274 660 662	120 ml	E1		PP					0	
3164	ARTICLES, PRESSURIZED, PNEUMATIC or HYDRAULIC (containing non-flammable gas)	2	6A		2.2	283 371 594	120 ml	E0		PP					0	
3165	AIRCRAFT HYDRAULIC POWER UNIT FUEL TANK (containing a mixture of anhydrous hydrazine and methylhydrazine) (M86 fuel)	3	FTC	I	3+6.1+8	802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3166	VEHICLE, FLAMMABLE GAS POWERED or VEHICLE, FLAMMABLE LIQUID POWERED or VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED	9	M11			388 666 667 669				PP					0	
3167	GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid	2	7F		2.1		0	E0		PP, EX, A	VE01				1	
3168	GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid	2	7TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3169	GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid	2	7T		2.3		0	E0		PP, EP, TOX, A	VE02				2	
3170	ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS	4.3	W2	II	4.3	244	500 g	E2		PP, EX, A	VE01		HA08		0	
3170	ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS	4.3	W2	III	4.3	244	1 kg	E1	**B**	PP, EX, A	VE01, VE03	LO03	HA07, HA08	IN01, IN02, IN03	0	VE03, LO03, HA07, IN01, IN02 and IN03 apply only when this substance is carried in bulk or without packaging
3171	BATTERY POWERED VEHICLE or BATTERY POWERED EQUIPMENT	9	M11			388 666 667 669				PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	6.1	T1	I	6.1	210 274 802	0	E5		PP, EP, TOX, A	VE02				2	
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	6.1	T1	II	6.1	210 274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	6.1	T1	III	6.1	210 274 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3174	TITANIUM DISULPHIDE	4.2	S4	III	4.2		0	E1		PP					0	
3175	SOLIDS or mixtures of solids (such as preparations and wastes) CONTAINING FLAMMABLE LIQUID, N.O.S. having a flash-point up to 60°C	4.1	F1	II	4.1	216 274 601 800	1 kg	E2	**B**	PP, EX, A	VE01, VE03			IN01, IN02	1	VE03, IN01and IN02 apply only when this substance is carried in bulk or without packaging
3175	SOLIDS CONTAINING FLAMMABLE LIQUID, MOLTEN, having a flash-point up to 60°C	4.1	F1	II	4.1	216 274 601 800	1 kg	E2	**T**	PP, EX, A	VE01, VE03			IN01, IN02	1	VE03, IN01and IN02 apply only when this substance is carried in bulk or without packaging
3176	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	4.1	F2	II	4.1	274	0	E0		PP					1	
3176	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	4.1	F2	III	4.1	274	0	E0		PP					0	
3178	FLAMMABLE SOLID, INORGANIC, N.O.S.	4.1	F3	II	4.1	274	1 kg	E2		PP					1	
3178	FLAMMABLE SOLID, INORGANIC, N.O.S.	4.1	F3	III	4.1	274	5 kg	E1		PP					0	
3179	FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	4.1	FT2	II	4.1+6.1	274 802	1 kg	E2		PP, EP					2	
3179	FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	4.1	FT2	III	4.1+6.1	274 802	5 kg	E1		PP, EP					0	
3180	FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	4.1	FC2	II	4.1+8	274	1 kg	E2		PP, EP					1	
3180	FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	4.1	FC2	III	4.1+8	274	5 kg	E1		PP, EP					0	
3181	METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	4.1	F3	II	4.1	274	1 kg	E2		PP					1	
3181	METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	4.1	F3	III	4.1	274	5 kg	E1		PP					0	
3182	METAL HYDRIDES, FLAMMABLE, N.O.S.	4.1	F3	II	4.1	274 554	1 kg	E2		PP					1	
3182	METAL HYDRIDES, FLAMMABLE, N.O.S.	4.1	F3	III	4.1	274 554	5 kg	E1		PP					0	
3183	SELF-HEATING LIQUID, ORGANIC, N.O.S.	4.2	S1	II	4.2	274	0	E2		PP					0	
3183	SELF-HEATING LIQUID, ORGANIC, N.O.S.	4.2	S1	III	4.2	274	0	E1		PP					0	
3184	SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	4.2	ST1	II	4.2+6.1	274 802	0	E2		PP, EP, TOX, A	VE02				2	
3184	SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	4.2	ST1	III	4.2+6.1	274 802	0	E1		PP, EP, TOX, A	VE02				0	
3185	SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	4.2	SC1	II	4.2+8	274	0	E2		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3185	SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	4.2	SC1	III	4.2+8	274	0	E1		PP, EP					0	
3186	SELF-HEATING LIQUID, INORGANIC, N.O.S.	4.2	S3	II	4.2	274	0	E2		PP					0	
3186	SELF-HEATING LIQUID, INORGANIC, N.O.S.	4.2	S3	III	4.2	274	0	E1		PP					0	
3187	SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	4.2	ST3	II	4.2+6.1	274 802	0	E2		PP, EP, TOX, A	VE02				2	
3187	SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	4.2	ST3	III	4.2+6.1	274 802	0	E1		PP, EP, TOX, A	VE02				0	
3188	SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	4.2	SC3	II	4.2+8	274	0	E2		PP, EP					0	
3188	SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	4.2	SC3	III	4.2+8	274	0	E1		PP, EP					0	
3189	METAL POWDER, SELF-HEATING, N.O.S.	4.2	S4	II	4.2	274 555	0	E2		PP					0	
3189	METAL POWDER, SELF-HEATING, N.O.S.	4.2	S4	III	4.2	274 555	0	E1		PP					0	
3190	SELF-HEATING SOLID, INORGANIC, N.O.S.	4.2	S4	II	4.2	274	0	E2		PP					0	
3190	SELF-HEATING SOLID, INORGANIC, N.O.S.	4.2	S4	III	4.2	274	0	E1	**B**	PP					0	
3191	SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	4.2	ST4	II	4.2+6.1	274 802	0	E2		PP, EP					2	
3191	SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	4.2	ST4	III	4.2+6.1	274 802	0	E1		PP, EP					0	
3192	SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	4.2	SC4	II	4.2+8	274	0	E2		PP, EP					0	
3192	SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	4.2	SC4	III	4.2+8	274	0	E1		PP, EP					0	
3194	PYROPHORIC LIQUID, INORGANIC, N.O.S.	4.2	S3	I	4.2	274	0	E0		PP					0	
3200	PYROPHORIC SOLID, INORGANIC, N.O.S.	4.2	S4	I	4.2	274	0	E0		PP					0	
3205	ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	4.2	S4	II	4.2	183 274	0	E2		PP					0	
3205	ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	4.2	S4	III	4.2	183 274	0	E1		PP					0	
3206	ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.	4.2	SC4	II	4.2+8	182 274	0	E2		PP, EP					0	
3206	ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.	4.2	SC4	III	4.2+8	183 274	0	E1		PP, EP					0	
3208	METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	4.3	W2	I	4.3	274 557	0	E0		PP, EX, A	VE01		HA08		0	
3208	METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	4.3	W2	II	4.3	274 557	500 g	E0		PP, EX, A	VE01		HA08		0	
3208	METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	4.3	W2	III	4.3	274 557	1 kg	E1		PP, EX, A	VE01		HA08		0	
3209	METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	4.3	WS	I	4.3+4.2	274 558	0	E0		PP, EX, A	VE01		HA08		0	
3209	METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	4.3	WS	II	4.3+4.2	274 558	0	E2		PP, EX, A	VE01		HA08		0	
3209	METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	4.3	WS	III	4.3+4.2	274 558	0	E1		PP, EX, A	VE01		HA08		0	
3210	CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	274 351	1 L	E2		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3210	CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1	274 351	5 L	E1		PP					0	
3211	PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1		1 L	E2		PP					0	
3211	PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1		5 L	E1		PP					0	
3212	HYPOCHLORITES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 349	1 kg	E2		PP					0	
3213	BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	274 350	1 L	E2		PP					0	
3213	BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1	274 350	5 L	E1		PP					0	
3214	PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	274 353	1 L	E2		PP					0	
3215	PERSULPHATES, INORGANIC, N.O.S.	5.1	O2	III	5.1		5 kg	E1		PP					0	
3216	PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1		5 L	E1		PP					0	
3218	NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	270 511	1 L	E2		PP					0	
3218	NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1	270 511	5 L	E1		PP					0	
3219	NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	103 274	1 L	E2		PP					0	
3219	NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1	103 274	5 L	E1		PP					0	
3220	PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	2	2A		2.2	662	120 ml	E1		PP					0	
3221	SELF-REACTIVE LIQUID TYPE B	4.1	SR1		4.1+1	181 194 274	25 ml	E0		PP			HA01, HA10		3	
3222	SELF-REACTIVE SOLID TYPE B	4.1	SR1		4.1+1	181 194 274	100g	E0		PP			HA01, HA10		3	
3223	SELF-REACTIVE LIQUID TYPE C	4.1	SR1		4.1	194 274	25 ml	E0		PP					0	
3224	SELF-REACTIVE SOLID TYPE C	4.1	SR1		4.1	194 274	100g	E0		PP					0	
3225	SELF-REACTIVE LIQUID TYPE D	4.1	SR1		4.1	194 274	125 ml	E0		PP					0	
3226	SELF-REACTIVE SOLID TYPE D	4.1	SR1		4.1	194 274	500 g	E0		PP					0	
3227	SELF-REACTIVE LIQUID TYPE E	4.1	SR1		4.1	194 274	125 ml	E0		PP					0	
3228	SELF-REACTIVE SOLID TYPE E	4.1	SR1		4.1	194 274	500 g	E0		PP					0	
3229	SELF-REACTIVE LIQUID TYPE F	4.1	SR1		4.1	194 274	125 ml	E0		PP					0	
3230	SELF-REACTIVE SOLID TYPE F	4.1	SR1		4.1	194 274	500 g	E0		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
3231	SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED	4.1	SR2		4.1+1	181 194 274	0	E0		PP		HA01, HA10	3	
3232	SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED	4.1	SR2		4.1+1	181 194 274	0	E0		PP		HA01, HA10	3	
3233	SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED	4.1	SR2		4.1	194 274	0	E0		PP			0	
3234	SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED	4.1	SR2		4.1	194 274	0	E0		PP			0	
3235	SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED	4.1	SR2		4.1	194 274	0	E0		PP			0	
3236	SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED	4.1	SR2		4.1	194 274	0	E0		PP			0	
3237	SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED	4.1	SR2		4.1	194 274	0	E0		PP			0	
3238	SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED	4.1	SR2		4.1	194 274	0	E0		PP			0	
3239	SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED	4.1	SR2		4.1	194 274	0	E0		PP			0	
3240	SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED	4.1	SR2		4.1	194 274	0	E0		PP			0	
3241	2-BROMO-2-NITROPROPANE-1,3-DIOL	4.1	SR1	III	4.1	638	5 kg	E1		PP			0	
3242	AZODICARBONAMIDE	4.1	SR1	II	4.1	215 638	1 kg	E0		PP			0	
3243	SOLIDS CONTAINING TOXIC LIQUID, N.O.S.	6.1	T9	II	6.1	217 274 601 802	500 g	E4		PP, EP, TOX, A	VE02		2	
3244	SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.	8	C10	II	8	218 274	1 kg	E2		PP, EP			0	
3245	GENETICALLY MODIFIED MICROORGANISMS or GENETICALLY MODIFIED ORGANISMS	9	M8		9	219 637 802	0	E0		PP			0	
3245	GENETICALLY MODIFIED MICRO-ORGANISMS or GENETICALLY MODIFIED ORGANISMS, in refrigerated liquid nitrogen	9	M8		9 +2.2	219 637 802	0	E0		PP			0	
3246	METHANESULPHONYL CHLORIDE	6.1	TC1	I	6.1+8	354 802	0	E0		PP, EP, TOX, A	VE02		2	
3247	SODIUM PEROXOBORATE, ANHYDROUS	5.1	O2	II	5.1		1 kg	E2		PP			0	
3248	MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	220 221 601 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02		2	
3248	MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	220 221 601 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02		0	
3249	MEDICINE, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	221 601 802	500 g	E4		PP, EP			2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3249	MEDICINE, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	221 601 802	5 kg	E1		PP, EP					0	
3250	CHLOROACETIC ACID, MOLTEN	6.1	TC1	II	6.1+8	802	0	E0		PP, EP, TOX, A	VE02				2	
3251	ISOSORBIDE-5-MONONITRATE	4.1	SR1	III	4.1	226 638	5 kg	E0		PP					0	
3252	DIFLUOROMETHANE (REFRIGERANT GAS R 32)	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
3253	DISODIUM TRIOXOSILICATE	8	C6	III	8		5 kg	E1		PP, EP					0	
3254	TRIBUTYLPHOSPHANE	4.2	S1	I	4.2		0	E0		PP					0	
3255	tert-BUTYL HYPOCHLORITE	4.2	SC1	**CARRIAGE PROHIBITED**												
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60°C, at or above its flash-point and below 100°C	3	F2	III	3	274 560	0	E0	**T**	PP, EX, A	VE01				0	
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60°C, at or above its flash-point and at or above 100°C	3	F2	III	3	274 560	0	E0	**T**	PP, EX, A	VE01				0	
3257	ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100°C and below its flash-point (including molten metals, molten salts, etc.)	9	M9	III	9	274 643 668	0	E0	**T**	PP					0	
3258	ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C	9	M10	III	9	274 643	0	E0		PP					0	
3259	AMINES, SOLID, CORROSIVE, N.O.S. or POLYAMINES, SOLID, CORROSIVE, N.O.S.	8	C8	I	8	274	0	E0		PP, EP					0	
3259	AMINES, SOLID, CORROSIVE, N.O.S. or POLYAMINES, SOLID, CORROSIVE, N.O.S.	8	C8	II	8	274	1 kg	E2		PP, EP					0	
3259	AMINES, SOLID, CORROSIVE, N.O.S. or POLYAMINES, SOLID, CORROSIVE, N.O.S.	8	C8	III	8	274	5 kg	E1	**T**	PP, EP					0	
3260	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	8	C2	I	8	274	0	E0		PP, EP					0	
3260	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	8	C2	II	8	274	1 kg	E2		PP, EP					0	
3260	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	8	C2	III	8	274	5 kg	E1		PP, EP					0	
3261	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	8	C4	I	8	274	0	E0		PP, EP					0	
3261	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	8	C4	II	8	274	1 kg	E2		PP, EP					0	
3261	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	8	C4	III	8	274	5 kg	E1		PP, EP					0	
3262	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	8	C6	I	8	274	0	E0		PP, EP					0	
3262	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	8	C6	II	8	274	1 kg	E2		PP, EP					0	
3262	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	8	C6	III	8	274	5 kg	E1		PP, EP					0	
3263	CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	8	C8	I	8	274	0	E0		PP, EP					0	
3263	CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	8	C8	II	8	274	1 kg	E2		PP, EP					0	
3263	CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	8	C8	III	8	274	5 kg	E1		PP, EP					0	
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	C1	I	8	274	0	E0	**T**	PP, EP					0	
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	C1	II	8	274	1 L	E2	**T**	PP, EP					0	
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	C1	III	8	274	5 L	E1	**T**	PP, EP					0	
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	I	8	274	0	E0	**T**	PP, EP					0	
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	II	8	274	1 L	E2	**T**	PP, EP					0	
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	III	8	274	5 L	E1	**T**	PP, EP					0	
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	I	8	274	0	E0	**T**	PP, EP					0	
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	II	8	274	1 L	E2	**T**	PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	III	8	274	5 L	E1	**T**	PP, EP			0	
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	I	8	274	0	E0	**T**	PP, EP			0	
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	II	8	274	1 L	E2	**T**	PP, EP			0	
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	III	8	274	5 L	E1	**T**	PP, EP			0	
3268	SAFETY DEVICES, electrically initiated	9	M5		9	280 289	0	E0		PP			0	
3269	POLYESTER RESIN KIT, liquid base material	3	F3	II	3	236 340	5 L	E0		PP, EX, A	VE01		1	
3269	POLYESTER RESIN KIT, liquid base material	3	F3	III	3	236 340	5 L	E0		PP, EX, A	VE01		0	
3270	NITROCELLULOSE MEMBRANE FILTERS, with not more than 12.6% nitrogen, by dry mass	4.1	F1	II	4.1	237 286	1 kg	E2		PP			1	
3271	ETHERS, N.O.S.	3	F1	II	3	274	1 L	E2	**T**	PP, EX, A	VE01		1	
3271	ETHERS, N.O.S.	3	F1	III	3	274	5 L	E1	**T**	PP, EX, A	VE01		0	
3272	ESTERS, N.O.S.	3	F1	II	3	274 601	1 L	E2	**T**	PP, EX, A	VE01		1	
3272	ESTERS, N.O.S.	3	F1	III	3	274 601	5 L	E1	**T**	PP, EX, A	VE01		0	
3273	NITRILES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1	274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
3273	NITRILES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02		2	
3274	ALCOHOLATES SOLUTION, N.O.S., in alcohol	3	FC	II	3+8	274	1 L	E2		PP, EP, EX, A	VE01		1	
3275	NITRILES, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	I	6.1+3	274 315 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02		2	
3275	NITRILES, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	II	6.1+3	274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02		2	
3276	NITRILES, LIQUID, TOXIC, N.O.S.	6.1	T1	I	6.1	274 315 802	0	E5		PP, EP, TOX, A	VE02		2	
3276	NITRILES, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	274 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02		2	
3276	NITRILES, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	274 802	5 L	E1		PP, EP, TOX, A	VE02		0	
3277	CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.	6.1	TC1	II	6.1+8	274 561 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3278	ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T1	I	6.1	43 274 315 802	0	E5		PP, EP, TOX, A	VE02		2	
3278	ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	43 274 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3278	ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	43 274 802	5 L	E1		PP, EP, TOX, A	VE02		0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3279	ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	I	6.1+3	43 274 315 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3279	ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	II	6.1+3	43 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3280	ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	6.1	T3	I	6.1	274 315 802	0	E5		PP, EP, TOX, A	VE02				2	
3280	ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	6.1	T3	II	6.1	274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3280	ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	6.1	T3	III	6.1	274 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3281	METAL CARBONYLS, LIQUID, N.O.S.	6.1	T3	I	6.1	274 315 562 802	0	E5		PP, EP, TOX, A	VE02				2	
3281	METAL CARBONYLS, LIQUID, N.O.S.	6.1	T3	II	6.1	274 562 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3281	METAL CARBONYLS, LIQUID, N.O.S.	6.1	T3	III	6.1	274 562 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3282	ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T3	I	6.1	274 562 802	0	E5		PP, EP, TOX, A	VE02				2	
3282	ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T3	II	6.1	274 562 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3282	ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T3	III	6.1	274 562 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3283	SELENIUM COMPOUND, SOLID, N.O.S.	6.1	T5	I	6.1	274 563 802	0	E5		PP, EP					2	
3283	SELENIUM COMPOUND, SOLID, N.O.S.	6.1	T5	II	6.1	274 563 802	500 g	E4		PP, EP					2	
3283	SELENIUM COMPOUND, SOLID, N.O.S.	6.1	T5	III	6.1	274 563 802	5 kg	E1		PP, EP					0	
3284	TELLURIUM COMPOUND, N.O.S.	6.1	T5	I	6.1	274 802	0	E5		PP, EP					2	
3284	TELLURIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	274 802	500 g	E4		PP, EP					2	
3284	TELLURIUM COMPOUND, N.O.S.	6.1	T5	III	6.1	274 802	5 kg	E1		PP, EP					0	
3285	VANADIUM COMPOUND, N.O.S.	6.1	T5	I	6.1	274 564 802	0	E5		PP, EP					2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3285	VANADIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	274 564 802	500 g	E4		PP, EP					2	
3285	VANADIUM COMPOUND, N.O.S.	6.1	T5	III	6.1	274 564 802	5 kg	E1		PP, EP					0	
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	I	3+6.1+8	274 802	0	E0	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	II	3+6.1+8	274 802	1 L	E2	**T**	PP, EP, EX, TOX, A	VE01, VE02				2	
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	I	6.1	274 315 802	0	E5	**T**	PP, EP, TOX, A	VE02				2	
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	II	6.1	274 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	III	6.1	274 802	5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
3288	TOXIC SOLID, INORGANIC, N.O.S.	6.1	T5	I	6.1	274 802	0	E5		PP, EP					2	
3288	TOXIC SOLID, INORGANIC, N.O.S.	6.1	T5	II	6.1	274 802	500 g	E4		PP, EP					2	
3288	TOXIC SOLID, INORGANIC, N.O.S.	6.1	T5	III	6.1	274 802	5 kg	E1		PP, EP					0	
3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	6.1	TC3	I	6.1+8	274 315 802	0	E5	**T**	PP, EP, TOX, A	VE02				2	
3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	6.1	TC3	II	6.1+8	274 802	100 ml	E4	**T**	PP, EP, TOX, A	VE02				2	
3290	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	6.1	TC4	I	6.1+8	274 802	0	E5		PP, EP					2	
3290	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	6.1	TC4	II	6.1+8	274 802	500 g	E4		PP, EP					2	
3291	CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S.	6.2	I3	II	6.2	565 802	0	E0		PP					0	
3291	CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S., in refrigerated liquid nitrogen	6.2	I3	II	6.2 +2.2	565 802	0	E0		PP					0	
3292	BATTERIES, CONTAINING SODIUM, or CELLS, CONTAINING SODIUM	4.3	W3		4.3	239 295	0	E0		PP, EX, A	VE01		HA08		0	
3293	HYDRAZINE, AQUEOUS SOLUTION with not more than 37% hydrazine, by mass	6.1	T4	III	6.1	566 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3294	HYDROGEN CYANIDE, SOLUTION IN ALCOHOL with not more than 45% hydrogen cyanide	6.1	TF1	I	6.1+3	610 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	I	3		500 ml	E3	**T**	PP, EX, A	VE01				1	
3295	HYDROCARBONS, LIQUID, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	1 L	E2	**T**	PP, EX, A	VE01				1	
3295	HYDROCARBONS, LIQUID, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	1 L	E2	**T**	PP, EX, A	VE01				1	
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	III	3		5 L	E1	**T**	PP, EX, A	VE01				0	

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(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
3296	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	2	2A		2.2	662	120 ml	E1		PP			0	
3297	ETHYLENE OXIDE AND CHLOROTETRAFLUORO-ETHANE MIXTURE with not more than 8.8% ethylene oxide	2	2A		2.2	660 662	120 ml	E1		PP			0	
3298	ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not more than 7.9% ethylene oxide	2	2A		2.2	660 662	120 ml	E1		PP			0	
3299	ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not more than 5.6% ethylene oxide	2	2A		2.2	660 662	120 ml	E1		PP			0	
3300	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	2	2TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
3301	CORROSIVE LIQUID, SELF-HEATING, N.O.S.	8	CS1	I	8+4.2	274	0	E0		PP, EP			0	
3301	CORROSIVE LIQUID, SELF-HEATING, N.O.S.	8	CS1	II	8+4.2	274	0	E2		PP, EP			0	
3302	2-DIMETHYLAMINOETHYL ACRYLATE, STABILIZED	6.1	T1	II	6.1	386 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	2	1TO		2.3+5.1	274	0	E0		PP, EP, TOX, A	VE02		2	
3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	2	1TC		2.3+8	274	0	E0		PP, EP, TOX, A	VE02		2	
3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2	1TFC		2.3+2.1+8	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2	1TOC		2.3+5.1+8	274	0	E0		PP, EP, TOX, A	VE02		2	
3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	2	2TO		2.3+5.1	274	0	E0		PP, EP, TOX, A	VE02		2	
3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	2	2TC		2.3+8	274	0	E0		PP, EP, TOX, A	VE02		2	
3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2	2TFC		2.3+2.1+8	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02		2	
3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2	2TOC		2.3+5.1+8	274	0	E0		PP, EP, TOX, A	VE02		2	
3311	GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.	2	3O		2.2+5.1	274	0	E0		PP			0	
3312	GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.	2	3F		2.1	274	0	E0		PP, EX, A	VE01		1	
3313	ORGANIC PIGMENTS, SELF-HEATING	4.2	S2	II	4.2		0	E2		PP			0	
3313	ORGANIC PIGMENTS, SELF-HEATING	4.2	S2	III	4.2		0	E1		PP			0	
3314	PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour	9	M3	III	none	207 633	5 kg	E1		PP, EP, EX, A	VE01		0	
3315	CHEMICAL SAMPLE, TOXIC	6.1	T8	I	6.1	250 802	0	E0		PP, EP, TOX, A	VE02		2	
3316	CHEMICAL KIT or FIRST AID KIT	9	M11		9	251 340 671	See SP 251	See SP 340		PP			0	
~~3316~~	~~CHEMICAL KIT or FIRST AID KIT~~	~~9~~	~~M11~~	~~III~~	~~9~~	~~251 340~~	~~See SP 251~~	~~See SP 340~~		~~PP~~			~~0~~	
3317	2-AMINO-4,6-DINITROPHENOL, WETTED with not less than 20% water, by mass	4.1	D	I	4.1		0	E0		PP			1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3318	AMMONIA SOLUTION, relative density less than 0.880 at 15°C in water, with more than 50% ammonia	2	4TC		2.3+8	23	0	E0		PP, EP, TOX, A	VE02				2	
3319	NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin, by mass	4.1	D	II	4.1	272 274	0	E0		PP					0	
3320	SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE SOLUTION, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide by mass	8	C5	II	8		1 L	E2		PP, EP					0	
3320	SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE SOLUTION, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide by mass	8	C5	III	8		5 L	E1		PP, EP					0	
3321	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted	7			7X	172 317 325 336	0	E0		PP					2	
3322	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted	7			7X	172 317 325 336	0	E0		PP					2	
3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted	7			7X	172 317 325	0	E0		PP					2	
3324	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE	7			7X+7E	172 326 336	0	E0		PP					2	
3325	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE	7			7X+7E	172 326 336	0	E0		PP					2	
3326	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE	7			7X+7E	172 326	0	E0		PP					2	
3327	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form	7			7X+7E	172 326	0	E0		PP					2	
3328	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE	7			7X+7E	172 326 337	0	E0		PP					2	
3329	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE	7			7X+7E	172 326 337	0	E0		PP					2	
3330	RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE	7			7X+7E	172 326	0	E0		PP					2	
3331	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE	7			7X+7E	172 326	0	E0		PP					2	
3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted	7			7X	172 317	0	E0		PP					2	
3333	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE	7			7X+7E	172	0	E0		PP					2	
3334	Aviation regulated liquid, n.o.s.	9	M11	**NOT SUBJECT TO ADN**												

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3335	Aviation regulated solid, n.o.s.	9	M11	NOT SUBJECT TO ADN												
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.	3	F1	I	3	274	0	E0		PP, EX, A	VE01				1	
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	274 640C	1 L	E2		PP, EX, A	VE01				1	
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	274 640D	1 L	E2		PP, EX, A	VE01				1	
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.	3	F1	III	3	274	5 L	E1		PP, EX, A	VE01				0	
3337	REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1-trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane)	2	2A		2.2	662	120 ml	E1		PP					0	
3338	REFRIGERANT GAS R 407A (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 20% difluoromethane and 40% pentafluoroethane)	2	2A		2.2	662	120 ml	E1		PP					0	
3339	REFRIGERANT GAS R 407B (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 10% difluoromethane and 70% pentafluoroethane	2	2A		2.2	662	120 ml	E1		PP					0	
3340	REFRIGERANT GAS R 407C (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 23% difluoromethane and 25% pentafluoroethane)	2	2A		2.2	662	120 ml	E1		PP					0	
3341	THIOUREA DIOXIDE	4.2	S2	II	4.2		0	E2		PP					0	
3341	THIOUREA DIOXIDE	4.2	S2	III	4.2		0	E1		PP					0	
3342	XANTHATES	4.2	S2	II	4.2		0	E2		PP					0	
3342	XANTHATES	4.2	S2	III	4.2		0	E1		PP					0	
3343	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass	3	D		3	274 278	0	E0		PP, EX, A	VE01				0	
3344	PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN) MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	4.1	D	II	4.1	272 274	0	E0		PP					1	
3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
3346	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3346	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	
3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3349	PYRETHROID PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 802	0	E5		PP, EP					2	
3349	PYRETHROID PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 802	500 g	E4		PP, EP					2	
3349	PYRETHROID PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 802	5 kg	E1		PP, EP					0	
3350	PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3350	PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 802	1 L	E2		PP, EP, EX, TOX, A	VE01, VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 802	0	E5		PP, EP, EX, TOX, A	VE01, VE02				2	
3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 802	100 ml	E4		PP, EP, EX, TOX, A	VE01, VE02				2	
3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 802	5 L	E1		PP, EP, EX, TOX, A	VE01, VE02				0	
3352	PYRETHROID PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648 802	0	E5		PP, EP, TOX, A	VE02				2	
3352	PYRETHROID PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648 802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3352	PYRETHROID PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3354	INSECTICIDE GAS, FLAMMABLE, N.O.S.	2	2F		2.1	274 662	0	E0		PP, EX, A	VE01				1	
3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	2	2TF		2.3+2.1	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3356	OXYGEN GENERATOR, CHEMICAL	5.1	O3		5.1	284	0	E0		PP					0	
3357	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin, by mass	3	D	II	3	274 288	0	E0		PP, EX, A	VE01				1	
3358	REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas	2	6F		2.1	291	0	E0		PP, EX, A	VE01				1	
3359	FUMIGATED CARGO TRANSPORT UNIT	9	M11			302				PP						
3360	Fibres, vegetable, dry	4.1	F1	**NOT SUBJECT TO ADN**												
3361	CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	6.1	TC1	II	6.1+8	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3362	CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	TFC	II	6.1+3+8	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3363	DANGEROUS GOODS IN MACHINERY or DANGEROUS GOODS IN APPARATUS	9	M11		9	301 672	0	E0								
3364	TRINITROPHENOL (PICRIC ACID) WETTED with not less than 10% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
3365	TRINITROCHLOROBENZENE (PICRYL CHLORIDE) WETTED with not less than 10% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
3366	TRINITROTOLUENE (TNT), WETTED with not less than 10% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
3367	TRINITROBENZENE, WETTED with not less than 10% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
3368	TRINITROBENZOIC ACID, WETTED with not less than 10% water, by mass	4.1	D	I	4.1		0	E0		PP					1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3369	SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 10% water, by mass	4.1	DT	I	4.1+6.1	802	0	E0		PP, EP					2	
3370	UREA NITRATE, WETTED with not less than 10% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
3371	2-METHYLBUTANAL	3	F1	II	3		1 L	E2		PP, EX, A	VE01				1	
3373	BIOLOGICAL SUBSTANCE, CATEGORY B	6.2	I4		6.2	319	0	E0		PP					0	
3373	BIOLOGICAL SUBSTANCE, CATEGORY B (animal material only)	6.2	I4		6.2	319	0	E0		PP					0	
3374	ACETYLENE, SOLVENT FREE	2	2F		2.1	662	0	E0		PP, EX, A	VE01				1	
3375	AMMONIUM NITRATE EMULSION, or SUSPENSION or GEL, intermediate for blasting explosives, liquid	5.1	O1	II	5.1	309	0	E2		PP					0	
3375	AMMONIUM NITRATE EMULSION, or SUSPENSION or GEL, intermediate for blasting explosives, solid	5.1	O2	II	5.1	309	0	E2		PP					0	
3376	4-NITROPHENYLHYDRAZINE, with not less than 30% water, by mass	4.1	D	I	4.1		0	E0		PP					1	
3377	SODIUM PERBORATE MONOHYDRATE	5.1	O2	III	5.1		5 kg	E1		PP					0	
3378	SODIUM CARBONATE PEROXYHYDRATE	5.1	O2	II	5.1		1 kg	E2		PP					0	
3378	SODIUM CARBONATE PEROXYHYDRATE	5.1	O2	III	5.1		5 kg	E1		PP					0	
3379	DESENSITIZED EXPLOSIVE, LIQUID, N.O.S.	3	D	I	3	274 311	0	E0		PP, EX, A	VE01				1	
3380	DESENSITIZED EXPLOSIVE, SOLID, N.O.S.	4.1	D	I	4.1	274 311	0	E0		PP					1	
3381	TOXIC BY INHALATION LIQUID, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	6.1	T1 or T4	I	6.1	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3382	TOXIC BY INHALATION LIQUID, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	6.1	T1 or T4	I	6.1	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3383	TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	6.1	TF1	I	6.1 +3	274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3384	TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	6.1	TF1	I	6.1 +3	274 802	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3385	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	6.1	TW1	I	6.1 +4.3	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3386	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	6.1	TW1	I	6.1 +4.3	274 802	0	E0		PP, EP, TOX, A	VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3387	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	6.1	TO1	I	6.1 +5.1	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3388	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	6.1	TO1	I	6.1 +5.1	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3389	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	6.1	TC1 or TC3	I	6.1 +8	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3390	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	6.1	TC1 or TC3	I	6.1 +8	274 802	0	E0		PP, EP, TOX, A	VE02				2	
3391	ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC	4.2	S5	I	4.2	274	0	E0		PP					0	
3392	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC	4.2	S5	I	4.2	274	0	E0		PP					0	
3393	ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC, WATER REACTIVE	4.2	SW	I	4.2 +4.3	274	0	E0		PP, EX, A	VE01				0	
3394	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER REACTIVE	4.2	SW	I	4.2 +4.3	274	0	E0		PP, EX, A	VE01				0	
3395	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE	4.3	W2	I	4.3	274	0	E0		PP, EX, A	VE01		HA08		0	
3395	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE	4.3	W2	II	4.3	274	500 g	E2		PP, EX, A	VE01		HA08		0	
3395	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE	4.3	W2	III	4.3	274	1 kg	E1		PP, EX, A	VE01		HA08		0	
3396	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE, FLAMMABLE	4.3	WF2	I	4.3 +4.1	274	0	E0		PP, EX, A	VE01		HA08		1	
3396	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE, FLAMMABLE	4.3	WF2	II	4.3 +4.1	274	500 g	E2		PP, EX, A	VE01		HA08		1	
3396	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE, FLAMMABLE	4.3	WF2	III	4.3 +4.1	274	1 kg	E1		PP, EX, A	VE01		HA08		0	
3397	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE, SELF-HEATING	4.3	WS	I	4.3 +4.2	274	0	E0		PP, EX, A	VE01		HA08		0	
3397	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE, SELF-HEATING	4.3	WS	II	4.3 +4.2	274	500 g	E2		PP, EX, A	VE01		HA08		0	
3397	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE, SELF-HEATING	4.3	WS	III	4.3 +4.2	274	1 kg	E1		PP, EX, A	VE01		HA08		0	
3398	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER REACTIVE	4.3	W1	I	4.3	274	0	E0		PP, EX, A	VE01		HA08		0	
3398	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER REACTIVE	4.3	W1	II	4.3	274	500 ml	E2		PP, EX, A	VE01		HA08		0	
3398	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER REACTIVE	4.3	W1	III	4.3	274	1 L	E1		PP, EX, A	VE01		HA08		0	
3399	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER REACTIVE, FLAMMABLE	4.3	WF1	I	4.3 +3	274	0	E0		PP, EX, A	VE01		HA08		1	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)	(13)
3399	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER REACTIVE, FLAMMABLE	4.3	WF1	II	4.3 +3	274	500 ml	E2		PP, EX, A	VE01	HA08	1	
3399	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER REACTIVE, FLAMMABLE	4.3	WF1	III	4.3 +3	274	1 L	E1		PP, EX, A	VE01	HA08	0	
3400	ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING	4.2	S5	II	4.2	274	500 g	E2		PP			0	
3400	ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING	4.2	S5	III	4.2	274	1 kg	E1		PP			0	
3401	ALKALI METAL AMALGAM, SOLID	4.3	W2	I	4.3	182	0	E0		PP, EX, A	VE01	HA08	0	
3402	ALKALINE EARTH METAL AMALGAM, SOLID	4.3	W2	I	4.3	183 506	0	E0		PP, EX, A	VE01	HA08	0	
3403	POTASSIUM METAL ALLOYS, SOLID	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01	HA08	0	
3404	POTASSIUM SODIUM ALLOYS, SOLID	4.3	W2	I	4.3		0	E0		PP, EX, A	VE01	HA08	0	
3405	BARIUM CHLORATE SOLUTION	5.1	OT1	II	5.1 +6.1	802	1 L	E2		PP, EP, TOX, A	VE02		2	
3405	BARIUM CHLORATE SOLUTION	5.1	OT1	III	5.1 +6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
3406	BARIUM PERCHLORATE SOLUTION	5.1	OT1	II	5.1 +6.1	802	1 L	E2		PP, EP, TOX, A	VE02		2	
3406	BARIUM PERCHLORATE SOLUTION	5.1	OT1	III	5.1 +6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
3407	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE SOLUTION	5.1	O1	II	5.1		1 L	E2		PP			0	
3407	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE SOLUTION	5.1	O1	III	5.1		5 L	E1		PP			0	
3408	LEAD PERCHLORATE SOLUTION	5.1	OT1	II	5.1 +6.1		1 L	E2		PP, EP			2	
3408	LEAD PERCHLORATE SOLUTION	5.1	OT1	III	5.1 +6.1		5 L	E1		PP, EP			0	
3409	CHLORONITROBENZENES, LIQUID	6.1	T1	II	6.1	279 802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3410	4-CHLORO-o-TOLUIDINE HYDROCHLORIDE SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
3411	beta-NAPHTHYLAMINE SOLUTION	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3411	beta-NAPHTHYLAMINE SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
3412	FORMIC ACID with not less than 10% but not more than 85% acid by mass	8	C3	II	8		1 L	E2	**T**	PP, EP			0	
3412	FORMIC ACID with not less than 5% but less than 10% acid by mass	8	C3	III	8		5 L	E1	**T**	PP, EP			0	
3413	POTASSIUM CYANIDE SOLUTION	6.1	T4	I	6.1	802	0	E5		PP, EP, TOX, A	VE02		2	
3413	POTASSIUM CYANIDE SOLUTION	6.1	T4	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3413	POTASSIUM CYANIDE SOLUTION	6.1	T4	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	
3414	SODIUM CYANIDE SOLUTION	6.1	T4	I	6.1	802	0	E5		PP, EP, TOX, A	VE02		2	
3414	SODIUM CYANIDE SOLUTION	6.1	T4	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02		2	
3414	SODIUM CYANIDE SOLUTION	6.1	T4	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02		0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3415	SODIUM FLUORIDE SOLUTION	6.1	T4	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
3416	CHLOROACETOPHENONE, LIQUID	6.1	T1	II	6.1	802	0	E0		PP, EP, TOX, A	VE02				2	
3417	XYLYL BROMIDE, SOLID	6.1	T2	II	6.1	802	0	E4		PP, EP					2	
3418	2,4-TOLUYLENEDIAMINE SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
3419	BORON TRIFLUORIDE ACETIC ACID COMPLEX, SOLID	8	C4	II	8		1 kg	E2		PP, EP					0	
3420	BORON TRIFLUORIDE PROPIONIC ACID COMPLEX, SOLID	8	C4	II	8		1 kg	E2		PP, EP					0	
3421	POTASSIUM HYDROGENDIFLUORIDE SOLUTION	8	CT1	II	8 +6.1	802	1 L	E2		PP, EP, TOX, A	VE02				2	
3421	POTASSIUM HYDROGENDIFLUORIDE SOLUTION	8	CT1	III	8 +6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
3422	POTASSIUM FLUORIDE SOLUTION	6.1	T4	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
3423	TETRAMETHYLAMMONIUM HYDROXIDE, SOLID	8	C8	II	8		1 kg	E2		PP, EP					0	
3424	AMMONIUM DINITRO -o-CRESOLATE SOLUTION	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3424	AMMONIUM DINITRO -o-CRESOLATE SOLUTION	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
3425	BROMOACETIC ACID, SOLID	8	C4	II	8		1 kg	E2		PP, EP					0	
3426	ACRYLAMIDE SOLUTION	6.1	T1	III	6.1		5 L	E1	**T**	PP, EP, TOX, A	VE02				0	
3427	CHLOROBENZYL CHLORIDES, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
3428	3-CHLORO-4-METHYLPHENYL ISOCYANATE, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3429	CHLOROTOLUIDINES, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
3430	XYLENOLS, LIQUID	6.1	T1	II	6.1	802	100 ml	E4		PP, EP, TOX, A	VE02				2	
3431	NITROBENZOTRIFLUORIDES, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3432	POLYCHLORINATED BIPHENYLS, SOLID	9	M2	II	9	305 802	1 kg	E2		PP, EP					0	
3434	NITROCRESOLS, LIQUID	6.1	T1	III	6.1	802	5 L	E1		PP, EP, TOX, A	VE02				0	
3436	HEXAFLUOROACETONE HYDRATE, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3437	CHLOROCRESOLS, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3438	alpha-METHYLBENZYL ALCOHOL, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
3439	NITRILES, SOLID, TOXIC, N.O.S.	6.1	T2	I	6.1	274 802	0	E5		PP, EP					2	
3439	NITRILES, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	274 802	500 g	E4		PP, EP					2	
3439	NITRILES, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	274 802	5 kg	E1		PP, EP					0	
3440	SELENIUM COMPOUND, LIQUID, N.O.S.	6.1	T4	I	6.1	274 802	0	E5		PP, EP, TOX, A	VE02				2	
3440	SELENIUM COMPOUND, LIQUID, N.O.S.	6.1	T4	II	6.1	274 802	100 ml	E4		PP, EP, TOX, A	VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3440	SELENIUM COMPOUND, LIQUID, N.O.S.	6.1	T4	III	6.1	274 802	5 L	E1		PP, EP, TOX, A	VE02				0	
3441	CHLORODINITROBENZENES, SOLID	6.1	T2	II	6.1	279 802	500 g	E4		PP, EP					2	
3442	DICHLOROANILINES, SOLID	6.1	T2	II	6.1	279 802	500 g	E4		PP, EP					2	
3443	DINITROBENZENES, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3444	NICOTINE HYDROCHLORIDE, SOLID	6.1	T2	II	6.1	43 802	500 g	E4		PP, EP					2	
3445	NICOTINE SULPHATE, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3446	NITROTOLUENES, SOLID	6.1	T2	II	6.1	802	500 g	E4	**T**	PP, EP					2	
3447	NITROXYLENES, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3448	TEAR GAS SUBSTANCE, SOLID, N.O.S.	6.1	T2	I	6.1	274 802	0	E0		PP, EP					2	
3448	TEAR GAS SUBSTANCE, SOLID, N.O.S.	6.1	T2	II	6.1	274 802	0	E0		PP, EP					2	
3449	BROMOBENZYL CYANIDES, SOLID	6.1	T2	I	6.1	138 802	0	E5		PP, EP					2	
3450	DIPHENYLCHLOROARSINE, SOLID	6.1	T3	I	6.1	802	0	E0		PP, EP					2	
3451	TOLUIDINES, SOLID	6.1	T2	II	6.1	279 802	500 g	E4	**T**	PP, EP					2	
3452	XYLIDINES, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3453	PHOSPHORIC ACID, SOLID	8	C2	III	8		5 kg	E1		PP, EP					0	
3454	DINITROTOLUENES, SOLID	6.1	T2	II	6.1	802	500 g	E4		PP, EP					2	
3455	CRESOLS, SOLID	6.1	TC2	II	6.1+8	802	500 g	E4	**T**	PP, EP					2	
3456	NITROSYLSULPHURIC ACID, SOLID	8	C2	II	8		1 kg	E2	**T3**	PP, EP					0	
3457	CHLORONITROTOLUENES, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
3458	NITROANISOLES, SOLID	6.1	T2	III	6.1	279 802	5 kg	E1		PP, EP					0	
3459	NITROBROMOBENZENES, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
3460	N-ETHYLBENZYLTOLUIDINES, SOLID	6.1	T2	III	6.1	802	5 kg	E1		PP, EP					0	
3462	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1	T2	I	6.1	210 274 802	0	E5		PP, EP					2	
3462	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1	T2	II	6.1	210 274 802	500 g	E4		PP, EP					2	
3462	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1	T2	III	6.1	210 274 802	5 kg	E1		PP, EP					0	
3463	PROPIONIC ACID with not less than 90% acid by mass	8	CF1	II	8 +3		1 L	E2	**T**	PP, EP, EX, A	VE01				1	
3464	ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T2	I	6.1	43 274 802	0	E5		PP, EP					2	
3464	ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	43 274 802	500 g	E4		PP, EP					2	
3464	ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	43 274 802	5 kg	E1		PP, EP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3465	ORGANOARSENIC COMPOUND, SOLID, N.O.S.	6.1	T3	I	6.1	274 802	0	E5		PP, EP					2	
3465	ORGANOARSENIC COMPOUND, SOLID, N.O.S.	6.1	T3	II	6.1	274 802	500 g	E4		PP, EP					2	
3465	ORGANOARSENIC COMPOUND, SOLID, N.O.S.	6.1	T3	III	6.1	274 802	5 kg	E1		PP, EP					0	
3466	METAL CARBONYLS, SOLID, N.O.S	6.1	T3	I	6.1	274 562 802	0	E5		PP, EP					2	
3466	METAL CARBONYLS, SOLID, N.O.S	6.1	T3	II	6.1	274 562 802	500 g	E4		PP, EP					2	
3466	METAL CARBONYLS, SOLID, N.O.S	6.1	T3	III	6.1	274 562 802	5 kg	E1		PP, EP					0	
3467	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T3	I	6.1	274 562 802	0	E5		PP, EP					2	
3467	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T3	II	6.1	274 562 802	500 g	E4		PP, EP					2	
3467	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S	6.1	T3	III	6.1	274 562 802	5 kg	E1		PP, EP					0	
3468	HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM or HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM CONTAINED IN EQUIPMENT or HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM PACKED WITH EQUIPMENT	2	1F		2.1	321 356	0	E0	**T**	PP, EX, A	VE01				1	
3469	PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning or reducing compound)	3	FC	I	3 +8	163 367	0	E0		PP, EX, A	VE01				1	
3469	PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning or reducing compound)	3	FC	II	3 +8	163 367	1 L	E2		PP, EX, A	VE01				1	
3469	PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning or reducing compound)	3	FC	III	3 +8	163 367	5 L	E1		PP, EX, A	VE01				0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3470	PAINT, CORROSIVE, FLAMMABLE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL CORROSIVE, FLAMMABLE (including paint thinning or reducing compound)	8	CF1	II	8 +3	163 367	1 L	E2		PP, EP, EX, A	VE01				1	
3471	HYDROGENDIFLUORIDES SOLUTION, N.O.S.	8	CT1	II	8 +6.1	802	1 L	E2		PP, EP					2	
3471	HYDROGENDIFLUORIDES SOLUTION, N.O.S.	8	CT1	III	8 +6.1	802	5 L	E1		PP, EP					0	
3472	CROTONIC ACID, LIQUID	8	C3	III	8		5 L	E1		PP, EP					0	
3473	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT containing flammable liquids	3	F3		3	328	1 L	E0		PP, EX, A	VE01					
3474	1-HYDROXYBENZOTRIAZOLE MONOHYDRATE	4.1	D	I	4.1		0	E0		PP					1	
3475	ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 10% ethanol	3	F1	II	3	333	1 L	E2	**T**	PP, EX, A	VE01				1	
3476	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing water-reactive substances	4.3	W3		4.3	328 334	500 ml or 500 g	E0		PP, EX, A	VE01		HA08		0	
3477	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances	8	C11		8	328 334	1 L or 1 kg	E0		PP, EP, A					0	
3478	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas	2	6F		2.1	328 338	120 ml	E0		PP, EX, A	VE01				1	
3479	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride	2	6F		2.1	328 339	120 ml	E0		PP, EX, A	VE01				1	
3480	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	9A	M4		9	188 230 310 348 376 377 387 636	0	E0		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	9A	M4		9	188 230 310 348 360 376 377 387 670	0	E0		PP					0	
3482	ALKALI METAL DISPERSION, FLAMMABLE or ALKALINE EARTH METAL DISPERSION, FLAMMABLE	4.3	WF1	I	4.3+3	182 183 506	0	E0		PP, EX, A	VE01		HA08		1	
3483	MOTOR FUEL ANTI-KNOCK MIXTURE, FLAMMABLE	6.1	TF1	I	6.1+3		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3484	HYDRAZINE AQUEOUS SOLUTION, FLAMMABLE with more than 37% hydrazine, by mass	8	CFT	I	8+3+6.1	530	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3485	CALCIUM HYPOCHLORITE, DRY, CORROSIVE or CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 39% available chlorine (8.8% available oxygen)	5.1	OC2	II	5.1+8	314	1 kg	E2		PP					0	
3486	CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 10% but not more than 39% available chlorine	5.1	OC2	III	5.1+8	314	5 kg	E1		PP					0	
3487	CALCIUM HYPOCHLORITE, HYDRATED, CORROSIVE or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, CORROSIVE with not less than 5.5% but not more than 16% water	5.1	OC2	II	5.1+8	314 322	1 kg	E2		PP					0	
3487	CALCIUM HYPOCHLORITE, HYDRATED, CORROSIVE or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, CORROSIVE with not less than 5.5% but not more than 16% water	5.1	OC2	III	5.1+8	314	5 kg	E1		PP					0	
3488	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	6.1	TFC	I	6.1+3+8	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3489	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	6.1	TFC	I	6.1+3+8	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3490	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	6.1	TFW	I	6.1+4.3+3	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3491	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	6.1	TFW	I	6.1+4.3+3	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	I	3+6.1	343 649	0	E0	T	PP, EP, EX, TOX, A	VE01, VE02				2	
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	II	3+6.1	343 649	1 L	E2	T	PP, EP, EX, TOX, A	VE01, VE02				2	
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	III	3+6.1	343 649	5 L	E1	T	PP, EP, EX, TOX, A	VE01, VE02				0	
3495	IODINE	8	CT2	III	8+6.1	279 802	5 kg	E1		PP, EP, TOX, A	VE02				0	
3496	Batteries, nickel-metal hydride	9	M11	**NOT SUBJECT TO ADN**												
3497	KRILL MEAL	4.2	S2	II	4.2	300	0	E2		PP					0	
3497	KRILL MEAL	4.2	S2	III	4.2	300	0	E1		PP					0	
3498	IODINE MONOCHLORIDE, LIQUID	8	C1	II	8		1L	E0		PP, EP					0	
3499	CAPACITOR, ELECTRIC DOUBLE LAYER (with an energy storage capacity greater than 0.3 Wh)	9	M11		9	361	0	E0		PP					0	
3500	CHEMICAL UNDER PRESSURE, N.O.S	2	8A		2.2	274 659	0	E0		PP					0	
3501	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.	2	8F		2.1	274 659	0	E0		PP, EX, A	VE01				1	
3502	CHEMICAL UNDER PRESSURE, TOXIC, N.O.S.	2	8T		2.2+6.1	274 659	0	E0		PP, EP, TOX, A	VE02				2	
3503	CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.	2	8C		2.2+8	274 659	0	E0		PP, EP	VE02				0	
3504	CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.	2	8TF		2.1+6.1	274 659	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3505	CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.	2	8FC		2.1+8	274 659	0	E0		PP, EP, EX, A	VE01				1	
3506	MERCURY CONTAINED IN MANUFACTURED ARTICLES	8	CT3		8+6.1	366	5kg	E0		PP, EP, TOX, A	VE02				0	
3507	URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, less than 0.1 kg per package, non-fissile or fissile-excepted	6.1		I	6.1+8	317 369	0	E0		PP, EP					0	
3508	CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3Wh)	9	M11		9	372	0	E0		PP					0	
3509	PACKAGING DISCARDED, EMPTY, UNCLEANED	9	M11		9	663	0	E0		PP					0	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3510	ADSORBED GAS, FLAMMABLE, N.O.S.	2	9F		2.1	274	0	E0		PP, EX, A	VE01				1	
3511	ADSORBED GAS, N.O.S.	2	9A		2.2	274	0	E0		PP					0	
3512	ADSORBED GAS, TOXIC, N.O.S.	2	9T		2.3	274	0	E0		PP, EP, TOX, A	VE02				2	
3513	ADSORBED GAS, OXIDIZING, N.O.S.	2	9O		2.2+5.1	274	0	E0		PP					0	
3514	ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.	2	9TF		2.3+2.1	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3515	ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.	2	9TO		2.3+5.1	274	0	E0		PP, EP, TOX, A	VE02				2	
3516	ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.	2	9TC		2.3+8	274 379	0	E0		PP, EP,TOX, A	VE02				2	
3517	ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2	9TFC		2.3+2.1+8	274	0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3518	ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2	9TOC		2.3+5.1+8	274	0	E0		PP, EP, TOX, A	VE02				2	
3519	BORON TRIFLUORIDE, ADSORBED	2	9TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
3520	CHLORINE, ADSORBED	2	9TOC		2.3+5.1+8		0	E0		PP, EP, TOX, A	VE02				2	
3521	SILICON TETRAFLUORIDE, ADSORBED	2	9TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
3522	ARSINE, ADSORBED	2	9TF		2.3+2.1		0	E0		PP,EP,EX, TOX,A	VE01, VE02				2	
3523	GERMANE, ADSORBED	2	9TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3524	PHOSPHORUS PENTAFLUORIDE, ADSORBED	2	9TC		2.3+8		0	E0		PP, EP, TOX, A	VE02				2	
3525	PHOSPHINE, ADSORBED	2	9TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	
3526	HYDROGEN SELENIDE, ADSORBED	2	9TF		2.3+2.1		0	E0		PP, EP, EX, TOX, A	VE01, VE02				2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3527	POLYESTER RESIN KIT, solid base material	4.1	F4	II	4.1	236 340	5Kg	E0		PP					1	
3527	POLYESTER RESIN KIT, solid base material	4.1	F4	III	4.1	236 340	5Kg	E0		PP					0	
3528	ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED	3	F3		3	363 667 669	0	E0		PP, EX, A	VE01				0	
3529	ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED	2	6F		2.1	363 667 669	0	E0		PP, EX, A	VE01				0	
3530	ENGINE, INTERNAL COMBUSTION or MACHINERY, INTERNAL COMBUSTION	9	M11		9	363 667 669	0	E0		PP					0	
3531	POLYMERIZING SUBSTANCE, SOLID, STABILIZED, N.O.S.	4.1	PM1	III	4.1	274 386	0	E0		PP					0	
3532	POLYMERIZING SUBSTANCE, LIQUID, STABILIZED, N.O.S.	4.1	PM1	III	4.1	274 386	0	E0		PP					0	
3533	POLYMERIZING SUBSTANCE, SOLID, TEMPERATURE CONTROLLED, N.O.S.	4.1	PM2	III	4.1	274 386	0	E0		PP					0	
3534	POLYMERIZING SUBSTANCE, LIQUID, TEMPERATURE CONTROLLED, N.O.S.	4.1	PM2	III	4.1	274 386	0	E0		PP					0	
3535	TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.	6.1	TF3	I	6.1 +4.1	274	0	E5		PP, EP, EX, A	VE01				2	
3535	TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.	6.1	TF3	II	6.1 +4.1	274	500 g	E4		PP, EP, EX, A	VE01				2	
3536	LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries	9	M4		9	389	0	E0		PP					0	
3537	ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.	2	6F		See 5.2.2.1.12	274 667	0	E0		PP, EX,A	VE01				1	
3538	ARTICLES CONTAINING NON-FLAMMABLE, NON TOXIC GAS, N.O.S.	2	6A		See 5.2.2.1.12	274 667	0	E0		PP					0	
3539	ARTICLES CONTAINING TOXIC GAS, N.O.S.	2	6T		See 5.2.2.1.12	274 667	0	E0		PP, EP, TOX, A	VE02				2	

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UN No. or ID No.	Name and description	Class	Classi-fication Code	Packing group	Labels	Special provis-ions	Limited and excepted quantities		Carriage permitted	Equipment required	Venti-lation	Provisions concerning loading, unloading and carriage			Number of blue cones/ lights	Remarks
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6			7.1.5	3.2.1
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)			(12)	(13)
3540	ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.	3	F3		See 5.2.2.1.12	274 667	0	E0		PP, EX, A	VE01				1	
3541	ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.	4.1	F4		See 5.2.2.1.12	274 667	0	E0		PP					0	
3542	ARTICLES CONTAINING A SUBSTANCE LIABLE TO SPONTANEOUS COMBUSTION, N.O.S.	4.2	S6		See 5.2.2.1.12	274 667	0	E0		PP					0	
3543	ARTICLES CONTAINING A SUBSTANCE WHICH IN CONTACT WITH WATER EMITS FLAMMABLE GASES, N.O.S.	4.3	W3		See 5.2.2.1.12	274 667	0	E0		PP, EX, A	VE01		HA08		0	
3544	ARTICLES CONTAINING OXIDIZING SUBSTANCE, N.O.S.	5.1	O3		See 5.2.2.1.12	274 667	0	E0		PP					0	
3545	ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.	5.2	P1 or P2		See 5.2.2.1.12	274 667	0	E0		PP, EX, A	VE01				0	
3546	ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.	6.1	T10		See 5.2.2.1.12	274 667	0	E0		PP, EP, TOX, A	VE02				0	
3547	ARTICLES CONTAINING CORROSIVE SUBSTANCE, N.O.S.	8	C11		See 5.2.2.1.12	274 667	0	E0		PP, EP					0	
3548	ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS, N.O.S.	9	M11		See 5.2.2.1.12	274 667	0	E0		PP					0	
9000	AMMONIA, DEEPLY REFRIGERATED	2	3TC		2.3+8				**T**	PP, EP, TOX, A	VE02				2	Only admitted for carriage in tank vessels
9001	SUBSTANCES WITH A FLASH-POINT ABOVE 60 ºC which are carried heated within a limiting range of 15K	3	F4		none				**T**	PP					0	Dangerous only when carried in tank vessels
9002	SUBSTANCES WITH A SELF-IGNITION TEMPERATURE OF 200 ºC AND BELOW, N.O.S.	3	F5		none				**T**	PP					0	Dangerous only when carried in tank vessels
9003	SUBSTANCES WITH A FLASH-POINT ABOVE 60 ºC AND NOT MORE THAN 100 ºC, which do not belong to	9			none				**T**	PP					0	Dangerous only when carried in tank vessels
9004	DIPHENYLMETHANE-4, 4'-DIISOCYANATE	9			none				**T**	PP					0	Dangerous only when carried in tank vessels
9005	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., MOLTEN	9			none				**T**	PP					0	Dangerous only when carried in tank vessels
9006	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9			none				**T**	PP					0	Dangerous only when carried in tank vessels

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3.2.2 Table B: List of dangerous goods in alphabetical order

The following Table B is an alphabetical list of the substances and articles which are listed in the UN numerical order in Table A of 3.2.1. It does not form an integral part of ADN. It has been prepared, with all necessary care by the Secretariat of the United Nations Economic Commission for Europe, in order to facilitate the consultation of the annexed Regulations, but it cannot be relied upon as a substitute for the careful study and observance of the actual provisions of those annexed Regulations which, in case of conflict, are deemed to be authoritative.

NOTE 1: *For the purpose of determining the alphabetical order the following information has been ignored, even when it forms part of the proper shipping name: numbers; Greek letters; the abbreviations "sec" and "tert"; and the letters "N" (nitrogen), "n" (normal), "o" (ortho) "m" (meta), "p" (para) and "N.O.S." (not otherwise specified).*

NOTE 2: *The name of a substance or article in block capital letters indicates a proper shipping name (see 3.1.2).*

NOTE 3: *The name of a substance or article in block capital letters followed by the word "see" indicates an alternative proper shipping name or part of a proper shipping name (except for PCBs) (see 3.1.2.1).*

NOTE 4: *An entry in lower case letters followed by the word "see" indicates that the entry is not a proper shipping name; it is a synonym.*

NOTE 5: *Where an entry is partly in block capital letters and partly in lower case letters, the latter part is considered not to be part of the proper shipping name (see 3.1.2.1).*

NOTE 6: *A proper shipping name may be used in the singular or plural, as appropriate, for the purposes of documentation and package marking (see 3.1.2.3).*

NOTE 7: *For the exact determination of a proper shipping name, see 3.1.2.*

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Name and description	UN No.	Class	Remarks
Accumulators, electric, see	2794	8	
	2795	8	
	2800	8	
	3028	8	
	3292	4.3	
ACETAL	1088	3	
ACETALDEHYDE	1089	3	
ACETALDEHYDE AMMONIA	1841	9	
ACETALDEHYDE OXIME	2332	3	
ACETIC ACID, GLACIAL	2789	8	
ACETIC ACID SOLUTION, more than 10% but not more than 80% acid, by mass	2790	8	
ACETIC ACID SOLUTION, more than 80% acid, by mass	2789	8	
ACETIC ANHYDRIDE	1715	8	
Acetoin, see	2621	3	
ACETONE	1090	3	
ACETONE CYANOHYDRIN, STABILIZED	1541	6.1	
ACETONE OILS	1091	3	
ACETONITRILE	1648	3	
ACETYL BROMIDE	1716	8	
ACETYL CHLORIDE	1717	3	
ACETYLENE, DISSOLVED	1001	2	
ACETYLENE, SOLVENT FREE	3374	2	
Acetylene tetrabromide, see	2504	6.1	
Acetylene tetrachloride, see	1702	6.1	
ACETYL IODIDE	1898	8	
ACETYL METHYL CARBINOL	2621	3	
Acid butyl phosphate, see	1718	8	
Acid mixture, hydrofluoric and sulphuric, see	1786	8	
Acid mixture, nitrating acid, see	1796	8	
Acid mixture, spent, nitrating acid, see	1826	8	
Acraldehyde, inhibited, see	1092	6.1	
ACRIDINE	2713	6.1	
ACROLEIN DIMER, STABILIZED	2607	3	
ACROLEIN, STABILIZED	1092	6.1	
ACRYLAMIDE, SOLID	2074	6.1	
ACRYLAMIDE, SOLUTION	3426	6.1	
ACRYLIC ACID, STABILIZED	2218	8	
ACRYLONITRILE, STABILIZED	1093	3	
Actinolite, see	2212	9	
Activated carbon, see	1362	4.2	
Activated charcoal, see	1362	4.2	
ADHESIVES containing flammable liquid	1133	3	
ADIPONITRILE	2205	6.1	
ADSORBED GAS, FLAMMABLE, N.O.S.	3510	2	
ADSORBED GAS, N.O.S.	3511	2	
ADSORBED GAS, OXIDIZING, N.O.S.	3513	2	
ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.	3516	2	
ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	3517	2	
ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.	3514	2	
ADSORBED GAS, TOXIC, N.O.S.	3512	2	
ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	3518	2	
ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.	3515	2	
Aeroplane flares, see	0093	1	
	0403	1	
	0404	1	
	0420	1	
	0421	1	
AEROSOLS	1950	2	
AGENT, BLASTING, TYPE B	0331	1	
AGENT, BLASTING, TYPE E	0332	1	
Air bag inflators, see	0503	1	
	3268	9	
Air bag modules, see	0503	1	
	3268	9	

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Name and description	UN No.	Class	Remarks
AIR, COMPRESSED	1002	2	
Aircraft evacuation slides, see	2990	9	
AIRCRAFT HYDRAULIC POWER UNIT FUEL TANK (containing a mixture of anhydrous hydrazine and methylhydrazine) (M86 fuel)	3165	3	
Aircraft survival kits, see	2990	9	
AIR, REFRIGERATED LIQUID	1003	2	
ALCOHOLATES SOLUTION, N.O.S., in alcohol	3274	3	
Alcohol, denaturated, see	1986 1987	3 3	
Alcohol, industrial, see	1986 1987	3 3	
ALCOHOLS, N.O.S.	1987	3	
ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	1986	3	
ALCOHOLIC BEVERAGES, with more than 24% but not more than 70% alcohol by volume	3065	3	
ALCOHOLIC BEVERAGES, with more than 70% alcohol by volume	3065	3	
Aldehyde, see	1989	3	
ALDEHYDES, N.O.S.	1989	3	
ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	1988	3	
ALDOL	2839	6.1	
ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.	3206	4.2	
ALKALI METAL ALLOY, LIQUID, N.O.S.	1421	4.3	
ALKALI METAL AMALGAM, LIQUID	1389	4.3	
ALKALI METAL AMALGAM, SOLID	3401	4.3	
ALKALI METAL AMIDES	1390	4.3	
ALKALI METAL DISPERSION	1391	4.3	
ALKALI METAL DISPERSION, FLAMMABLE	3482	4.3	
Alkaline corrosive battery fluid, see	2797	8	
ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	3205	4.2	
ALKALINE EARTH METAL ALLOY, N.O.S.	1393	4.3	
ALKALINE EARTH METAL AMALGAM, LIQUID	1392	4.3	
ALKALINE EARTH METAL AMALGAM, SOLID	3402	4.3	
ALKALINE EARTH METAL DISPERSION	1391	4.3	
ALKALINE EARTH METAL DISPERSION, FLAMMABLE	1391	4.3	
ALKALOIDS, LIQUID, N.O.S.	3140	6.1	
ALKALOIDS, SOLID, N.O.S.	1544	6.1	
ALKALOID SALTS, LIQUID, N.O.S.	3140	6.1	
ALKALOID SALTS, SOLID, N.O.S.	1544	6.1	
Alkyl aluminium halides, see	3394	4.2	
ALKYLPHENOLS, LIQUID, N.O.S. (including C_2-C_{12} homologues)	3145	8	
ALKYLPHENOLS, SOLID, N.O.S. (including C_2-C_{12} homologues)	2430	8	
ALKYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid	2584	8	
ALKYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	2586	8	
ALKYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid	2583	8	
ALKYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid	2585	8	
ALKYLSULPHURIC ACIDS	2571	8	
Allene, see	2200	2	
ALLYL ACETATE	2333	3	
ALLYL ALCOHOL	1098	6.1	
ALLYLAMINE	2334	6.1	
ALLYL BROMIDE	1099	3	
ALLYL CHLORIDE	1100	3	
Allyl chlorocarbonate, see	1722	6.1	
ALLYL CHLOROFORMATE	1722	6.1	

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Name and description	UN No.	Class	Remarks
ALLYL ETHYL ETHER	2335	3	
ALLYL FORMATE	2336	3	
ALLYL GLYCIDYL ETHER	2219	3	
ALLYL IODIDE	1723	3	
ALLYL ISOTHIOCYANATE, STABILIZED	1545	6.1	
ALLYLTRICHLOROSILANE, STABILIZED	1724	8	
Aluminium alkyls, see	3394	4.2	
Aluminium alkyl halides, liquid, see	3394	4.2	
Aluminium alkyl halides, solid, see	3393	4.2	
Aluminium alkyl hydrides, see	3394	4.2	
ALUMINIUM BOROHYDRIDE	2870	4.2	
ALUMINIUM BOROHYDRIDE IN DEVICES	2870	4.2	
ALUMINIUM BROMIDE, ANHYDROUS	1725	8	
ALUMINIUM BROMIDE SOLUTION	2580	8	
ALUMINIUM CARBIDE	1394	4.3	
ALUMINIUM CHLORIDE, ANHYDROUS	1726	8	
ALUMINIUM CHLORIDE SOLUTION	2581	8	
Aluminium dross, see	3170	4.3	
ALUMINIUM FERROSILICON POWDER	1395	4.3	
ALUMINIUM HYDRIDE	2463	4.3	
ALUMINIUM NITRATE	1438	5.1	
ALUMINIUM PHOSPHIDE	1397	4.3	
ALUMINIUM PHOSPHIDE PESTICIDE	3048	6.1	
ALUMINIUM POWDER, COATED	1309	4.1	
ALUMINIUM POWDER, UNCOATED	1396	4.3	
ALUMINIUM REMELTING BY-PRODUCTS	3170	4.3	
ALUMINIUM RESINATE	2715	4.1	
ALUMINIUM SILICON POWDER, UNCOATED	1398	4.3	
ALUMINIUM SMELTING BY-PRODUCTS	3170	4.3	
Amatols, see	0082	1	
AMINES, FLAMMABLE, CORROSIVE, N.O.S.	2733	3	
AMINES, LIQUID, CORROSIVE, N.O.S.	2735	8	
AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	2734	8	
AMINES, SOLID, CORROSIVE, N.O.S.	3259	8	
Aminobenzene, see	1547	6.1	
2-Aminobenzotrifluoruride, see	2942	6.1	
3-Aminobenzotrifluoruride, see	2948	6.1	
Aminobutane, see	1125	3	
2-AMINO-4-CHLOROPHENOL	2673	6.1	
2-AMINO-5-DIETHYLAMINOPENTANE	2946	6.1	
2-AMINO-4,6-DINITROPHENOL, WETTED with not less than 20% water, by mass	3317	4.1	
2-(2-AMINOETHOXY) ETHANOL	3055	8	
N-AMINOETHYLPIPERAZINE	2815	8	
1-Amino-2-nitrobenzene, see	1661	6.1	
1-Amino-3-nitrobenzene, see	1661	6.1	
1-Amino-4-nitrobenzene, see	1661	6.1	
AMINOPHENOLS (o-, m-, p-)	2512	6.1	
AMINOPYRIDINES (o-, m-, p-)	2671	6.1	
AMMONIA, ANHYDROUS	1005	2	
AMMONIA, DEEPLY REFRIGERATED	9000	2	Admitted only for carriage in tank vessels
AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia	2672	8	
AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 35% but not more than 50% ammonia	2073	2	

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AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	3318	2	
AMMONIUM ARSENATE	1546	6.1	
Ammonium bichromate, see	1439	5.1	
Ammonium bifluoride solid, see	1727	8	
Ammonium bifluoride solution, see	2817	8	
Ammonium bisulphate, see	2506	8	
Ammonium bisulphite solution, see	2693	8	
AMMONIUM DICHROMATE	1439	5.1	
AMMONIUM DINITRO-o-CRESOLATE, SOLID	1843	6.1	
AMMONIUM DINITRO-o-CRESOLATE, SOLUTION	3424	6.1	
AMMONIUM FLUORIDE	2505	6.1	
AMMONIUM FLUOROSILICATE	2854	6.1	
Ammonium hexafluorosilicate, see	2854	6.1	
AMMONIUM HYDROGENDIFLUORIDE, SOLID	1727	8	
AMMONIUM HYDROGENDIFLUORIDE SOLUTION	2817	8	
AMMONIUM HYDROGEN SULPHATE	2506	8	
Ammonium hydrosulphide solution (treat as ammonium sulphide solution), see	2683	8	
AMMONIUM METAVANADATE	2859	6.1	
AMMONIUM NITRATE	0222	1	
AMMONIUM NITRATE with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance	1942	5.1	
AMMONIUM NITRATE EMULSION, intermediate for blasting explosives, liquid	3375	5.1	
AMMONIUM NITRATE EMULSION, intermediate for blasting explosives, solid	3375	5.1	
Ammonium nitrate explosive, see	0082 0331	1 1	
AMMONIUM NITRATE BASED FERTILIZER	2067	5.1	
AMMONIUM NITRATE BASED FERTILIZER	2071	9	
AMMONIUM NITRATE GEL, intermediate for blasting explosives, liquid	3375	5.1	
AMMONIUM NITRATE GEL, intermediate for blasting explosives, solid	3375	5.1	
AMMONIUM NITRATE, LIQUID hot concentrated solution, in a concentration of more than 80% but not more than 93%	2426	5.1	
AMMONIUM NITRATE SUSPENSION, intermediate for blasting explosives, liquid	3375	5.1	
AMMONIUM NITRATE SUSPENSION, intermediate for blasting explosives, solid	3375	5.1	
AMMONIUM PERCHLORATE	0402 1442	1 5.1	
Ammonium permanganate, see	1482	5.1	
AMMONIUM PERSULPHATE	1444	5.1	
AMMONIUM PICRATE dry or wetted with less than 10% water, by mass	0004	1	
AMMONIUM PICRATE, WETTED with not less than 10% water, by mass	1310	4.1	
AMMONIUM POLYSULPHIDE SOLUTION	2818	8	
AMMONIUM POLYVANADATE	2861	6.1	
Ammonium silicofluoride, see	2854	6.1	
AMMONIUM SULPHIDE SOLUTION	2683	8	
Ammunition, blank, see	0014 0326 0327 0338 0413	1 1 1 1 1	
Ammunition, fixed Ammunition, semi-fixed Ammunition, separate loading, see	0005 0006 0007 0321 0348 0412	1 1 1 1 1 1	
AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	0171 0254 0297	1 1 1	

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Name and description	UN No.	Class	Remarks
AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge	0247	1	
AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	0009 0010 0300	1 1 1	
Ammunition, incendiary (water-activated contrivances) with burster, expelling charge or propelling charge, see	0248 0249	1 1	
AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	0243 0244	1 1	
Ammunition, industrial, see	0275 0276 0277 0278 0323 0381	1 1 1 1 1 1	
Ammunition, lachrymatory, see	0018 0019 0301 2017	1 1 1 1	
AMMUNITION, PRACTICE	0362 0488	1 1	
AMMUNITION, PROOF	0363	1	
AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	0015 0016 0303	1 1 1	
Ammunition, smoke (water-activated contrivances), white phosphorus with burster, expelling charge or propelling charge, see	0248	1	
Ammunition, smoke (water-activated contrivances), without white phosphorus or phosphides with burster, expelling charge or propelling charge, see	0249	1	
AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	0245 0246	1 1	
Ammunition, sporting, see	0012 0328 0339 0417	1 1 1 1	
AMMUNITION, TEAR-PRODUCING, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	2017	6.1	
AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	0018 0019 0301	1 1 1	
AMMUNITION, TOXIC with burster, expelling charge or propelling charge	0020	1	Carriage prohibited
AMMUNITION, TOXIC with burster, expelling charge or propelling charge	0021	1	Carriage prohibited
Ammunition, toxic (water-activated contrivances) with burster, expelling charge or propelling charge, see	0248 0249	1 1	
AMMUNITION, TOXIC, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	2016	6.1	
Amosite, see	2212	9	
Amphibole asbestos, see	2212	9	
AMYL ACETATES	1104	3	
AMYL ACID PHOSPHATE	2819	8	
Amyl aldehyde, see	2058	3	
AMYLAMINE	1106	3	
n-Amylamine, see	1106	3	
AMYL BUTYRATES	2620	3	
AMYL CHLORIDE	1107	3	
n-AMYLENE, see	1108	3	
AMYL FORMATES	1109	3	
AMYL MERCAPTAN	1111	3	
n-AMYL METHYL KETONE	1110	3	
AMYL NITRATE	1112	3	
AMYL NITRITE	1113	3	
AMYLTRICHLOROSILANE	1728	8	
Anaesthetic ether, see	1155	3	
ANILINE	1547	6.1	
Aniline chloride, see	1548	6.1	
ANILINE HYDROCHLORIDE	1548	6.1	
Aniline oil, see	1547	6.1	
Aniline salt, see	1548	6.1	
ANISIDINES	2431	6.1	
ANISOLE	2222	3	
ANISOYL CHLORIDE	1729	8	
Anthophyllite, see	2212	9	

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Antimonous chloride, see	1733	8	
ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S.	3141	6.1	
ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S.	1549	6.1	
Antimony hydride, see	2676	2	
ANTIMONY LACTATE	1550	6.1	
Antimony (III) lactate, see	1550	6.1	
ANTIMONY PENTACHLORIDE, LIQUID	1730	8	
ANTIMONY PENTACHLORIDE SOLUTION	1731	8	
ANTIMONY PENTAFLUORIDE	1732	8	
Antimony perchloride, liquid, see	1730	8	
ANTIMONY POTASSIUM TARTRATE	1551	6.1	
ANTIMONY POWDER	2871	6.1	
ANTIMONY TRICHLORIDE	1733	8	
A.n.t.u., see	1651	6.1	
ARGON, COMPRESSED	1006	2	
ARGON, REFRIGERATED LIQUID	1951	2	
Arsenates, n.o.s., see	1556 1557	6.1 6.1	
ARSENIC	1558	6.1	
ARSENIC ACID, LIQUID	1553	6.1	
ARSENIC ACID, SOLID	1554	6.1	
ARSENICAL DUST	1562	6.1	
Arsenical flue dust, see	1562	6.1	
ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2760	3	
ARSENICAL PESTICIDE, LIQUID, TOXIC	2994	6.1	
ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	2993	6.1	
ARSENICAL PESTICIDE, SOLID, TOXIC	2759	6.1	
ARSENIC BROMIDE	1555	6.1	
Arsenic (III) bromide, see	1555	6.1	
Arsenic chloride, see	1560	6.1	
ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	1556	6.1	
ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	1557	6.1	
Arsenic (III) oxide, see	1561	6.1	
Arsenic (V) oxide, see	1559	6.1	
ARSENIC PENTOXIDE	1559	6.1	
Arsenic sulphides, see	1556 1557	6.1 6.1	
ARSENIC TRICHLORIDE	1560	6.1	
ARSENIC TRIOXIDE	1561	6.1	
Arsenious chloride, see	1560	6.1	
Arsenites, n.o.s., see	1556 1557	6.1 6.1	
Arsenous chloride, see	1560	6.1	
ARSINE	2188	2	
ARSINE, ADSORBED	3522	2	
ARTICLES CONTAINING A SUBSTANCE LIABLE TO SPONTANEOUS COMBUSTION, N.O.S.	3542	4.2	
ARTICLES CONTAINING A SUBSTANCE WHICH EMITS FLAMMABLE GAS IN CONTACT WITH WATER, N.O.S.	3543	4.3	
ARTICLES CONTAINING CORROSIVE SUBSTANCE, N.O.S.	3547	8	
ARTICLES CONTAINING FLAMMABLE GAS, N.O.S	3537	2	
ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.	3540	3	
ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.	3541	4.1	
ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS, N.O.S.	3548	9	
ARTICLES CONTAINING NON-FLAMMABLE, NON TOXIC GAS, N.O.S.	3538	2	

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Name and description	UN No.	Class	Remarks
ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.	3545	5.2	
ARTICLES CONTAINING OXIDIZING SUBSTANCE, N.O.S.	3544	5.1	
ARTICLES CONTAINING TOXIC GAS, N.O.S.	3539	2	
ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.	3546	6.1	
ARTICLES, EEI, see	0486	1	
ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE	0486	1	
ARTICLES, EXPLOSIVE, N.O.S.	0349	1	
	0350	1	
	0351	1	
	0352	1	
	0353	1	
	0354	1	
	0355	1	
	0356	1	
	0462	1	
	0463	1	
	0464	1	
	0465	1	
	0466	1	
	0467	1	
	0468	1	
	0469	1	
	0470	1	
	0471	1	
	0472	1	
ARTICLES, PRESSURIZED, HYDRAULIC (containing non-flammable gas)	3164	2	
ARTICLES, PRESSURIZED, PNEUMATIC (containing non-flammable gas)	3164	2	
ARTICLES, PYROPHORIC	0380	1	
ARTICLES, PYROTECHNIC for technical purposes	0428	1	
	0429	1	
	0430	1	
	0431	1	
	0432	1	
ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid	2584	8	
ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	2586	8	
ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid	2583	8	
ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid	2585	8	
ASBESTOS, AMPHIBOLE	2212	2	
ASBESTOS, CHRYSOTILE	2590	2	
Asphalt, with a flash-point above 60°C, at or above its flash-point, see	3256	3	
Asphalt, at or above 100 °C and below its flash-point, see	3257	9	
Aviation regulated liquid, n.o.s.	3334	9	Not subject to ADN
Aviation regulated solid, n.o.s.	3335	9	Not subject to ADN
AZODICARBONAMIDE	3242	4.1	
Bag charges, see	0242	1	
	0279	1	
	0414	1	
Ballistite, see	0160	1	
	0161	1	
Bangalore torpedoes, see	0136	1	
	0137	1	
	0138	1	
	0294	1	
BARIUM	1400	4.3	
BARIUM ALLOYS, PYROPHORIC	1854	4.2	
BARIUM AZIDE, dry or wetted with less than 50% water, by mass	0224	1	
BARIUM AZIDE, WETTED with not less than 50% water, by mass	1571	4.1	
Barium binoxide, see	1449	5.1	
BARIUM BROMATE	2719	5.1	
BARIUM CHLORATE, SOLID	1445	5.1	
BARIUM CHLORATE, SOLUTION	3405	5.1	
BARIUM COMPOUND, N.O.S.	1564	6.1	
BARIUM CYANIDE	1565	6.1	
Barium dioxide, see	1449	5.1	
BARIUM HYPOCHLORITE with more than 22% available chlorine	2741	5.1	
BARIUM NITRATE	1446	5.1	
BARIUM OXIDE	1884	6.1	

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Name and description	UN No.	Class	Remarks
BARIUM PERCHLORATE, SOLID	1447	5.1	
BARIUM PERCHLORATE, SOLUTION	3406	5.1	
BARIUM PERMANGANATE	1448	5.1	
BARIUM PEROXIDE	1449	5.1	
Barium selenate, see	2630	6.1	
Barium selenite, see	2630	6.1	
Barium superoxide, see	1449	5.1	
BATTERIES, CONTAINING SODIUM	3292	4.3	
BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	3028	8	
Batteries, nickel-metal hydride	3496	9	Not subject to ADN
BATTERY POWERED EQUIPMENT	3171	9	
BATTERY POWERED VEHICLE	3171	9	
BATTERIES, WET, FILLED WITH ACID, electric storage	2794	8	
BATTERIES, WET, FILLED WITH ALKALI, electric storage	2795	8	
BATTERIES, WET, NON-SPILLABLE, electric storage	2800	8	
BATTERY FLUID, ACID	2796	8	
BATTERY FLUID, ALKALI	2797	8	
BENZALDEHYDE	1990	9	
BENZENE	1114	3	
BENZENESULPHONYL CHLORIDE	2225	8	
Benzenethiol, see	2337	6.1	
BENZIDINE	1885	6.1	
Benzol, see	1114	3	
Benzolene, see	1268	3	
BENZONITRILE	2224	6.1	
BENZOQUINONE	2587	6.1	
Benzosulphochloride, see	2225	8	
BENZOTRICHLORIDE	2226	8	
BENZOTRIFLUORIDE	2338	3	
BENZOYL CHLORIDE	1736	8	
BENZYL BROMIDE	1737	6.1	
BENZYL CHLORIDE	1738	6.1	
Benzyl chlorocarbonate, see	1739	8	
BENZYL CHLOROFORMATE	1739	8	
Benzyl cyanide, see	2470	6.1	
BENZYLDIMETHYLAMINE	2619	8	
BENZYLIDENE CHLORIDE	1886	6.1	
BENZYL IODIDE	2653	6.1	
BERYLLIUM COMPOUND, N.O.S.	1566	6.1	
BERYLLIUM NITRATE	2464	5.1	
BERYLLIUM POWDER	1567	6.1	
Bhusa	1327	4.1	Not subject to ADN
BICYCLO[2.2.1]HEPTA-2,5-DIENE, STABILIZED	2251	3	
Bifluorides, n.o.s., see	1740	8	
BIOLOGICAL SUBSTANCE, CATEGORY B	3373	6.2	
BIOLOGICAL SUBSTANCE, CATEGORY B (animal material only)	3373	6.2	
(BIO) MEDICAL WASTE, N.O.S.	3291	6.2	
BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2782	3	
BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	3016	6.1	
BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3015	6.1	
BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	2781	6.1	
BISULPHATES, AQUEOUS SOLUTION	2837	8	
BISULPHITES, AQUEOUS SOLUTION, N.O.S.	2693	8	
Bitumen, with a flash-point above 60 °C, at or above its flash-point, see	3256	3	

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Name and description	UN No.	Class	Remarks
Bitumen, at or above 100 °C and below its flash-point, see	3257	9	
BLACK POWDER, COMPRESSED	0028	1	
BLACK POWDER, granular or as a meal	0027	1	
BLACK POWDER, IN PELLETS	0028	1	
Blasting cap assemblies, see	0360 0361	1 1	
Blasting caps, electric, see	0030 0255 0456	1 1 1	
Bleaching powder, see	2208	5.1	
BOMBS with bursting charge	0033 0034 0035 0291	1 1 1 1	
Bombs, illuminating, see	0254	1	
BOMBS, PHOTO-FLASH	0037 0038 0039 0299	1 1 1 1	
BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device	2028	8	
Bombs, target identification, see	0171 0254 0297	1 1 1	
BOMBS WITH FLAMMABLE LIQUID with bursting charge	0399 0400	1 1	
BOOSTERS WITH DETONATOR	0225 0268	1 1	
BOOSTERS without detonator	0042 0283	1 1	
Borate and chlorate mixture, see	1458	5.1	
BORNEOL	1312	4.1	
BORON TRIBROMIDE	2692	8	
BORON TRICHLORIDE	1741	2	
BORON TRIFLUORIDE ACETIC ACID COMPLEX, LIQUID	1742	8	
BORON TRIFLUORIDE ACETIC ACID COMPLEX, SOLID	3419	8	
BORON TRIFLUORIDE, ADSORBED	3519	2	
BORON TRIFLUORIDE	1008	2	
BORON TRIFLUORIDE DIETHYL ETHERATE	2604	8	
BORON TRIFLUORIDE DIHYDRATE	2851	8	
BORON TRIFLUORIDE DIMETHYL ETHERATE	2965	4.3	
BORON TRIFLUORIDE PROPIONIC ACID COMPLEX, LIQUID	1743	8	
BORON TRIFLUORIDE PROPIONIC ACID COMPLEX, SOLID	3420	8	
BROMATES, INORGANIC, N.O.S.	1450	5.1	
BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S	3213	5.1	
BROMINE	1744	8	
BROMINE CHLORIDE	2901	2	
BROMINE PENTAFLUORIDE	1745	5.1	
BROMINE SOLUTION	1744	8	
BROMINE TRIFLUORIDE	1746	5.1	
BROMOACETIC ACID, SOLID	3425	8	
BROMOACETIC ACID, SOLUTION	1938	8	
BROMOACETONE	1569	6.1	
omega-Bromoacetone, see	2645	6.4	
BROMOACETYL BROMIDE	2513	8	
BROMOBENZENE	2514	3	
BROMOBENZYL CYANIDES, LIQUID	1694	6.1	
BROMOBENZYL CYANIDES, SOLID	3449	6.1	
1-BROMOBUTANE	1126	3	
2-BROMOBUTANE	2339	3	
BROMOCHLOROMETHANE	1887	6.1	
1-BROMO-3-CHLOROPROPANE	2688	6.1	
1-Bromo-2,3-epoxypropane, see	2558	6.1	
Bromoethane, see	1891	6.1	
2-BROMOETHYL ETHYL ETHER	2340	3	
BROMOFORM	2515	6.1	

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Bromomethane, see	1062	2	
1-BROMO-3-METHYLBUTANE	2341	3	
BROMOMETHYLPROPANES	2342	3	
2-BROMO-2-NITROPROPANE-1,3-DIOL	3241	4.1	
2-BROMOPENTANE	2343	3	
BROMOPROPANES	2344	3	
3-BROMOPROPYNE	2345	3	
BROMOTRIFLUOROETHYLENE	2419	2	
BROMOTRIFLUOROMETHANE	1009	2	
BRUCINE	1570	6.1	
BURSTERS, explosive	0043	1	
BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, having a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l	1010	2	
BUTADIENE, STABILIZED, (1,2-butadiene)	1010	2	
BUTADIENE, STABILIZED, (1,3-butadiene)	1010	2	
BUTANE	1011	2	
BUTANEDIONE	2346	3	
Butane-1-thiol, see	2347	3	
BUTANOLS	1120	3	
1-Butanol, see	1120	3	
Butan-2-ol, see	1120	3	
Butanol, secondary, see	1120	3	
Butanol, tertiary, see	1120	3	
Butanone, see	1193	3	
2-Butenal, see	1143	6.1	
Butene, see	1012	2	
Bute-1-ene-3-one, see	1251	3	
1,2-Buteneoxide, see	3022	3	
2-Buten-1-ol, see	2614	3	
BUTYL ACETATES	1123	3	
Butyl acetate, secondary, see	1123	3	
BUTYL ACID PHOSPHATE	1718	8	
BUTYL ACRYLATES, STABILIZED	2348	3	
n-Butyl alcohol, see	1120	3	
Butyl alcohols, see	1120	3	
n-BUTYLAMINE	1125	3	
N-BUTYLANILINE	2738	6.1	
sec-Butyl benzene, see	2709	3	
BUTYLBENZENES	2709	3	
n-Butyl bromide, see	1126	3	
n-Butyl chloride, see	1127	3	
n-BUTYL CHLOROFORMATE	2743	6.1	
tert-BUTYLCYCLOHEXYL CHLOROFORMATE	2747	6.1	
BUTYLENES MIXTURE or 1-BUTYLENE or CIS-2-BUTYLENE or TRANS-2-BUTYLENE	1012	2	
1,2-BUTYLENE OXIDE, STABILIZED	3022	3	
Butyl ethers, see	1149	3	
Butyl ethyl ether, see	1179	3	
n-BUTYL FORMATE	1128	3	
tert-BUTYL HYPOCHLORITE	3255	4.2	Carriage prohi-bited
N,n-BUTYLIMIDAZOLE	2690	6.1	
N,n-Butyliminazole, see	2690	6.1	
n-BUTYL ISOCYANATE	2485	6.1	
tert-BUTYL ISOCYANATE	2484	6.1	
Butyl lithium, see	3394	4.2	
BUTYL MERCAPTAN	2347	3	
n-BUTYL METHACRYLATE, STABILIZED	2227	3	
BUTYL METHYL ETHER	2350	3	
BUTYL NITRITES	2351	3	
Butylphenols, liquid, see	3145	8	
Butylphenols, solid, see	2430	8	

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Name and description	UN No.	Class	Remarks
BUTYL PROPIONATES	1914	3	
p-tert-Butyltoluene, see	2667	6.1	
BUTYLTOLUENES	2667	6.1	
BUTYLTRICHLOROSILANE	1747	8	
5-tert-BUTYL-2,4,6-TRINITRO-m-XYLENE	2956	4.1	
BUTYL VINYL ETHER, STABILIZED	2352	3	
But-1-yne, see	2452	2	
1,4-BUTYNEDIOL	2716	6.1	
2-Butyne-1,4-diol, see	2716	6.1	
BUTYRALDEHYDE	1129	3	
n-Butyraldehyde, see	1129	3	
BUTYRALDOXIME	2840	3	
BUTYRIC ACID	2820	8	
BUTYRIC ANHYDRIDE	2739	8	
Butyrone, see	2710	3	
BUTYRONITRILE	2411	3	
Butyroyl chloride, see	2353	3	
BUTYRYL CHLORIDE	2353	3	
Cable cutters, explosive, see	0070	1	
CACODYLIC ACID	1572	6.1	
CADMIUM COMPOUND	2570	6.1	
CAESIUM	1407	4.3	
CAESIUM HYDROXIDE	2682	8	
CAESIUM HYDROXIDE SOLUTION	2681	8	
CAESIUM NITRATE	1451	5.1	
Caffeine, see	1544	6.1	
Cajeputene, see	2052	3	
CALCIUM	1401	4.3	
CALCIUM ALLOYS, PYROPHORIC	1855	4.2	
CALCIUM ARSENATE	1573	6.1	
CALCIUM ARSENATE AND CALCIUM ARSENITE MIXTURE, SOLID	1574	6.1	
Calcium bisulphite solution, see	2693	8	
CALCIUM CARBIDE	1402	4.3	
CALCIUM CHLORATE	1452	5.1	
CALCIUM CHLORATE, AQUEOUS SOLUTION	2429	5.1	
CALCIUM CHLORITE	1453	5.1	
CALCIUM CYANAMIDE with more than 0.1% calcium carbide	1403	4.3	
CALCIUM CYANIDE	1575	6.1	
CALCIUM DITHIONITE	1923	4.2	
CALCIUM HYDRIDE	1404	4.3	
CALCIUM HYDROSULPHITE, see	1923	4.2	
CALCIUM HYPOCHLORITE, DRY	1748	5.1	
CALCIUM HYPOCHLORITE, DRY with more than 39% available chlorine (8.8% available oxygen)	1748	5.1	
CALCIUM HYPOCHLORITE, DRY, CORROSIVE with more than 39% available chlorine (8.8% available oxygen)	3485	5.1	
CALCIUM HYPOCHLORITE, HYDRATED with not less than 5.5% but not more than 16% water	2880	5.1	
CALCIUM HYPOCHLORITE, HYDRATED MIXTURE with not less than 5.5% but not more than 16% water	2880	5.1	
CALCIUM HYPOCHLORITE, HYDRATED, CORROSIVE with not less than 5.5% but not more than 16% water	3487	5.1	
CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, CORROSIVE with not less than 5.5% but not more than 16% water	3487	5.1	
CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 10% but not more than 39% available chlorine	2208	5.1	
CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	1748	5.1	
CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 10% but not more than 39% available chlorine	3486	5.1	

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Name and description	UN No.	Class	Remarks
CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 39% available chlorine (8.8% available oxygen)	3485	5.1	
CALCIUM MANGANESE SILICON	2844	4.3	
CALCIUM NITRATE	1454	5.1	
Calcium oxide	1910	8	Not subject to ADN
CALCIUM PERCHLORATE	1455	5.1	
CALCIUM PERMANGANATE	1456	5.1	
CALCIUM PEROXIDE	1457	5.1	
CALCIUM PHOSPHIDE	1360	4.3	
CALCIUM, PYROPHORIC	1855	4.2	
CALCIUM RESINATE	1313	4.1	
CALCIUM RESINATE, FUSED	1314	4.1	
Calcium selenate, see	2630	6.1	
CALCIUM SILICIDE	1405	4.3	
Calcium silicon, see	1405	4.3	
Calcium superoxide, see	1457	5.1	
Camphanone, see	2717	4.1	
CAMPHOR OIL	1130	3	
CAMPHOR, synthetic	2717	4.1	
CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3Wh)	3508	9	
CAPACITOR, ELECTRIC DOUBLE LAYER (with an energy storage capacity greater than 0.3 Wh)	3499	9	
CAPROIC ACID	2829	8	
CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2758	3	
CARBAMATE PESTICIDE, LIQUID, TOXIC	2992	6.1	
CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	2991	6.1	
CARBAMATE PESTICIDE, SOLID, TOXIC	2757	6.1	
Carbolic acid, see	1671 2312 2821	6.1 6.1 6.1	
CARBON, animal or vegetable origin	1361	4.2	
CARBON, ACTIVATED	1362	4.2	
Carbon bisulphide, see	1131	3	
Carbon black (animal or vegetable origin), see	1361	4.2	
CARBON DIOXIDE	1013	2	
Carbon dioxide and ethylene oxide mixture, see	1041 1952 3300	2 2 2	
CARBON DIOXIDE, REFRIGERATED LIQUID	2187	2	
Carbon dioxide, solid	1845	9	Not subject to ADN
CARBON DISULPHIDE	1131	3	
Carbonic anhydride, see	1013 1845 2187	2 9 2	
CARBON MONOXIDE, COMPRESSED	1016	2	
Carbon oxysulphide, see	2204	2.3	
Carbon sulphide, see	1131	3	
CARBON TETRABROMIDE	2516	6.1	
CARBON TETRACHLORIDE	1846	6.1	
Carbonyl chloride, see	1076	2	
CARBONYL FLUORIDE	2417	2	
CARBONYL SULPHIDE	2204	2	
Cartridge cases, empty, primed, see	0055 0379	1 1	
Cartridges, actuating, for fire extinguisher or apparatus valve, see	0275 0276 0323 0381	1 1 1 1	
Cartridges, explosive, see	0048	1	
CARTRIDGES, FLASH	0049 0050	1 1	

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Name and description	UN No.	Class	Remarks
CARTRIDGES FOR WEAPONS with bursting charge	0005	1	
	0006	1	
	0007	1	
	0321	1	
	0348	1	
	0412	1	
CARTRIDGES FOR WEAPONS, BLANK	0014	1	
	0326	1	
	0327	1	
	0338	1	
	0413	1	
CARTRIDGES FOR WEAPONS, INERT PROJECTILE	0012	1	
	0328	1	
	0339	1	
	0417	1	
Cartridges, illuminating, see	0171	1	
	0254	1	
	0297	1	
CARTRIDGES, OIL WELL	0277	1	
	0278	1	
CARTRIDGES, POWER DEVICE	0275	1	
	0276	1	
	0323	1	
	0381	1	
CARTRIDGES, SIGNAL	0054	1	
	0312	1	
	0405	1	
CARTRIDGES, SMALL ARMS	0012	1	
	0339	1	
	0417	1	
CARTRIDGES, SMALL ARMS, BLANK or CARTRIDGES FOR TOOLS, BLANK	0014	1	
	0327	1	
	0338	1	
Cartridges, starter, jet engine, see	0275	1	
	0276	1	
	0323	1	
	0381	1	
CASES, CARTRIDGE, EMPTY, WITH PRIMER	0055	1	
	0379	1	
CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	0446	1	
	0447	1	
Casinghead gasoline, see	1203	3	
CASTOR BEANS	2969	9	
CASTOR FLAKE	2969	9	
CASTOR MEAL	2969	9	
CASTOR POMACE	2969	9	
CAUSTIC ALKALI LIQUID, N.O.S.	1719	8	
Caustic potash, see	1814	8	
Caustic soda, see	1824	8	
Caustic soda liquor, see	1824	8	
CELLS, CONTAINING SODIUM	3292	4.3	
CELLULOID in block, rods, rolls, sheets, tubes, etc., except scrap	2000	4.1	
CELLULOID, SCRAP	2002	4.2	
Cement, see	1133	3	
CERIUM, slabs, ingots or rods	1333	4.1	
CERIUM, turnings or gritty powder	3078	4.3	
Cer mishmetall, see	1323	4.1	
Charcoal, activated, see	1362	4.1	
Charcoal, non-activated, see	1361	4.2	
CHARGES, BURSTING, PLASTICS BONDED	0457	1	
	0458	1	
	0459	1	
	0460	1	
CHARGES, DEMOLITION	0048	1	
CHARGES, DEPTH	0056	1	
Charges, expelling, explosive, for fire extinguishers, see	0275	1	
	0276	1	
	0323	1	
	0381	1	
CHARGES, EXPLOSIVE, COMMERCIAL without detonator	0442	1	
	0443	1	
	0444	1	
	0445	1	
CHARGES, PROPELLING	0271	1	
	0272	1	
	0415	1	
	0491	1	
CHARGES, PROPELLING, FOR CANNON	0242	1	
	0279	1	
	0414	1	
CHARGES, SHAPED, FLEXIBLE, LINEAR	0237	1	
	0288	1	
CHARGES, SHAPED, without detonator	0059	1	
	0439	1	
	0440	1	
	0441	1	
CHARGES, SUPPLEMENTARY, EXPLOSIVE	0060	1	
CHEMICAL KIT	3316	9	
CHEMICAL SAMPLE, TOXIC	3315	6.1	

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CHEMICAL UNDER PRESSURE, N.O.S.	3500	2	
CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.	3501	2	
CHEMICAL UNDER PRESSURE, TOXIC, N.O.S.	3502	2	
CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.	3503	2	
CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.	3504	2	
CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.	3505	2	
Chile saltpetre, see	1498	5.1	
CHLORAL, ANHYDROUS, STABILIZED	2075	6.1	
CHLORATE AND BORATE MIXTURE	1458	5.1	
CHLORATE AND MAGNESIUM CHLORIDE MIXTURE, SOLID	1459	5.1	
CHLORATE AND MAGNESIUM CHLORIDE MIXTURE, SOLUTION	3407	5.1	
CHLORATES, INORGANIC, N.O.S.	1461	5.1	
CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3210	5.1	
CHLORIC ACID, AQUEOUS SOLUTION with not more than 10% chloric acid	2626	5.1	
CHLORINE	1017	2	
CHLORINE, ADSORBED	3520	2	
CHLORINE PENTAFLUORIDE	2548	2	
CHLORINE TRIFLUORIDE	1749	2	
CHLORITES, INORGANIC, N.O.S.	1462	5.1	
CHLORITE SOLUTION	1908	8	
Chloroacetaldehyde, see	2232	6.1	
CHLOROACETIC ACID, MOLTEN	3250	6.1	
CHLOROACETIC ACID, SOLID	1751	6.1	
CHLOROACETIC ACID SOLUTION	1750	6.1	
CHLOROACETONE, STABILIZED	1695	6.1	
CHLOROACETONITRILE	2668	6.1	
CHLOROACETOPHENONE, LIQUID	3416	6.1	
CHLOROACETOPHENONE, SOLID	1697	6.1	
CHLOROACETYL CHLORIDE	1752	6.1	
CHLOROANILINES, LIQUID	2019	6.1	
CHLOROANILINES, SOLID	2018	6.1	
CHLOROANISIDINES	2233	6.1	
CHLOROBENZENE	1134	3	
CHLOROBENZOTRIFLUORIDES	2234	3	
CHLOROBENZYL CHLORIDES, LIQUID	2235	6.1	
CHLOROBENZYL CHLORIDES, SOLID	3427	6.1	
1-Chloro-3-bromopropane, see	2688	6.1	
1-Chlorobutane, see	1127	3	
2-Chlorobutane, see	1127	3	
CHLOROBUTANES	1127	3	
CHLOROCRESOLS, SOLUTION	2669	6.1	
CHLOROCRESOLS, SOLID	3437	6.1	
CHLORODIFLUORO-BROMOMETHANE	1974	2	
1-CHLORO-1,1-DIFLUORO-ETHANE	2517	2	
CHLORODIFLUOROMETHANE	1018	2	
CHLORODIFLUORO-METHANE AND CHLORO-PENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane	1973	2	
3-Chloro-1,2-dihydroxypropane, see	2689	6.1	
Chlorodimethyl ether, see	1239	6.1	
1-Chloro-2,2-dimethylpropane, see	1107	3	
CHLORODINITROBENZENES, LIQUID	1577	6.1	
CHLORODINITROBENZENES, SOLID	3441	6.1	

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2-CHLOROETHANAL	2232	6.1	
Chloroethane, see	1037	2	
Chloroethane nitrile, see	2668	6.1	
2-Chloroethanol, see	1135	6.1	
CHLOROFORM	1888	6.1	
CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.	3277	6.1	
CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	2742	6.1	
Chloromethane, see	1063	2	
1-Chloro-3-methylbutane, see	1107	3	
2-Chloro-2-methylbutane, see	1107	3	
CHLOROMETHYL CHLOROFORMATE	2745	6.1	
Chloromethyl cyanide, see	2668	6.1	
CHLOROMETHYL ETHYL ETHER	2354	3	
1-Chloro-3-methylbutane, see	1107	3	
1-Chloro-3-methylbutane, see	1107	3	
Chloromethyl methyl ether, see	1239	6.1	
3-CHLORO-4-METHYLPHENYL ISOCYANATE, LIQUID	2236	6.1	
3-CHLORO-4-METHYLPHENYL ISOCYANATE, SOLID	3428	6.1	
1-Chloro-2-methylpropane, see	1127	3	
2-Chloro-2-methylpropane, see	1127	3	
3-Chloro-2-methylprop-1-ene, see	2554	3	
CHLORONITROANILINES	2237	6.1	
CHLORONITROBENZENES LIQUID	3409	6.1	
CHLORONITROBENZENES SOLID	1578	6.1	
CHLORONITROTOLUENES, LIQUID	2433	6.1	
CHLORONITROTOLUENES, SOLID	3457	6.1	
CHLOROPENTAFLUORO-ETHANE	1020	2	
1-Chloropentane	1107	3	
CHLOROPHENOLATES, LIQUID	2904	8	
CHLOROPHENOLATES, SOLID	2905	8	
CHLOROPHENOLS, LIQUID	2021	6.1	
CHLOROPHENOLS, SOLID	2020	6.1	
CHLOROPHENYL-TRICHLOROSILANE	1753	8	
CHLOROPICRIN	1580	6.1	
CHLOROPICRIN AND METHYL BROMIDE MIXTURE, with more than 2% chloropicrin	1581	2	
CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	1582	2	
CHLOROPICRIN MIXTURE, N.O.S.	1583	6.1	
CHLOROPLATINIC ACID, SOLID	2507	8	
CHLOROPRENE, STABILIZED	1991	3	
1-CHLOROPROPANE	1278	3	
2-CHLOROPROPANE	2356	3	
3-Chloro-propanediol-1,2, see	2689	6.1	
3-CHLOROPROPANOL-1	2849	6.1	
2-CHLOROPROPENE	2456	3	
3-Chloropropene, see	1100	3	
3-Chloroprop-1-ene, see	1100	3	
2-CHLOROPROPIONIC ACID	2511	8	
2-CHLOROPYRIDINE	2822	6.1	
CHLOROSILANES, CORROSIVE, N.O.S.	2987	8	
CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	2986	8	
CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	2985	3	
CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	3361	6.1	
CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	3362	6.1	
CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	2988	4.3	

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Name and description	UN No.	Class	Remarks
CHLOROSULPHONIC ACID (with or without sulphur trioxide)	1754	8	
1-CHLORO-1,2,2,2-TETRAFLUOROETHANE	1021	2	
CHLOROTOLUENES	2238	3	
4-CHLORO-o-TOLUIDINE HYDROCHLORIDE, SOLID	1579	6.1	
4-CHLORO-o-TOLUIDINE HYDROCHLORIDE, SOLUTION	3410	6.1	
CHLOROTOLUIDINES LIQUID	3429	6.1	
CHLOROTOLUIDINES SOLID	2239	6.1	
1-CHLORO-2,2,2-TRIFLUOROETHANE	1983	2	
Chlorotrifluoroethylene, see	1082	2	
CHLOROTRIFLUOROMETHANE	1022	2	
CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane	2599	2	
Chromic acid, solid, see	1463	5.1	
CHROMIC ACID SOLUTION	1755	8	
Chromic anhydride, solid, see	1463	5.1	
CHROMIC FLUORIDE, SOLID	1756	8	
CHROMIC FLUORIDE SOLUTION	1757	8	
Chromic nitrate, see	2720	5.1	
Chromium (VI) dichloride dioxide, see	1758	8	
Chromium (III) fluoride, solid, see	1756	8	
CHROMIUM NITRATE	2720	5.1	
Chromium (III) nitrate, see	2720	5.1	
CHROMIUM OXYCHLORIDE	1758	8	
CHROMIUM TRIOXIDE, ANHYDROUS	1463	5.1	
CHROMOSULPHURIC ACID	2240	8	
Chrysotile, see	2590	9	
Cinene, see	2052	3	
Cinnamene, see	2055	3	
Cinnamol, see	2055	3	
CLINICAL WASTE, UNSPECIFIED, N.O.S.	3291	6.2	
COAL GAS, COMPRESSED	1023	2	
COAL TAR DISTILLATES, FLAMMABLE	1136	3	
Coal tar naphtha, see	1268	3	
Coal tar oil, see	1136	3	
COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining)	1139	3	
COBALT NAPHTHENATES, POWDER	2001	4.1	
COBALT RESINATE, PRECIPITATED	1318	4.1	
Cocculus, see	3172	6.1	
	3462	6.1	
Collodion cottons, see	0340	1	
	0341	1	
	0342	1	
	2059	3	
	2555	4.1	
	2556	4.1	
	2557	4.1	
COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	0382	1	
	0383	1	
	0384	1	
	0461	1	
Composition B, see	0118	1	
COMPRESSED GAS, N.O.S.	1956	2	
COMPRESSED GAS, FLAMMABLE, N.O.S.	1954	2	
COMPRESSED GAS, OXIDIZING, N.O.S.	3156	2	
COMPRESSED GAS, TOXIC, N.O.S.	1955	2	
COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	3304	2	
COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	1953	2	
COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	3305	2	
COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	3303	2	

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COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	3306	2	
CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	0248 0249	1 1	
COPPER ACETOARSENITE	1585	6.1	
COPPER ARSENITE	1586	6.1	
Copper (II) arsenite, see	1586	6.1	
COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2776	3	
COPPER BASED PESTICIDE, LIQUID, TOXIC	3010	6.1	
COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3009	6.1	
COPPER BASED PESTICIDE, SOLID, TOXIC	2775	6.1	
COPPER CHLORATE	2721	5.1	
Copper (II) chlorate, see	2721	5.1	
COPPER CHLORIDE	2802	8	
COPPER CYANIDE	1587	6.1	
Copper selenate, see	2630	6.1	
Copper selenite, see	2630	6.1	
COPRA	1363	4.2	
CORD, DETONATING, flexible	0065 0289	1 1	
CORD, DETONATING, metal clad	0102 0290	1 1	
CORD, DETONATING, MILD EFFECT, metal clad	0104	1	
CORD, IGNITER	0066	1	
Cordite, see	0160 0161	1 1	
CORROSIVE LIQUID, N.O.S.	1760	8	
CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	3264	8	
CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	3265	8	
CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	3266	8	
CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	3267	8	
CORROSIVE LIQUID, FLAMMABLE, N.O.S.	2920	8	
CORROSIVE LIQUID, OXIDIZING, N.O.S.	3093	8	
CORROSIVE LIQUID, SELF-HEATING, N.O.S.	3301	8	
CORROSIVE LIQUID, TOXIC, N.O.S.	2922	8	
CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	3094	8	
CORROSIVE SOLID, N.O.S.	1759	8	
CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	3260	8	
CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	3261	8	
CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	3262	8	
CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	3263	8	
CORROSIVE SOLID, FLAMMABLE, N.O.S.	2921	8	
CORROSIVE SOLID, OXIDIZING, N.O.S.	3084	8	
CORROSIVE SOLID, SELF-HEATING, N.O.S.	3095	8	
CORROSIVE SOLID, TOXIC, N.O.S.	2923	8	
CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	3096	8	
COTTON WASTE, OILY	1364	4.2	
COTTON, WET	1365	4.2	
COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3024	3	
COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	3026	6.1	
COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3025	6.1	
COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	3027	6.1	
Creosote, see	2810	6.1	
Creosote salts, see	1334	4.1	

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Name and description	UN No.	Class	Remarks
CRESOLS, LIQUID	2076	6.1	
CRESOLS, SOLID	3455	6.1	
CRESYLIC ACID	2022	6.1	
Crocidolite, see	2212	9	
CROTONALDEHYDE	1143	6.1	
CROTONALDEHYDE, STABILIZED	1143	6.1	
CROTONIC ACID, LIQUID	3472	8	
CROTONIC ACID, SOLID	2823	8	
Crotonic aldehyde / Crotonic aldehyde, stabilized, see	1143	6.1	
CROTONYLENE	1144	3	
Crude naphtha, see	1268	3	
Cumene, see	1918	3	
Cupric chlorate, see	2721	5.1	
CUPRIETHYLENEDIAMINE SOLUTION	1761	8	
Cutback bitumen, with a flash-point not greater than 60 °C, see	1999	3	
Cutback bitumen, with a flash-point above 60 °C, at or above its flash-point, see	3256	3	
Cutback bitumen, at or above 100 °C and below its flash-point, see	3257	9	
CUTTERS, CABLE, EXPLOSIVE	0070	1	
CYANIDE SOLUTION, N.O.S.	1935	6.1	
CYANIDES, INORGANIC, SOLID, N.O.S.	1588	6.1	
Cyanides, organic, flammable, toxic, n.o.s., see	3273	3	
Cyanides, organic, toxic, n.o.s., see	3276 3439	6.1 6.1	
Cyanides, organic, toxic, flammable, n.o.s., see	3275	6.1	
Cyanoacetonitrile, see	2647	6.1	
CYANOGEN	1026	2	
CYANOGEN BROMIDE	1889	6.1	
CYANOGEN CHLORIDE, STABILIZED	1589	2	
CYANURIC CHLORIDE	2670	8	
CYCLOBUTANE	2601	2	
CYCLOBUTYL CHLOROFORMATE	2744	6.1	
1,5,9-CYCLODODECATRIENE	2518	6.1	
CYCLOHEPTANE	2241	3	
CYCLOHEPTATRIENE	2603	3	
1,3,5-Cycloheptatriene, see	2603	3	
CYCLOHEPTENE	2242	3	
1,4-Cyclohexadienedione, see	2587	6.1	
CYCLOHEXANE	1145	3	
Cyclehexanethiol, see	3054	3	
CYCLOHEXANONE	1915	3	
CYCLOHEXENE	2256	3	
CYCLOHEXENYLTRI-CHLOROSILANE	1762	8	
CYCLOHEXYL ACETATE	2243	3	
CYCLOHEXYLAMINE	2357	8	
CYCLOHEXYL ISOCYANATE	2488	6.1	
CYCLOHEXYL MERCAPTAN	3054	3	
CYCLOHEXYLTRI-CHLOROSILANE	1763	8	
CYCLONITE AND CYCLOTETRAMETHYLENE-TETRANITRAMINE MIXTURE, WETTED with not less than 15% water, by mass or DESENSITIZED with not less than 10% phlegmatiser by mass, see	0391	1	
CYCLONITE, DESENSITIZED, see	0483	1	
CYCLONITE, WETTED with not less than 15% water, by mass, see	0072	1	
CYCLOOCTADIENES	2520	3	
CYCLOOCTADIENE PHOSPHINES, see	2940	4.2	
CYCLOOCTATETRAENE	2358	3	
CYCLOPENTANE	1146	3	
CYCLOPENTANOL	2244	3	
CYCLOPENTANONE	2245	3	
CYCLOPENTENE	2246	3	

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CYCLOPROPANE	1027	2	
CYCLOTETRAMETHYLENE-TETRANITRAMINE, DESENSITIZED	0484	1	
CYCLOTETRAMETHYLENE-TETRANITRAMINE, WETTED with not less than 15% water, by mass	0226	1	
CYCLOTRIMETHYLENE-TRINITRAMINE AND CYCLOTETRAMETHYLENE-TETRANITRAMINE MIXTURE, DESENSITIZED with not less than 10% phlegmatiser by mass	0391	1	
CYCLOTRIMETHYLENE-TRINITRAMINE AND CYCLOTETRAMETHYLENE-TETRANITRAMINE MIXTURE, WETTED with not less than 15% water, by mass	0391	1	
CYCLOTRIMETHYLENE-TRINITRAMINE, DESENSITIZED	0483	1	
CYCLOTRIMETHYLENE-TRINITRAMINE, WETTED with not less than 15% water, by mass	0072	1	
CYMENES	2046	3	
Cymol, see	2046	3	
Deanol, see	2051	8	
DANGEROUS GOODS IN MACHINERY OR DANGEROUS GOODS IN APPARATUS	3363	9	
DECABORANE	1868	4.1	
DECAHYDRONAPHTHALENE	1147	3	
Decalin, see	1147	3	
n-DECANE	2247	3	
DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES, N.O.S.	0132	1	
Depth charge, see	0056	1	
DESENSITIZED EXPLOSIVE, LIQUID, N.O.S.	3379	3	
DESENSITIZED EXPLOSIVE, SOLID, N.O.S.	3380	4.1	
Detonating relays, see	0029	1	
	0267	1	
	0360	1	
	0361	1	
	0455	1	
	0500	1	
DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	0360	1	
	0361	1	
	0500	1	
DETONATORS FOR AMMUNITION	0073	1	
	0364	1	
	0365	1	
	0366	1	
DETONATORS, ELECTRIC for blasting	0030	1	
	0255	1	
	0456	1	
DETONATORS, NON-ELECTRIC for blasting	0029	1	
	0267	1	
	0455	1	
DEUTERIUM, COMPRESSED	1957	2	
DEVICES, SMALL, HYDROCARBON GAS POWERED with release device	3150	2	
DIACETONE ALCOHOL	1148	3	
DIALKYL-(C_{12}-C_{18})-DIMETHYL-AMMONIUM and 2-PROPANOL	3175	4.1	
DIALLYLAMINE	2359	3	
DIALLYL ETHER	2360	3	
4,4'-DIAMINODIPHENYL-METHANE	2651	6.1	
1,2-Diaminoethane, see	1604	8	
Diaminopropylamine, see	2269	8	
DI-n-AMYLAMINE	2841	3	
DIAZODINITROPHENOL, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	0074	1	
Dibenzopyridine, see	2713	6.1	
DIBENZYLDICHLOROSILANE	2434	8	
DIBORANE	1911	2	
1,2-DIBROMOBUTAN-3-ONE	2648	6.1	
DIBROMOCHLOROPROPANES	2872	6.1	
1,2-Dibromo-3-chloropropane, see	2872	6.1	
DIBROMODIFLUOROMETHANE	1941	9	

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Name and description	UN No.	Class	Remarks
DIBROMOMETHANE	2664	6.1	
DI-n-BUTYLAMINE	2248	8	
DIBUTYLAMINOETHANOL	2873	6.1	
2-Dibutylaminoethanol, see	2873	6.1	
N,N-Di-n-butylaminoethanol, see	2873	6.1	
DIBUTYL ETHERS	1149	3	
DICHLOROACETIC ACID	1764	8	
1,3-DICHLOROACETONE	2649	6.1	
DICHLOROACETYL CHLORIDE	1765	8	
DICHLOROANILINES, LIQUID	1590	6.1	
DICHLOROANILINES, SOLID	3442	6.1	
o-DICHLOROBENZENE	1591	6.1	
2,2'-DICHLORODIETHYL ETHER	1916	6.1	
DICHLORODIFLUORO-METHANE	1028	2	
DICHLORODIFLUORO-METHANE AND 1,1-DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane	2602	2	
Dichlorodifluoromethane and ethylene oxide mixture, see	3070	2	
DICHLORODIMETHYL ETHER, SYMMETRICAL	2249	6.1	Carriage prohi-bited
1,1-DICHLOROETHANE	2362	3	
1,2-Dichloroethane, see	1184	3	
1,2-DICHLOROETHYLENE	1150	3	
Di(2-chloroethyl) ether, see	1916	6.1	
DICHLOROFLUOROMETHANE	1029	2	
alpha-Dichlorohydrin, see	2750	6.1	
DICHLOROISOCYANURIC ACID, DRY	2465	5.1	
DICHLOROISOCYANURIC ACID SALTS	2465	5.1	
DICHLOROISOPROPYL ETHER	2490	6.1	
DICHLOROMETHANE	1593	6.1	
1,1-DICHLORO-1-NITROETHANE	2650	6.1	
DICHLOROPENTANES	1152	3	
Dichlorophenol, see	2020 2021	6.1 6.1	
DICHLOROPHENYL ISOCYANATES	2250	6.1	
DICHLOROPHENYLTRI-CHLOROSILANE	1766	8	
1,2-DICHLOROPROPANE	1279	3	
1,3-DICHLORO-PROPANOL-2	2750	6.1	
1,3-Dichloro-2-propanone, see	2649	6.1	
DICHLOROPROPENES	2047	3	
DICHLOROSILANE	2189	2	
1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE	1958	2	
Dichloro-s-triazine-2,4,6-trione, see	2465	5.1	
1,4-Dicyanobutane, see	2205	6.1	
Dicycloheptadiene, see	2251	3	
DICYCLOHEXYLAMINE	2565	8	
Dicyclohexylamine nitrite, see	2687	4.1	
DICYCLOHEXYLAMMONIUM NITRITE	2687	4.1	
DICYCLOPENTADIENE	2048	3	
1,2-DI-(DIMETHYLAMINO) ETHANE	2372	3	
DIDYMIUM NITRATE	1465	5.1	
DIESEL FUEL	1202	3	
1,1-Diethoxyethane, see	1088	3	
1,2-Diethoxyethane, see	1153	3	
DIETHOXYMETHANE	2373	3	
3,3-DIETHOXYPROPENE	2374	3	
DIETHYLAMINE	1154	3	
2-DIETHYLAMINOETHANOL	2686	8	
3-DIETHYL-AMINOPROPYLAMINE	2684	3	
N,N-DIETHYLANILINE	2432	6.1	
DIETHYLBENZENE	2049	3	
Diethylcarbinol, see	1105	3	
DIETHYL CARBONATE	2366	3	

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DIETHYLDICHLOROSILANE	1767	8	
Diethylenediamine, see	2579	8	
DIETHYLENEGLYCOL DINITRATE, DESENSITIZED with not less than 25% non-volatile, water-insoluble phlegmatizer, by mass	0075	1	
DIETHYLENETRIAMINE	2079	8	
N,N-Diethylethanolamine, see	2686	3	
DIETHYL ETHER	1155	3	
N,N-DIETHYLETHYLENE-DIAMINE	2685	8	
Di-(2-ethylhexyl) phosphoric acid, see	1902	8	
DIETHYL KETONE	1156	3	
DIETHYL SULPHATE	1594	6.1	
DIETHYL SULPHIDE	2375	3	
DIETHYLTHIOPHOSPHORYL CHLORIDE	2751	8	
Diethylzinc, see	3394	4.2	
2,4-Difluoroaniline, see	2941	6.1	
Difluorochloroethane, see	2517	2	
1,1-DIFLUOROETHANE	1030	2	
1,1-DIFLUOROETHYLENE	1959	2	
DIFLUOROMETHANE	3252	2	
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 10% difluoromethane and 70% pentafluoroethane, see	3339	2	
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 20% difluoromethane and 40% pentafluoroethane, see	3338	2	
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 23% difluoromethane and 25% pentafluoroethane, see	3340	2	
DIFLUOROPHOSPHORIC ACID, ANHYDROUS	1768	8	
2,3-DIHYDROPYRAN	2376	3	
DIISOBUTYLAMINE	2361	3	
DIISOBUTYLENE, ISOMERIC COMPOUNDS	2050	3	
alpha-Diisobutylene, see	2050	3	
beta-Diisobutylene, see	2050	3	
DIISOBUTYL KETONE	1157	3	
DIISOOCTYL ACID PHOSPHATE	1902	8	
DIISOPROPYLAMINE	1158	3	
DIISOPROPYL ETHER	1159	3	
DIKETENE, STABILIZED	2521	6.1	
1,1-DIMETHOXYETHANE	2377	3	
1,2-DIMETHOXYETHANE	2252	3	
Dimethoxystrychnine, see	1570	6.1	
DIMETHYLAMINE, ANHYDROUS	1032	2	
DIMETHYLAMINE AQUEOUS SOLUTION	1160	3	
2-DIMETHYLAMINO-ACETONITRILE	2378	3	
2-DIMETHYLAMINOETHANOL	2051	8	
2-DIMETHYLAMINOETHYL ACRYLATE, STABILIZED	3302	6.1	
2-DIMETHYLAMINOETHYL METHACRYLATE	2522	6.1	
N,N-DIMETHYLANILINE	2253	6.1	
Dimethylarsenic acid, see	1572	6.1	
N,N-Dimethylbenzylamine, see	2619	8	
2,3-DIMETHYLBUTANE	2457	3	
1,3-DIMETHYLBUTYLAMINE	2379	3	
DIMETHYLCARBAMOYL CHLORIDE	2262	8	
DIMETHYL CARBONATE	1161	3	
DIMETHYLCYCLOHEXANES	2263	3	
N,N-DIMETHYLCYCLO-HEXYLAMINE	2264	8	
DIMETHYLDICHLOROSILANE	1162	3	
DIMETHYLDIETHOXYSILANE	2380	3	
DIMETHYLDIOXANES	2707	3	

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DIMETHYL DISULPHIDE	2381	3	
Dimethylethanolamine, see	2051	8	
DIMETHYL ETHER	1033	2	
N,N-DIMETHYLFORMAMIDE	2265	3	
DIMETHYLHYDRAZINE, SYMMETRICAL	2382	6.1	
DIMETHYLHYDRAZINE, UNSYMMETRICAL	1163	6.1	
1,1-Dimethylhydrazine, see	1163	6.1	
N,N-Dimethyl-4-nitrosoaniline, see	1369	4.2	
2,2-DIMETHYLPROPANE	2044	2	
DIMETHYL-N-PROPYLAMINE	2266	3	
DIMETHYL SULPHATE	1595	6.1	
DIMETHYL SULPHIDE	1164	3	
DIMETHYL THIOPHOSPHORYL CHLORIDE	2267	6.1	
Dimethylzinc, see	3394	4.2	
DINGU, see	0489	1	
DINITROANILINES	1596	6.1	
DINITROBENZENES, LIQUID	1597	6.1	
DINITROBENZENES, SOLID	3443	6.1	
Dinitrochlorobenzene, see	1577 3441	6.1 6.1	
DINITRO-o-CRESOL	1598	6.1	
DINITROGEN TETROXIDE	1067	2	
DINITROGLYCOLURIL	0489	1	
DINITROPHENOL, dry or wetted with less than 15% water, by mass	0076	1	
DINITROPHENOL SOLUTION	1599	6.1	
DINITROPHENOL, WETTED with not less than 15% water, by mass	1320	4.1	
DINITROPHENOLATES, alkali metals, dry or wetted with less than 15% water, by mass	0077	1	
DINITROPHENOLATES, WETTED with not less than 15% water, by mass	1321	4.1	
DINITRORESORCINOL, dry or wetted with less than 15% water, by mass	0078	1	
DINITRORESORCINOL, WETTED with not less than 15% water, by mass	1322	4.1	
DINITROSOBENZENE	0406	1	
Dinitrotoluene mixed with sodium chlorate, see	0083	1	
DINITROTOLUENES, LIQUID	2038	6.1	
DINITROTOLUENES, MOLTEN	1600	6.1	
DINITROTOLUENES, SOLID	3454	6.1	
DIOXANE	1165	3	
DIOXOLANE	1166	3	
DIPENTENE	2052	3	
DIPHENYLAMINE CHLOROARSINE	1698	6.1	
DIPHENYLCHLOROARSINE, LIQUID	1699	6.1	
DIPHENYLCHLOROARSINE, SOLID	3450	6.1	
DIPHENYLDICHLOROSILANE	1769	8	
DIPHENYLMETHANE-4, 4'-DIISOCYANATE	9004	9	Dangerous in tank vessels only
DIPHENYLMETHYL BROMIDE	1770	8	
DIPICRYLAMINE, see	0079	1	
DIPICRYL SULPHIDE, dry or wetted with less than 10% water, by mass	0401	1	
DIPICRYL SULPHIDE, WETTED with not less than 10% water, by mass	2852	4.1	
DIPROPYLAMINE	2383	3	
Dipropylene triamine, see	2269	8	
DI-n-PROPYL ETHER	2384	3	
DIPROPYL KETONE	2710	3	
DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	1903	8	
DISINFECTANT, LIQUID, TOXIC, N.O.S.	3142	6.1	
DISINFECTANT, SOLID, TOXIC, N.O.S.	1601	6.1	
DISODIUM TRIOXOSILICATE	3253	8	

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DIVINYL ETHER, STABILIZED	1167	3	
DODECYLTRICHLOROSILANE	1771	8	
Dry ice, see	1845	9	Not subject to ADN
DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	2801	8	
DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	1602	6.1	
DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	3147	8	
DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	3143	6.1	
DYE, LIQUID, CORROSIVE, N.O.S.	2801	8	
DYE, LIQUID, TOXIC, N.O.S.	1602	6.1	
DYE, SOLID, CORROSIVE, N.O.S.	3147	8	
DYE, SOLID, TOXIC, N.O.S.	3143	6.1	
Dynamite, see	0081	1	
Electric storage batteries, see	2794 2795 2800 3028	8 8 8 8	
Electrolyte (acid or alkaline) for batteries, see	2796 2797	8 8	
ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash-point (including molten metals, molten salts, etc.)	3257	9	
ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point and below 100°C	3256	3	
ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point and at or above 100°C	3256	3	
ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C	3258	9	
Empty battery-vehicle, uncleaned			See 4.3.2.4 of ADR, 5.1.3 and 5.4.1.1.6
Empty IBC, uncleaned			See 4.1.1.11 of ADR, 5.1.3 and 5.4.1.1.6
Empty large packaging, uncleaned			See 4.1.1.11 of ADR, 5.1.3 and 5.4.1.1.6
Empty MEGC, uncleaned			See 4.3.2.4 of ADR, 5.1.3 and 5.4.1.1.6
Empty packaging, uncleaned			See 4.1.1.11 of ADR, 5.1.3 and 5.4.1.1.6
Empty receptacle, uncleaned			See 5.1.3 and 5.4.1.1.6
Empty tank, uncleaned			See 4.3.2.4 of ADR, 5.1.3 and 5.4.1.1.6
Empty vehicle, uncleaned			See 5.1.3 and 5.4.1.1.6
Enamel, see	1263 3066 3469 3470	3 8 3 8	
ENGINE, FUEL CELL, FLAMMABLE GAS POWERED	3529	2.1	
ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED	3528	3	
ENGINE, INTERNAL COMBUSTION	3530	9	
ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED	3529	2.1	
ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED	3528	3	
Engines, rocket, see	0250 0322	1 1	
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	3082	9	

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Name and description	UN No.	Class	Remarks
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	3077	9	
EPIBROMOHYDRIN	2558	6.1	
EPICHLOROHYDRIN	2023	6.1	
1,2-Epoxybutane, stabilized, see	3022	3	
Epoxyethane, see	1040	2	
1,2-EPOXY-3-ETHOXYPROPANE	2752	3	
2,3-Epoxy-1-propanal, see	2622	3	
2,3-Epoxypropyl ethyl ether, see	2752	3	
ESTERS, N.O.S.	3272	3	
Ethanal, see	1089	3	
ETHANE	1035	2	
ETHANE, REFRIGERATED LIQUID	1961	2	
Ethanethiol, see	2363	3	
ETHANOL	1170	3	
ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 10% ethanol	3475	3	
ETHANOL SOLUTION	1170	3	
ETHANOLAMINE	2491	8	
ETHANOLAMINE SOLUTION	2491	8	
Ether, see	1155	3	
ETHERS, N.O.S.	3271	3	
2-Ethoxyethanol, see	1171	3	
2-Ethoxyethyl acetate, see	1172	3	
Ethoxy propane-1, see	2615	3	
ETHYL ACETATE	1173	3	
ETHYLACETYLENE, STABILIZED	2452	2	
ETHYL ACRYLATE, STABILIZED	1917	3	
ETHYL ALCOHOL, see	1170	3	
ETHYL ALCOHOL SOLUTION, see	1170	3	
ETHYLAMINE	1036	2	
ETHYLAMINE, AQUEOUS SOLUTION with not less than 50% but not more than 70% ethylamine	2270	3	
ETHYL AMYL KETONE	2271	3	
N-ETHYLANILINE	2272	6.1	
2-ETHYLANILINE	2273	6.1	
ETHYLBENZENE	1175	3	
N-ETHYL-N-BENZYLANILINE	2274	6.1	
N-ETHYLBENZYLTOLUIDINES, LIQUID	2753	6.1	
N-ETHYLBENZYLTOLUIDINES, SOLID	3460	6.1	
ETHYL BORATE	1176	3	
ETHYL BROMIDE	1891	6.1	
ETHYL BROMOACETATE	1603	6.1	
2-ETHYLBUTANOL	2275	3	
2-ETHYLBUTYL ACETATE	1177	3	
ETHYL BUTYL ETHER	1179	3	
2-ETHYLBUTYRALDEHYDE	1178	3	
ETHYL BUTYRATE	1180	3	
ETHYL CHLORIDE	1037	2	
ETHYL CHLOROACETATE	1181	6.1	
Ethyl chlorocarbonate, see	1182	6.1	
ETHYL CHLOROFORMATE	1182	6.1	
ETHYL 2-CHLOROPROPIONATE	2935	3	
Ethyl-alpha-chloropropionate, see	2935	3	
ETHYL CHLOROTHIOFORMATE	2826	8	
ETHYL CROTONATE	1862	3	
ETHYLDICHLOROARSINE	1892	6.1	
ETHYLDICHLOROSILANE	1183	4.3	
ETHYLENE, ACETYLENE AND PROPYLENE MIXTURE, REFRIGERATED LIQUID containing at least 71.5% ethylene with not more than 22.5% acetylene and not more than 6% propylene	3138	2	
ETHYLENE CHLOROHYDRIN	1135	6.1	
ETHYLENE	1962	2	

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Name and description	UN No.	Class	Remarks
ETHYLENEDIAMINE	1604	8	
ETHYLENE DIBROMIDE	1605	6.1	
Ethylene dibromide and methyl bromide, liquid mixture, see	1647	6.1	
ETHYLENE DICHLORIDE	1184	3	
ETHYLENE GLYCOL DIETHYL ETHER	1153	3	
ETHYLENE GLYCOL MONOETHYL ETHER	1171	3	
ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	1172	3	
ETHYLENE GLYCOL MONOMETHYL ETHER	1188	3	
ETHYLENE GLYCOL MONOMETHYL ETHER ACETATE	1189	3	
ETHYLENEIMINE, STABILIZED	1185	6.1	
ETHYLENE OXIDE	1040	2	
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	3300	2	
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% but not more than 87% ethylene oxide	1041	2	
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	1952	2	
ETHYLENE OXIDE AND CHLOROTETRAFLUORO-ETHANE MIXTURE with not more than 8.8% ethylene oxide	3297	2	
ETHYLENE OXIDE AND DICHLORODIFLUORO-METHANE MIXTURE with not more than 12.5% ethylene oxide	3070	2	
ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not more than 7.9% ethylene oxide	3298	2	
ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide	2983	3	
ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not more than 5.6% ethylene oxide	3299	2	
ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 °C	1040	2	
ETHYLENE, REFRIGERATED LIQUID	1038	2	
ETHYL ETHER, see	1155	3	
ETHYL FLUORIDE	2453	2	
ETHYL FORMATE	1190	3	
2-ETHYLHEXYLAMINE	2276	3	
2-ETHYLHEXYL CHLOROFORMATE	2748	6.1	
Ethylidene chloride, see	2362	3	
ETHYL ISOBUTYRATE	2385	3	
ETHYL ISOCYANATE	2481	6.1	
ETHYL LACTATE	1192	3	
ETHYL MERCAPTAN	2363	3	
ETHYL METHACRYLATE, STABILIZED	2277	3	
ETHYL METHYL ETHER	1039	2	
ETHYL METHYL KETONE	1193	3	
ETHYL NITRITE SOLUTION	1194	3	
ETHYL ORTHOFORMATE	2524	3	
ETHYL OXALATE	2525	6.1	
ETHYLPHENYL-DICHLOROSILANE	2435	8	
1-ETHYLPIPERIDINE	2386	3	
ETHYL PROPIONATE	1195	3	
ETHYL PROPYL ETHER	2615	3	
Ethyl silicate, see	1292	3	
Ethyl sulphate, see	1594	6.1	
N-ETHYLTOLUIDINES	2754	6.1	
ETHYLTRICHLOROSILANE	1196	3	
EXPLOSIVE, BLASTING, TYPE A	0081	1	
EXPLOSIVE, BLASTING, TYPE B	0082 0331	1 1	
EXPLOSIVE, BLASTING, TYPE C	0083	1	

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Name and description	UN No.	Class	Remarks
EXPLOSIVE, BLASTING, TYPE D	0084	1	
EXPLOSIVE, BLASTING, TYPE E	0241 0332	1 1	
Explosives, emulsion, see	0241 0332	1 1	
Explosive, seismic, see	0081 0082 0083 0331	1 1 1 1	
Explosive, slurry, see	0241 0332	1 1	
Explosive, water gel, see	0241 0332	1 1	
EXTRACTS, AROMATIC, LIQUID	1169	3	
EXTRACTS, FLAVOURING, LIQUID	1197	3	
FABRICS, ANIMAL, N.O.S. with oil	1373	4.2	
FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	1353	4.1	
FABRICS, SYNTHETIC, N.O.S. with oil	1373	4.2	
FABRICS, VEGETABLE, N.O.S. with oil	1373	4.2	
FERRIC ARSENATE	1606	6.1	
FERRIC ARSENITE	1607	6.1	
FERRIC CHLORIDE, ANHYDROUS	1773	8	
FERRIC CHLORIDE SOLUTION	2582	8	
FERRIC NITRATE	1466	5.1	
FERROCERIUM	1323	4.1	
FERROSILICON with 30% or more but less than 90% silicon	1408	4.3	
FERROUS ARSENATE	1608	6.1	
FERROUS METAL BORINGS in a form liable to self-heating	2793	4.2	
FERROUS METAL CUTTINGS in a form liable to self-heating	2793	4.2	
FERROUS METAL SHAVINGS in a form liable to self-heating	2793	4.2	
FERROUS METAL TURNINGS in a form liable to self-heating	2793	4.2	
FERTILIZER AMMONIATING SOLUTION with free ammonia	1043	2	
Fertilizer with ammonium nitrate, n.o.s., see	2067	5.1	
Fibres, animal, burnt, wet or damp	1372	4.2	Not subject to ADN
FIBRES, ANIMAL, N.O.S. with oil	1373	4.2	
FIBRES IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	1353	4.1	
FIBRES, SYNTHETIC, N.O.S. with oil	1373	4.2	
Fibres, vegetable, burnt, wet or damp	1372	4.2	Not subject to ADN
Fibres, vegetable, dry	3360	4.1	Not subject to ADN
FIBRES, VEGETABLE, N.O.S. with oil	1373	4.2	
Filler, liquid, see	1263 3066 3469 3470	3 8 3 8	
Films, nitrocellulose base, from which gelatin has been removed; film scrap, see	2002	4.2	
FILMS, NITROCELLULOSE BASE, gelatin coated, except scrap	1324	4.1	
FIRE EXTINGUISHER CHARGES, corrosive liquid	1774	8	
Fire extinguisher charges, expelling, explosive, see	0275 0276 0323 0381	1 1 1 1	
FIRE EXTINGUISHERS with compressed or liquefied gas	1044	2	
FIRELIGHTERS, SOLID with flammable liquid	2623	4.1	
FIREWORKS	0333 0334 0335 0336 0337	1 1 1 1 1	See 2.2.1.1.7
FIRST AID KIT	3316	9	
FISH MEAL, STABILIZED	2216	9	
FISH MEAL, UNSTABILIZED	1374	4.2	

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Name and description	UN No.	Class	Remarks
FISH SCRAP, STABILIZED, see	2216	9	
FISH SCRAP, UNSTABILIZED, see	1374	4.2	
Flammable gas in lighters, see	1057	2	
FLAMMABLE LIQUID, N.O.S	1993	3	
FLAMMABLE LIQUID, CORROSIVE, N.O.S.	2924	3	
FLAMMABLE LIQUID, TOXIC, N.O.S.	1992	3	
FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3286	3	
FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	3180	4.1	
FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	2925	4.1	
FLAMMABLE SOLID, INORGANIC, N.O.S.	3178	4.1	
FLAMMABLE SOLID, ORGANIC, N.O.S.	1325	4.1	
FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	3176	4.1	
FLAMMABLE SOLID, OXIDIZING, N.O.S.	3097	4.1	Carriage prohi-bited
FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	3179	4.1	
FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	2926	4.1	
FLARES, AERIAL	0093	1	
	0403	1	
	0404	1	
	0420	1	
	0421	1	
Flares, aeroplane, see	0093	1	
	0403	1	
	0404	1	
	0420	1	
	0421	1	
Flares, highway,	0191	1	
Flares, distress, small,	0373	1	
Flares, railway or highway, see			
FLARES, SURFACE	0092	1	
	0418	1	
	0419	1	
Flares, water-activated, see	0248	1	
	0249	1	
FLASH POWDER	0094	1	
	0305	1	
Flue dusts, toxic, see	1562	6.1	
Fluoric acid, see	1790	8	
FLUORINE, COMPRESSED	1045	2	
FLUOROACETIC ACID	2642	6.1	
FLUOROANILINES	2941	6.1	
2-Fluoroaniline, see	2941	6.1	
4-Fluoroaniline, see	2941	6.1	
o-Fluoroaniline, see	2941	6.1	
p-Fluoroaniline, see	2941	6.1	
FLUOROBENZENE	2387	3	
FLUOROBORIC ACID	1775	8	
Fluoroethane, see	2453	2	
Fluoroform, see	1984	2	
Fluoromethane, see	2454	2	
FLUOROPHOSPHORIC ACID, ANHYDROUS	1776	8	
FLUOROSILICATES, N.O.S.	2856	6.1	
FLUOROSILICIC ACID	1778	8	
FLUOROSULPHONIC ACID	1777	8	
FLUOROTOLUENES	2388	3	
FORMALDEHYDE SOLUTION with not less than 25% formaldehyde	2209	8	
FORMALDEHYDE SOLUTION, FLAMMABLE	1198	3	
Formalin, see	1198	3	
	2209	8	
Formamidine sulphinic acid, see	3341	4.2	
FORMIC ACID with more than 85% acid by mass	1779	8	
FORMIC ACID with not more than 85% acid by mass	3412	8	
Formic aldehyde, see	1198	3	
	2209	8	
2-Formyl-3,4-dihydro-2H-pyran, see	2607	3	
FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells	0099	1	
FUEL, AVIATION, TURBINE ENGINE	1863	3	

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FUEL CELL CARTRIDGES	3478	2	
	3479	2	
	3473	3	
	3476	4.3	
	3477	8	
FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT	3478	2	
	3479	2	
	3473	3	
	3476	4.3	
	3477	8	
FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT	3478	2	
	3479	2	
	3473	3	
	3476	4.3	
	3477	8	
Fumaroyl dichloride, see	1780	3	
FUMARYL CHLORIDE	1780	8	
FUMIGATED CARGO TRANSPORT UNIT	3359	9	
FURALDEHYDES	1199	6.1	
FURAN	2389	3	
FURFURYL ALCOHOL	2874	6.1	
FURFURYLAMINE	2526	3	
Furyl carbinol, see	2874	6.1	
FUSE, DETONATING, metal clad	0102	1	
	0290	1	
FUSE, DETONATING, MILD EFFECT, metal clad	0104	1	
FUSE, IGNITER, tubular, metal clad	0103	1	
FUSE, NON-DETONATING	0101	1	
FUSEL OIL	1201	3	
FUSE, SAFETY	0105	1	
Fuze, combination, percussion or time, see	0106	1	
	0107	1	
	0257	1	
	0316	1	
	0317	1	
	0367	1	
	0368	1	
FUZES, DETONATING	0106	1	
	0107	1	
	0257	1	
	0367	1	
FUZES, DETONATING with protective features	0408	1	
	0409	1	
	0410	1	
FUZES, IGNITING	0316	1	
	0317	1	
	0368	1	
GALLIUM	2803	8	
GAS CARTRIDGES without a release device, non-refillable, see	2037	2	
Gas drips, hydrocarbon, see	3295	3	
GAS OIL	1202	3	
GASOLINE	1203	3	
Gasoline and ethanol mixture, with more than 10% ethanol, see	3475	3	
Gasoline, casinghead, see	1203	3	
GAS, REFRIGERATED LIQUID, N.O.S.	3158	2	
GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.	3312	2	
GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.	3311	2	
GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid	3167	2	
GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid	3169	2	
GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid	3168	2	
Gelatin, blasting, see	0081	1	
Gelatin, dynamites, see	0081	1	
GENETICALLY MODIFIED MICROORGANISMS	3245	9	
GENETICALLY MODIFIED ORGANISMS	3245	9	
GERMANE	2192	2	
GERMANE, ADSORBED	3523	2	
Germanium hydride, see	2192	2	
Glycer-1,3-dichlorohydrin, see	2750	6.1	
GLYCEROL alpha-MONOCHLOROHYDRIN	2689	6.1	
Glyceryl trinitrate, see	0143	1	
	0144	1	
	1204	3	
	3064	3	

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GLYCIDALDEHYDE	2622	3	
GRENADES, hand or rifle, with bursting charge	0284	1	
	0285	1	
	0292	1	
	0293	1	
Grenades, illuminating, see	0171	1	
	0254	1	
	0297	1	
GRENADES, PRACTICE, hand or rifle	0110	1	
	0318	1	
	0372	1	
	0452	1	
Grenades, smoke, see	0015	1	
	0016	1	
	0245	1	
	0246	1	
	0303	1	
GUANIDINE NITRATE	1467	5.1	
GUANYLNITROSAMINO-GUANYLIDENE HYDRAZINE, WETTED with not less than 30% water, by mass	0113	1	
GUANYLNITROSAMINO-GUANYLTETRAZENE, WETTED with not less than 30% water, or mixture of alcohol and water, by mass	0114	1	
GUNPOWDER, COMPRESSED, see	0028	1	
GUNPOWDER, granular or as a meal, see	0027	1	
GUNPOWDER, IN PELLETS, see	0028	1	
Gutta percha solution, see	1287	3	
HAFNIUM POWDER, DRY	2545	4.2	
HAFNIUM POWDER, WETTED with not less than 25% water	1326	4.1	
HALOGENATED MONOMETHYLDIPHENYL-METHANES, LIQUID	3151	9	
HALOGENATED MONOMETHYLDIPHENYL-METHANES, SOLID	3152	9	
Hay	1327	4.1	Not subject to ADN
HEATING OIL, LIGHT	1202	3	
Heavy hydrogen, see	1957	2	
HELIUM, COMPRESSED	1046	2	
HELIUM, REFRIGERATED LIQUID	1963	2	
HEPTAFLUOROPROPANE	3296	2	
n-HEPTALDEHYDE	3056	3	
n-Heptanal, see	3056	3	
HEPTANES	1206	3	
4-Heptanone, see	2710	3	
n-HEPTENE	2278	3	
HEXACHLOROACETONE	2661	6.1	
HEXACHLOROBENZENE	2729	6.1	
HEXACHLOROBUTADIENE	2279	6.1	
Hexachloro-1,3-butadiene, see	2279	6.1	
HEXACHLOROCYCLO-PENTADIENE	2646	6.1	
HEXACHLOROPHENE	2875	6.1	
Hexachloro-2-propanone, see	2661	6.1	
HEXADECYLTRICHLORO-SILANE	1781	8	
HEXADIENES	2458	3	
HEXAETHYL TETRAPHOSPHATE	1611	6.1	
HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	1612	2	
HEXAFLUOROACETONE	2420	2	
HEXAFLUOROACETONE HYDRATE, LIQUID	2552	6.1	
HEXAFLUOROACETONE HYDRATE, SOLID	3436	6.1	
HEXAFLUOROETHANE	2193	2	
HEXAFLUOROPHOSPHORIC ACID	1782	8	
HEXAFLUOROPROPYLENE	1858	2	
Hexahydrocresol, see	2617	3	
Hexahydromethyl phenol, see	2617	3	
HEXALDEHYDE	1207	3	
HEXAMETHYLENEDIAMINE, SOLID	2280	8	

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Name and description	UN No.	Class	Remarks
HEXAMETHYLENEDIAMINE SOLUTION	1783	8	
HEXAMETHYLENE DIISOCYANATE	2281	6.1	
HEXAMETHYLENEIMINE	2493	3	
HEXAMETHYLENETETRAMINE	1328	4.1	
Hexamine, see	1328	4.1	
HEXANES	1208	3	
HEXANITRODIPHENYLAMINE	0079	1	
HEXANITROSTILBENE	0392	1	
Hexanoic acid, see	2829	8	
HEXANOLS	2282	3	
1-HEXENE	2370	3	
HEXOGEN AND CYCLOTETRA-METHYLENE-TETRANITRAMINE MIXTURE, WETTED with not less than 15% water, by mass or DESENSITIZED with not less than 10% phlegmatiser by mass, see	0391	1	
HEXOGEN, DESENSITIZED, see	0483	1	
HEXOGEN, WETTED with not less than 15% water, by mass, see	0072	1	
HEXOLITE, dry or wetted with less than 15% water, by mass	0118	1	
HEXOTOL, dry or wetted with less than 15% water, by mass, see	0118	1	
HEXOTONAL	0393	1	
HEXOTONAL, cast, see	0393	1	
HEXYL, see	0079	1	
HEXYLTRICHLOROSILANE	1784	8	
HMX, see	0391	1	
HMX, DESENSITIZED, see	0484	1	
HMX, WETTED with not less than 15% water, by mass, see	0226	1	
HYDRAZINE, ANHYDROUS	2029	8	
HYDRAZINE AQUEOUS SOLUTION, with more than 37% hydrazine by mass	2030	8	
HYDRAZINE, AQUEOUS SOLUTION with not more than 37% hydrazine, by mass	3293	6.1	
HYDRAZINE AQUEOUS SOLUTION, FLAMMABLE with more than 37% hydrazine, by mass	3484	8	
Hydrides, metal, water-reactive, n.o.s., see	1409	4.3	
Hydriodic acid, anhydrous, see	2197	2	
HYDRIODIC ACID	1787	8	
HYDROBROMIC ACID	1788	8	
HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	1964	2	
HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S. such as mixtures A, A01, A02, A0, A1, B1, B2, B or C	1965	2	
HYDROCARBON GAS REFILLS FOR SMALL DEVICES with release device	3150	2	
HYDROCARBONS, LIQUID, N.O.S.	3295	3	
HYDROCHLORIC ACID	1789	8	
HYDROCYANIC ACID, AQUEOUS SOLUTION with not more than 20% hydrogen cyanide	1613	6.1	
HYDROFLUORIC ACID with more than 60% but not more than 85% hydrogen fluoride	1790	8	
HYDROFLUORIC ACID with more than 85% hydrogen fluoride	1790	8	
HYDROFLUORIC ACID with not more than 60% hydrogen fluoride	1790	8	
HYDROFLUORIC ACID AND SULPHURIC ACID MIXTURE	1786	8	
Hydrofluoroboric acid, see	1775	8	
Hydrofluorosilicic acid, see	1778	8	
HYDROGEN AND METHANE MIXTURE, COMPRESSED	2034	2	
Hydrogen arsenide, see	2188	2	
HYDROGEN BROMIDE, ANHYDROUS	1048	2	
Hydrogen bromide solution, see	1788	8	
HYDROGEN CHLORIDE, ANHYDROUS	1050	2	
HYDROGEN CHLORIDE, REFRIGERATED LIQUID	2186	2	Carriage prohi-bited

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Name and description	UN No.	Class	Remarks
HYDROGEN, COMPRESSED	1049	2	
HYDROGEN CYANIDE, AQUEOUS SOLUTION with not more than 20% hydrogen cyanide, see	1613	6.1	
HYDROGEN CYANIDE, SOLUTION IN ALCOHOL with not more than 45% hydrogen cyanide	3294	6.1	
HYDROGEN CYANIDE, STABILIZED containing less than 3% water	1051	6.1	
HYDROGEN CYANIDE, STABILIZED, containing less than 3% water and absorbed in a porous inert material	1614	6.1	
HYDROGENDIFLUORIDES, SOLID, N.O.S.	1740	8	
HYDROGENDIFLUORIDES SOLUTION, N.O.S.	3471	8	
HYDROGEN FLUORIDE, ANHYDROUS	1052	8	
Hydrogen fluoride solution, see	1790	8	
HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM	3468	2	
HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM CONTAINED IN EQUIPMENT	3468	2	
HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM PACKED WITH EQUIPMENT	3468	2	
HYDROGEN IODIDE, ANHYDROUS	2197	2	
Hydrogen iodide solution, see	1787	8	
HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE with acid(s), water and not more than 5% peroxyacetic acid, STABILIZED	3149	5.1	
HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)	2984	5.1	
HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)	2014	5.1	
HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED with more than 60% hydrogen peroxide and not more than 70% hydrogen peroxide	2015	5.1	
HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED with more than 70% hydrogen peroxide	2015	5.1	
HYDROGEN, REFRIGERATED LIQUID	1966	2	
HYDROGEN SELENIDE, ADSORBED	3526	2	
HYDROGEN SELENIDE, ANHYDROUS	2202	2	
Hydrogen silicide, see	2203	2	
HYDROGEN SULPHIDE	1053	2	
Hydroselenic acid, see	2202	2	
Hydrosilicofluoric acid, see	1778	8	
1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, dry or wetted with less than 20% water, by mass	0508	1	
1-HYDROXYBENZOTRIAZOLE MONOHYDRATE	3474	4.1	
3-Hydroxybutan-2-one, see	2621	3	
HYDROXYLAMINE SULPHATE	2865	8	
1-Hydroxy-3-methyl-2-penten-4-yne, see	2705	8	
3-Hydroxyphenol, see	2876	6.1	
HYPOCHLORITES, INORGANIC, N.O.S.	3212	5.1	
HYPOCHLORITE SOLUTION	1791	8	
IGNITERS	0121	1	
	0314	1	
	0315	1	
	0325	1	
	0454	1	
3,3'-IMINODIPROPYLAMINE	2269	8	
India rubber, see	1287	3	
INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only	2900	6.2	
INFECTIOUS SUBSTANCE, AFFECTING HUMANS	2814	6.2	

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Name and description	UN No.	Class	Remarks
Ink, printer's, flammable, see	1210	3	
INSECTICIDE GAS, N.O.S.	1968	2	
INSECTICIDE GAS, FLAMMABLE, N.O.S.	3354	2	
INSECTICIDE GAS, TOXIC, N.O.S.	1967	2	
INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	3355	2	
IODINE MONOCHLORIDE SOLIDE	1792	8	
IODINE MONOCHLORIDE, LIQUID	3498	8	
IODINE PENTAFLUORIDE	2495	5.1	
2-IODOBUTANE	2390	3	
Iodomethane, see	2644	6.1	
IODOMETHYLPROPANES	2391	3	
IODOPROPANES	2392	3	
alpha-Iodotoluene, see	2653	6.1	
I.p.d.i., see	2290	6.1	
Iron chloride, anhydrous, see	1773	8	
Iron (III) chloride, anhydrous, see	1773	8	
Iron chloride solution, see	2582	8	
IRON OXIDE, SPENT obtained from coal gas purification	1376	4.2	
IRON PENTACARBONYL	1994	6.1	
Iron perchloride, anhydrous, see	1773	8	
Iron powder, pyrophoric, see	1383	4.2	
Iron sesquichloride, anhydrous, see	1773	8	
IRON SPONGE, SPENT obtained from coal gas purification	1376	4.2	
Iron swarf, see	2793	4.2	
ISOBUTANE	1969	2	
ISOBUTANOL	1212	3	
Isobutene, see	1055	2	
ISOBUTYL ACETATE	1213	3	
ISOBUTYL ACRYLATE, STABILIZED	2527	3	
ISOBUTYL ALCOHOL, see	1212	3	
ISOBUTYL ALDEHYDE, see	2045	3	
ISOBUTYLAMINE	1214	3	
ISOBUTYLENE	1055	2	
ISOBUTYL FORMATE	2393	3	
ISOBUTYL ISOBUTYRATE	2528	3	
ISOBUTYL ISOCYANATE	2486	6.1	
ISOBUTYL METHACRYLATE, STABILIZED	2283	3	
ISOBUTYL PROPIONATE	2394	3	
ISOBUTYRALDEHYDE	2045	3	
ISOBUTYRIC ACID	2529	3	
ISOBUTYRONITRILE	2284	3	
ISOBUTYRYL CHLORIDE	2395	3	
ISOCYANATES, FLAMMABLE, TOXIC, N.O.S.	2478	3	
ISOCYANATES, TOXIC, N.O.S.	2206	6.1	
ISOCYANATES, TOXIC, FLAMMABLE, N.O.S.	3080	6.1	
ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.	2478	3	
ISOCYANATE SOLUTION, TOXIC, N.O.S.	2206	6.1	
ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.	3080	6.1	
ISOCYANATO-BENZOTRIFLUORIDES	2285	6.1	
3-Isocyanatomethyl-3,5,5-tri-methylcyclohexyl isocyanate, see	2290	6.1	
Isododecane, see	2286	3	
ISOHEPTENE	2287	3	
ISOHEXENE	2288	3	
Isooctane, see	1262	3	
ISOOCTENE	1216	3	
Isopentane, see	1265	3	
ISOPENTENES	2371	3	
Isopentylamine, see	1106	3	
Isopentyl nitrite, see	1113	3	
ISOPHORONEDIAMINE	2289	8	

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Name and description	UN No.	Class	Remarks
ISOPHORONE DIISOCYANATE	2290	6.1	
ISOPRENE, STABILIZED	1218	3	
ISOPROPANOL	1219	3	
ISOPROPENYL ACETATE	2403	3	
ISOPROPENYLBENZENE	2303	3	
ISOPROPYL ACETATE	1220	3	
ISOPROPYL ACID PHOSPHATE	1793	8	
ISOPROPYL ALCOHOL, see	1219	3	
ISOPROPYLAMINE	1221	3	
ISOPROPYLBENZENE	1918	3	
ISOPROPYL BUTYRATE	2405	3	
Isopropyl chloride, see	2356	3	
ISOPROPYL CHLOROACETATE	2947	3	
ISOPROPYL CHLOROFORMATE	2407	6.1	
ISOPROPYL 2-CHLORO-PROPIONATE	2934	3	
Isopropyl-alpha-chloropropionate, see	2934	3	
Isopropyl ether, see	1159	3	
Isopropylethylene, see	2561	3	
Isopropyl formate, see	1281	3	
ISOPROPYL ISOBUTYRATE	2406	3	
ISOPROPYL ISOCYANATE	2483	6.1	
Isopropyl mercaptan, see	2402	3	
ISOPROPYL NITRATE	1222	3	
ISOPROPYL PROPIONATE	2409	3	
Isolpropyltoluene, see	2046	3	
Isopropyltoluol, see	2046	3	
ISOSORBIDE DINITRATE MIXTURE with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	2907	4.1	
ISOSORBIDE-5-MONONITRATE	3251	4.1	
Isovaleraldehyde, see	2058	3	
JET PERFORATING GUNS, CHARGED, oil well, without detonator	0124 0494	1 1	
Jet tappers, without detonator, see	0059	1	
KEROSENE	1223	3	
KETONES, LIQUID, N.O.S.	1224	3	
KRILL MEAL	3497	4.2	
KRYPTON, COMPRESSED	1056	2	
KRYPTON, REFRIGERATED LIQUID	1970	2	
Lacquer, see	1263 3066 3469 3470	3 8 3 8	
Lacquer base, liquid, see	1263 3066 3469 3470	3 8 3 8	
Lacquer base or lacquer chips, nitrocellulose, dry, see	2557	4.1	
Lacquer base or lacquer chips, plastic, wet with alcohol or solvent, see	1263 2059 2555 2556	3 3 4.1 4.1	
LEAD ACETATE	1616	6.1	
Lead (II) acetate, see	1616	6.1	
LEAD ARSENATES	1617	6.1	
LEAD ARSENITES	1618	6.1	
LEAD AZIDE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	0129	1	
Lead chloride, solid, see	2291	6.1	
LEAD COMPOUND, SOLUBLE, N.O.S.	2291	6.1	
LEAD CYANIDE	1620	6.1	
Lead (II) cyanide	1620	6.1	
LEAD DIOXIDE	1872	5.1	
LEAD NITRATE	1469	5.1	
Lead (II) nitrate	1469	5.1	
LEAD PERCHLORATE, SOLID	1470	5.1	
LEAD PERCHLORATE, SOLUTION	3408	5.1	
Lead (II) perchlorate	1470 3408	5.1 5.1	
Lead peroxide, see	1872	5.1	
LEAD PHOSPHITE, DIBASIC	2989	4.1	

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LEAD STYPHNATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	0130	1	
LEAD SULPHATE with more than 3% free acid	1794	8	
Lead tetraethyl, see	1649	6.1	
Lead tetramethyl, see	1649	6.1	
LEAD TRINITRORESORCINATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass, see	0130	1	
LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment	3072	9	
LIFE-SAVING APPLIANCES, SELF-INFLATING	2990	9	
LIGHTER REFILLS containing flammable gas	1057	2	
LIGHTERS containing flammable gas	1057	2	
LIGHTERS, FUSE	0131	1	
Limonene, inactive, see	2052	3	
LIQUEFIED GAS, N.O.S.	3163	2	
LIQUEFIED GAS, FLAMMABLE, N.O.S.	3161	2	
LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	1058	2	
LIQUEFIED GAS, OXIDIZING, N.O.S.	3157	2	
LIQUEFIED GAS, TOXIC, N.O.S.	3162	2	
LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	3308	2	
LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	3160	2	
LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	3309	2	
LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	3307	2	
LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	3310	2	
Liquefied petroleum gas, see	1075	2	
Liquid filler, see	1263 3066 3469 3470	3 8 3 8	
Liquid lacquer base, see	1263 3066 3469 3470	3 8 3 8	
LITHIUM	1415	4.3	
Lithium alkyls, liquid, see	3394	4.2	
Lithium alkyls, solid, see	3393	4.2	
LITHIUM ALUMINIUM HYDRIDE	1410	4.3	
LITHIUM ALUMINIUM HYDRIDE, ETHEREAL	1411	4.3	
LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries	3536	9	
LITHIUM ION BATTERIES (including lithium ion polymer batteries)	3480	9	
LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including lithium ion polymer batteries)	3481	9	
LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	3481	9	
LITHIUM METAL BATTERIES (including lithium alloy batteries)	3090	9	
LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries)	3091	9	
LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)	3091	9	
LITHIUM BOROHYDRIDE	1413	4.3	
LITHIUM FERROSILICON	2830	4.3	
LITHIUM HYDRIDE	1414	4.3	
LITHIUM HYDRIDE, FUSED SOLID	2805	4.3	
LITHIUM HYDROXIDE	2680	8	
LITHIUM HYDROXIDE SOLUTION	2679	8	
LITHIUM HYPOCHLORITE, DRY	1471	5.1	

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Name and description	UN No.	Class	Remarks
LITHIUM HYPOCHLORITE MIXTURE	1471	5.1	
Lithium in cartouches, see	1415	4.3	
LITHIUM NITRATE	2722	5.1	
LITHIUM NITRIDE	2806	4.3	
LITHIUM PEROXIDE	1472	5.1	
Lithium silicide, see	1417	4.3	
LITHIUM SILICON	1417	4.3	
L.n.g., see	1972	2	
LONDON PURPLE	1621	6.1	
L.p.g., see	1075	2	
Lye, see	1823	8	
Lythene, see	1268	3	
MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED	3529	2.1	
MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED	3528	3	
MACHINERY, INTERNAL COMBUSTION	3530	9	
MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED	3529	2.1	
MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED	3528	3	
MAGNESIUM in pellets, turnings or ribbons	1869	4.1	
Magnesium alkyls, see	3394	4.2	
MAGNESIUM ALLOYS with more than 50% magnesium in pellets, turnings or ribbons	1869	4.1	
MAGNESIUM ALLOYS POWDER	1418	4.3	
MAGNESIUM ALUMINIUM PHOSPHIDE	1419	4.3	
MAGNESIUM ARSENATE	1622	6.1	
Magnesium bisulphite solution, see	2693	8	
MAGNESIUM BROMATE	1473	5.1	
MAGNESIUM CHLORATE	2723	5.1	
Magnesium chloride and chlorate mixture, see	1459 3407	5.1 5.1	
MAGNESIUM DIAMIDE	2004	4.2	
Magnesium diphenyl, see	3393	4.2	
MAGNESIUM FLUOROSILICATE	2853	6.1	
MAGNESIUM GRANULES, COATED, particle size not less than 149 microns	2950	4.3	
MAGNESIUM HYDRIDE	2010	4.3	
MAGNESIUM NITRATE	1474	5.1	
MAGNESIUM PERCHLORATE	1475	5.1	
MAGNESIUM PEROXIDE	1476	5.1	
MAGNESIUM PHOSPHIDE	2011	4.3	
MAGNESIUM POWDER	1418	4.3	
Magnesium scrap, see	1869	4.1	
MAGNESIUM SILICIDE	2624	4.3	
Magnesium silicofluoride, see	2853	6.1	
Magnetized material	2807	9	Not subject to ADN
MALEIC ANHYDRIDE	2215	8	
MALEIC ANHYDRIDE, MOLTEN	2215	8	
Malonic dinitrile, see	2647	6.1	
Malonodinitrile, see	2647	6.1	
MALONONITRILE	2647	6.1	
MANEB	2210	4.2	
MANEB PREPARATION with not less than 60% maneb	2210	4.2	
MANEB PREPARATION, STABILIZED against self-heating	2968	4.3	
MANEB, STABILIZED against self-heating	2968	4.3	
Manganese ethylene-di-dithiocarbamate, see	2210	4.2	
Manganese ethylene-1,2-dithiocarbamate, see	2210	4.2	
MANGANESE NITRATE	2724	5.1	
Manganese (II) nitrate, see	2724	5.1	
MANGANESE RESINATE	1330	4.1	
Manganous nitrate, see	2724	5.1	

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Name and description	UN No.	Class	Remarks
MANNITOL HEXANITRATE, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	0133	1	
MATCHES, FUSEE	2254	4.1	
MATCHES, SAFETY (book, card or strike on box)	1944	4.1	
MATCHES, "STRIKE ANYWHERE"	1331	4.1	
MATCHES, WAX "VESTA"	1945	4.1	
MEDICAL WASTE, N.O.S.	3291	6.2	
MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3248	3	
MEDICINE, LIQUID, TOXIC, N.O.S.	1851	6.1	
MEDICINE, SOLID, TOXIC, N.O.S.	3249	6.1	
p-Mentha-1,8-diene, see	2052	8	
MERCAPTANS, LIQUID, FLAMMABLE, N.O.S.	3336	3	
MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S.	1228	3	
MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S.	3071	6.1	
MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.	3336	3	
MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	1228	3	
MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.	3071	6.1	
2-Mercaptoethanol, see	2966	6.1	
2-Mercaptopropionic acid, see	2936	6.1	
5-MERCAPTOTETRAZOL-1-ACETIC ACID	0448	1	
MERCURIC ARSENATE	1623	6.1	
MERCURIC CHLORIDE	1624	6.1	
MERCURIC NITRATE	1625	6.1	
MERCURIC POTASSIUM CYANIDE	1626	6.1	
Mercuric sulphate, see	1645	6.1	
Mercurol, see	1639	6.1	
Mercurous bisulphate, see	1645	6.1	
Mercurous chloride, see	2025	6.1	
MERCUROUS NITRATE	1627	6.1	
Mercurous sulphate, see	1645	6.1	
MERCURY	2809	8	
MERCURY ACETATE	1629	6.1	
MERCURY AMMONIUM CHLORIDE	1630	6.1	
MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2778	3	
MERCURY BASED PESTICIDE, LIQUID, TOXIC	3012	6.1	
MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3011	6.1	
MERCURY BASED PESTICIDE, SOLID, TOXIC	2777	6.1	
MERCURY BENZOATE	1631	6.1	
Mercury bichloride, see	1624	6.1	
MERCURY BROMIDES	1634	6.1	
MERCURY COMPOUND, LIQUID, N.O.S.	2024	6.1	
MERCURY COMPOUND, SOLID, N.O.S.	2025	6.1	
MERCURY CONTAINED IN MANUFACTURED ARTICLES	3506	8	
MERCURY CYANIDE	1636	6.1	
MERCURY FULMINATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	0135	1	
MERCURY GLUCONATE	1637	6.1	
MERCURY IODIDE	1638	6.1	
MERCURY NUCLEATE	1639	6.1	
MERCURY OLEATE	1640	6.1	
MERCURY OXIDE	1641	6.1	
MERCURY OXYCYANIDE, DESENSITIZED	1642	6.1	
MERCURY POTASSIUM IODIDE	1643	6.1	
MERCURY SALICYLATE	1644	6.1	

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Name and description	UN No.	Class	Remarks
MERCURY SULPHATE	1645	6.1	
MERCURY THIOCYANATE	1646	6.1	
Metal alkyl halides, water-reactive, n.o.s. / Metal aryl halides, water-reactive, n.o.s., see	3394	4.2	
Metal alkyl hydrides, water-reactive, n.o.s. / Metal aryl hydrides, water-reactive, n.o.s., see	3394	4.2	
Metal alkyls, water-reactive, n.o.s. / Metal aryls, water-reactive, n.o.s., see	3393	4.2	
Mesitylene, see	2325	3	
MESITYL OXIDE	1229	3	
METAL CARBONYLS, LIQUID, N.O.S.	3281	6.1	
METAL CARBONYLS, SOLID, N.O.S.	3466	6.1	
METAL CATALYST, DRY	2881	4.2	
METAL CATALYST, WETTED with a visible excess of liquid	1378	4.2	
METALDEHYDE	1332	4.1	
METAL HYDRIDES, FLAMMABLE, N.O.S.	3182	4.1	
METAL HYDRIDES, WATER-REACTIVE, N.O.S.	1409	4.3	
METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	3208	4.3	
METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	3209	4.3	
METAL POWDER, FLAMMABLE, N.O.S.	3089	4.1	
METAL POWDER, SELF-HEATING, N.O.S.	3189	4.2	
METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	3181	4.1	
METHACRYLALDEHYDE, STABILIZED	2396	3	
METHACRYLIC ACID, STABILIZED	2531	8	
METHACRYLONITRILE, STABILIZED	3079	6.1	
METHALLYL ALCOHOL	2614	3	
Methanal, see	1198 2209	3 8	
Methane and hydrogen mixture, see	2034	2	
METHANE, COMPRESSED	1971	2	
METHANE, REFRIGERATED LIQUID	1972	2	
METHANESULPHONYL CHLORIDE	3246	6.1	
METHANOL	1230	3	
2-Methoxyethyl acetate, see	1189	3	
METHOXYMETHYL ISOCYANATE	2605	6.1	
4-METHOXY-4-METHYLPENTAN-2-ONE	2293	3	
1-Methoxy-2-nitrobenzene, see	2730 3458	6.1 6.1	
1-Methoxy-3-nitrobenzene, see	2730 3458	6.1 6.1	
1-Methoxy-4-nitrobenzene, see	2730 3458	6.1 6.1	
1-METHOXY-2-PROPANOL	3092	3	
METHYL ACETATE	1231	3	
METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED such as mixture P1 or mixture P2	1060	2	
beta-Methyl acrolein, see	1143	6.1	
METHYL ACRYLATE, STABILIZED	1919	3	
METHYLAL	1234	3	
Methyl alcohol, see	1230	3	
Methyl allyl alcohol, see	2614	3	
METHYLALLYL CHLORIDE	2554	3	
METHYLAMINE, ANHYDROUS	1061	2	
METHYLAMINE, AQUEOUS SOLUTION	1235	3	
METHYLAMYL ACETATE	1233	3	
Methyl amyl alcohol, see	2053	3	
Methyl amyl ketone, see	1110	3	
N-METHYLANILINE	2294	6.1	

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Name and description	UN No.	Class	Remarks
Methylated spirit, see	1986	3	
	1987	3	
alpha-METHYLBENZYL ALCOHOL, LIQUID	2937	6.1	
alpha-METHYLBENZYL ALCOHOL, SOLID	3438	6.1	
METHYL BROMIDE with not more than 2% chloropicrin	1062	2	
Methyl bromide and chloropicrin mixture, with more than 2% chloropicrin, see	1581	2	
METHYL BROMIDE AND ETHYLENE DIBROMIDE MIXTURE, LIQUID	1647	6.1	
METHYL BROMOACETATE	2643	6.1	
2-METHYLBUTANAL	3371	3	
3-METHYLBUTAN-2-ONE	2397	3	
2-METHYL-1-BUTENE	2459	3	
2-METHYL-2-BUTENE	2460	3	
3-METHYL-1-BUTENE	2561	3	
N-METHYLBUTYLAMINE	2945	3	
METHYL tert-BUTYL ETHER	2398	3	
METHYL BUTYRATE	1237	3	
METHYL CHLORIDE	1063	2	
Methyl chloride and chloropicrin mixture, see	1582	2	
METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	1912	2	
METHYL CHLOROACETATE	2295	6.1	
Methyl chlorocarbonate, see	1238	6.1	
Methyl chloroform, see	2831	6.1	
METHYL CHLOROFORMATE	1238	6.1	
METHYL CHLOROMETHYL ETHER	1239	6.1	
METHYL 2-CHLORO-PROPIONATE	2933	3	
Methyl alpha-chloropropionate, see	2933	3	
METHYLCHLOROSILANE	2534	2	
Methyl cyanide, see	1648	3	
METHYLCYCLOHEXANE	2296	3	
METHYLCYCLOHEXANOLS, flammable	2617	3	
METHYLCYCLOHEXANONE	2297	3	
METHYLCYCLOPENTANE	2298	3	
METHYL DICHLOROACETATE	2299	6.1	
METHYLDICHLOROSILANE	1242	4.3	
Methylene bromide, see	2664	6.1	
Methylene chloride, see	1593	6.1	
Methylene chloride and methyl chloride mixture, see	1912	2	
Methylene cyanide, see	2647	6.1	
p,p'-Methylene dianiline, see	2651	6.1	
Methylene dibromide, see	2664	6.1	
2,2'-Methylene-di-(3,4,6-trichlorophenol), see	2875	6.1	
Methyl ethyl ether, see	1039	2	
METHYL ETHYL KETONE, see	1193	3	
2-METHYL-5-ETHYLPYRIDINE	2300	6.1	
METHYL FLUORIDE	2454	2	
METHYL FORMATE	1243	3	
2-METHYLFURAN	2301	3	
Methyl glycol, see	1188	3	
Methyl glycol acetate, see	1189	3	
2-METHYL-2-HEPTANETHIOL	3023	6.1	
5-METHYLHEXAN-2-ONE	2302	3	
METHYLHYDRAZINE	1244	6.1	
METHYL IODIDE	2644	6.1	
METHYL ISOBUTYL CARBINOL	2053	3	
METHYL ISOBUTYL KETONE	1245	3	
METHYL ISOCYANATE	2480	6.1	
METHYL ISOPROPENYL KETONE, STABILIZED	1246	3	
METHYL ISOTHIOCYANATE	2477	6.1	
METHYL ISOVALERATE	2400	3	

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Name and description	UN No.	Class	Remarks
METHYL MAGNESIUM BROMIDE IN ETHYL ETHER	1928	4.3	
METHYL MERCAPTAN	1064	2	
Methyl mercaptopropionaldehyde, see	2785	6.1	
METHYL METHACRYLATE MONOMER, STABILIZED	1247	3	
4-METHYLMORPHOLINE	2535	3	
N-METHYLMORPHOLINE, see	2535	3	
METHYL NITRITE	2455	2	Carriage prohi-bited
METHYL ORTHOSILICATE	2606	6.1	
METHYLPENTADIENE	2461	3	
Methylpentanes, see	1208	3	
2-METHYLPENTAN-2-OL	2560	3	
4-Methylpentan-2-ol, see	2053	3	
3-Methyl-2-penten-4ynol, see	2705	8	
METHYLPHENYL-DICHLOROSILANE	2437	8	
2-Methyl-2-phenylpropane, see	2709	3	
1-METHYLPIPERIDINE	2399	3	
METHYL PROPIONATE	1248	3	
Methylpropylbenzene, see	2046	3	
METHYL PROPYL ETHER	2612	3	
METHYL PROPYL KETONE	1249	3	
Methyl pyridines, see	2313	3	
Methylstyrene, inhibited, see	2618	3	
alpha-Methylstyrene, see	2303	3	
Methyl sulphate, see	1595	6.1	
Methyl sulphide, see	1164	3	
METHYLTETRAHYDROFURAN	2536	3	
METHYL TRICHLOROACETATE	2533	6.1	
METHYLTRICHLOROSILANE	1250	3	
alpha-METHYLVALERAL-DEHYDE	2367	3	
Methyl vinyl benzene, inhibited, see	2618	3	
METHYL VINYL KETONE, STABILIZED	1251	6.1	
M.i.b.c., see	2053	3	
MINES with bursting charge	0136 0137 0138 0294	1 1 1 1	
Mirbane oil, see	1662	6.1	
Missiles, guided, see	0180 0181 0182 0183 0295 0397 0398 0436 0437 0438	1 1 1 1 1 1 1 1 1 1	
Mixtures A, A01, A02, A0, A1, B1, B2, B or C, see	1965	2	
Mixture F1, mixture F2 or mixture F3, see	1078	2	
MIXTURES OF 1,3-BUTADIENE AND HYDROCARBONS, STABILIZED, having a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l	1010	2	
Mixture P1 or mixture P2, see	1060	2	
MOLYBDENUM PENTACHLORIDE	2508	8	
Monochloroacetic acid, see	1750 1751	6.1 6.1	
Monochlorobenzene, see	1134	3	
Monochlorodifluoromethane, see	1018	2	
Monochlorodifluoromethane and monochloropentafluoroethane mixture, see	1973	2	
Monochlorodifluoromono-bromomethane, see	1974	2	
Monochloropentafluoroethane and monochlorodifluoromethane mixture, see	1973	2	
Monoethylamine, see	1036	2	
MONONITROTOLUIDINES, see	2660	6.1	
Monopropylamine, see	1277	3	
MORPHOLINE	2054	8	

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MOTOR FUEL ANTI-KNOCK MIXTURE	1649	6.1	
MOTOR FUEL ANTI-KNOCK MIXTURE, FLAMMABLE	3483	6.1	
MOTOR SPIRIT	1203	3	
Motor spirit and ethanol mixture, with more than 10% ethanol, see	3475	3	
Muriatic acid, see	1789	8	
MUSK XYLENE, see	2956	4.1	
Mysorite, see	2212	9	
Naphta, see	1268	3	
Naphta, petroleum, see	1268	3	
Naphta, solvent, see	1268	3	
NAPHTHALENE, CRUDE	1334	4.1	
NAPHTHALENE, MOLTEN	2304	4.1	
NAPHTHALENE, REFINED	1334	4.1	
alpha-NAPHTHYLAMINE	2077	6.1	
beta-NAPHTHYLAMINE, SOLID	1650	6.1	
beta-NAPHTHYLAMINE, SOLUTION	3411	6.1	
NAPHTHYLTHIOUREA	1651	6.1	
1-Naphthylthiourea, see	1651	6.1	
NAPHTHYLUREA	1652	6.1	
NATURAL GAS, COMPRESSED with high methane content	1971	2	
NATURAL GAS, REFRIGERATED LIQUID with high methane content	1972	2	
Natural gasoline, see	1203	3	
Neohexane, see	1208	3	
NEON, COMPRESSED	1065	2	
NEON, REFRIGERATED LIQUID	1913	2	
Neothyl, see	2612	3	
NICKEL CARBONYL	1259	6.1	
NICKEL CYANIDE	1653	6.1	
Nickel (II) cyanide, see	1653	6.1	
NICKEL NITRATE	2725	5.1	
Nickel (II) nitrate, see	2725	5.1	
NICKEL NITRITE	2726	5.1	
Nickel (II) nitrite, see	2726	5.1	
Nickelous nitrate, see	2725	5.1	
Nickelous nitrite, see	2726	5.1	
Nickel tetracarbonyl, see	1259	6.1	
NICOTINE	1654	6.1	
NICOTINE COMPOUND, LIQUID, N.O.S	3144	6.1	
NICOTINE COMPOUND, SOLID, N.O.S	1655	6.1	
NICOTINE HYDROCHLORIDE, LIQUID	1656	6.1	
NICOTINE HYDROCHLORIDE, SOLID	3444	6.1	
NICOTINE HYDROCHLORIDE SOLUTION	1656	6.1	
NICOTINE PREPARATION, LIQUID, N.O.S.	3144	6.1	
NICOTINE PREPARATION, SOLID, N.O.S.	1655	6.1	
NICOTINE SALICYLATE	1657	6.1	
NICOTINE SULPHATE, SOLID	3445	6.1	
NICOTINE SULPHATE, SOLUTION	1658	6.1	
NICOTINE TARTRATE	1659	6.1	
NITRATES, INORGANIC, N.O.S.	1477	5.1	
NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3218	5.1	
NITRATING ACID MIXTURE with more than 50% nitric acid	1796	8	
NITRATING ACID MIXTURE with not more than 50% nitric acid	1796	8	
NITRATING ACID MIXTURE, SPENT, with more than 50% nitric acid	1826	8	
NITRATING ACID MIXTURE, SPENT, with not more than 50% nitric acid	1826	8	
NITRIC ACID, other than red fuming, with at least 65% but not more than 70% nitric acid	2031	8	

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NITRIC ACID, other than red fuming, with less than 65% nitric acid	2031	8	
NITRIC ACID, other than red fuming, with more than 70% nitric acid	2031	8	
NITRIC ACID, RED FUMING	2032	8	
NITRIC OXIDE, COMPRESSED	1660	2	
NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE	1975	2	
NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE, see	1975	2	
NITRILES, FLAMMABLE, TOXIC, N.O.S.	3273	3	
NITRILES, LIQUID, TOXIC, N.O.S.	3276	6.1	
NITRILES, SOLID, TOXIC, N.O.S.	3439	6.1	
NITRILES, TOXIC, FLAMMABLE, N.O.S.	3275	6.1	
NITRITES, INORGANIC, N.O.S.	2627	5.1	
NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3219	5.1	
NITROANILINES (o-, m-, p-)	1661	6.1	
NITROANISOLES, LIQUID	2730	6.1	
NITROANISOLES, SOLID	3458	6.1	
NITROBENZENE	1662	6.1	
Nitrobenzene bromide, see	2732	6.1	
NITROBENZENESULPHONIC ACID	2305	8	
Nitrobenzol, see	1662	6.1	
5-NITROBENZOTRIAZOL	0385	1	
NITROBENZOTRIFLUORIDES, LIQUID	2306	6.1	
NITROBENZOTRIFLUORIDES, SOLID	3431	6.1	
NITROBROMOBENZENES, LIQUID	2732	6.1	
NITROBROMOBENZENES, SOLID	3459	6.1	
NITROCELLULOSE, dry or wetted with less than 25% water (or alcohol), by mass	0340	1	
NITROCELLULOSE, unmodified or plasticized with less than 18% plasticizing substance, by mass	0341	1	
NITROCELLULOSE MEMBRANE FILTERS, with not more than 12.6% nitrogen, by dry mass	3270	4.1	
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH PLASTICIZER, WITH PIGMENT	2557	4.1	
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH PLASTICIZER, WITHOUT PIGMENT	2557	4.1	
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITHOUT PLASTICIZER, WITH PIGMENT	2557	4.1	
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITHOUT PLASTICIZER, WITHOUT PIGMENT	2557	4.1	
NITROCELLULOSE, PLASTICIZED with not less than 18% plasticizing substance, by mass	0343	1	
NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	2059	3	
NITROCELLULOSE, WETTED with not less than 25% alcohol, by mass	0342	1	
NITROCELLULOSE WITH ALCOHOL (not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass)	2556	4.1	
NITROCELLULOSE WITH WATER (not less than 25% water, by mass)	2555	4.1	
Nitrochlorobenzenes, see	1578	6.1	
	3409	6.1	
3-NITRO-4-CHLOROBENZO-TRIFLUORIDE	2307	6.1	
NITROCRESOLS, LIQUID	3434	6.1	
NITROCRESOLS, SOLID	2446	6.1	
NITROETHANE	2842	3	
NITROGEN, COMPRESSED	1066	2	

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NITROGEN DIOXIDE, see	1067	2	
NITROGEN, REFRIGERATED LIQUID	1977	2	
NITROGEN TRIFLUORIDE	2451	2	
NITROGEN TRIOXIDE	2421	2	Carriage prohi-bited
NITROGLYCERIN, DESENSITIZED with not less than 40% non-volatile water-insoluble phlegmatizer, by mass	0143	1	
NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin, by mass	3357	3	
NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass	3343	3	
NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin, by mass	3319	4.1	
NITROGLYCERIN, SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin	3064	3	
NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 10% nitroglycerin	0144	1	
NITROGLYCERIN SOLUTION IN ALCOHOL with not more than 1% nitroglycerin	1204	3	
NITROGUANIDINE, dry or wetted with less than 20% water, by mass	0282	1	
NITROGUANIDINE, WETTED with not less than 20% water, by mass	1336	4.1	
NITROHYDROCHLORIC ACID	1798	8	Carriage prohi-bited
NITROMANNITE, WETTED, see	0133	1	
NITROMETHANE	1261	3	
Nitromuriatic acid, see	1798	8	
NITRONAPHTHALENE	2538	4.1	
NITROPHENOLS (o-, m-, p-)	1663	6.1	
4-NITROPHENYLHYDRAZINE, with not less than 30% water, by mass	3376	4.1	
NITROPROPANES	2608	3	
p-NITROSODIMETHYLANILINE	1369	4.2	
NITROSTARCH, dry or wetted with less than 20% water, by mass	0146	1	
NITROSTARCH, WETTED with not less than 20% water, by mass	1337	4.1	
NITROSYL CHLORIDE	1069	2	
NITROSYLSULPHURIC ACID, LIQUID	2308	8	
NITROSYLSULPHURIC ACID, SOLID	3456	8	
NITROTOLUENES, LIQUID	1664	6.1	
NITROTOLUENES, SOLID	3446	6.1	
NITROTOLUIDINES	2660	6.1	
NITROTRIAZOLONE	0490	1	
NITRO UREA	0147	1	
NITROUS OXIDE	1070	2	
NITROUS OXIDE, REFRIGERATED LIQUID	2201	2	
NITROXYLENES, LIQUID	1665	6.1	
NITROXYLENES, SOLID	3447	6.1	
Non-activated carbon, see	1361	4.2	
Non-activated charcoal, see	1361	4.2	
NONANES	1920	3	
NONYLTRICHLOROSILANE	1799	8	
2,5-NORBORNADIENE, STABILIZED, see	2251	3	
Normal propyl alcohol, see	1274	3	
NTO, see	0490	1	
OCTADECYLTRICHLORO-SILANE	1800	8	
OCTADIENE	2309	3	
OCTAFLUOROBUT-2-ENE	2422	2	
OCTAFLUOROCYCLOBUTANE	1976	2	
OCTAFLUOROPROPANE	2424	2	

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OCTANES	1262	3	
OCTOGEN, see	0226	1	
	0391	1	
	0484	1	
OCTOL, dry or wetted with less than 15% water, by mass, see	0266	1	
OCTOLITE, dry or wetted with less than 15% water, by mass	0266	1	
OCTONAL	0496	1	
OCTYL ALDEHYDES	1191	3	
tert-Octyl mercaptan, see	3023	6.1	
OCTYLTRICHLOROSILANE	1801	8	
Oenanthol, see	3056	3	
OIL GAS, COMPRESSED	1071	2	
Oleum, see	1831	8	
ORGANIC PEROXIDE TYPE B, LIQUID	3101	5.2	
ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED	3111	5.2	
ORGANIC PEROXIDE TYPE B, SOLID	3102	5.2	
ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED	3112	5.2	
ORGANIC PEROXIDE TYPE C, LIQUID	3103	5.2	
ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED	3113	5.2	
ORGANIC PEROXIDE TYPE C, SOLID	3104	5.2	
ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED	3114	5.2	
ORGANIC PEROXIDE TYPE D, LIQUID	3105	5.2	
ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED	3115	5.2	
ORGANIC PEROXIDE TYPE D, SOLID	3106	5.2	
ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED	3116	5.2	
ORGANIC PEROXIDE TYPE E, LIQUID	3107	5.2	
ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED	3117	5.2	
ORGANIC PEROXIDE TYPE E, SOLID	3108	5.2	
ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED	3118	5.2	
ORGANIC PEROXIDE TYPE F, LIQUID	3109	5.2	
ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED	3119	5.2	
ORGANIC PEROXIDE TYPE F, SOLID	3110	5.2	
ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED	3120	5.2	
Organic peroxides, see 2.2.52.4 for an alphabetic list of currently assigned organic peroxides and see	3101 to 3120	5.2	
ORGANIC PIGMENTS, SELF-HEATING	3313	4.2	
ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	3280	6.1	
ORGANOARSENIC COMPOUND, SOLID, N.O.S.	3465	6.1	
ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2762	3	
ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	2996	6.1	
ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	2995	6.1	
ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	2761	6.1	
ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.	3282	6.1	
ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.	3467	6.1	
Organometallic compound, solid, water-reactive, flammable, n.o.s., see	3396	4.3	

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Organometallic compound or Organometallic compound solution or Organometallic compound dispersion, water-reactive, flammable, n.o.s., see	3399	4.3	
ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC	3392	4.2	
ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC	3391	4.2	
ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING	3400	4.2	
ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE	3394	4.2	
ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC, WATER-REACTIVE	3393	4.2	
ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE	3398	4.3	
ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE	3395	4.3	
ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE	3399	4.3	
ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE	3396	4.3	
ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, SELF-HEATING	3397	4.3	
ORGANOPHOSPHORUS COMPOUND, LIQUID; TOXIC, N.O.S.	3278	6.1	
ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.	3464	6.1	
ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	3279	6.1	
ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2784	3	
ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	3018	6.1	
ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3017	6.1	
ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	2783	6.1	
ORGANOTIN COMPOUND, LIQUID, N.O.S.	2788	6.1	
ORGANOTIN COMPOUND, SOLID, N.O.S.	3146	6.1	
ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2787	3	
ORGANOTIN PESTICIDE, LIQUID, TOXIC	3020	6.1	
ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3019	6.1	
ORGANOTIN PESTICIDE, SOLID, TOXIC	2786	6.1	
Orthophospohoric acid, see	1805	8	
OSMIUM TETROXIDE	2471	6.1	
OXIDIZING LIQUID, N.O.S.	3139	5.1	
OXIDIZING LIQUID, CORROSIVE, N.O.S.	3098	5.1	
OXIDIZING LIQUID, TOXIC, N.O.S.	3099	5.1	
OXIDIZING SOLID, N.O.S.	1479	5.1	
OXIDIZING SOLID, CORROSIVE, N.O.S.	3085	5.1	
OXIDIZING SOLID, FLAMMABLE, N.O.S.	3137	5.1	Carriage prohi-bited
OXIDIZING SOLID, SELF-HEATING, N.O.S.	3100	5.1	Carriage prohi-bited
OXIDIZING SOLID, TOXIC, N.O.S.	3087	5.1	
OXIDIZING SOLID, WATER-REACTIVE, N.O.S.	3121	5.1	Carriage prohi-bited
Oxirane, see	1040	2	
OXYGEN, COMPRESSED	1072	2	
OXYGEN DIFLUORIDE, COMPRESSED	2190	2	

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OXYGEN GENERATOR, CHEMICAL	3356	5.1	
OXYGEN, REFRIGERATED LIQUID	1073	2	
1-Oxy-4-nitrobenzene, see	1663	6.1	
PACKAGINGS, DISCARDED, EMPTY, UNCLEANED	3509	9	
PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263 3066 3469 3470	3 8 3 8	
PAINT RELATED MATERIAL (including paint thinning and reducing compound)	1263 3066 3469 3470	3 8 3 8	
Paint thinning and reducing compound, see	1263 3066 3469 3470	3 8 3 8	
PAPER, UNSATURATED OIL TREATED, incompletely dried (including carbon paper)	1379	4.2	
Paraffin, see	1223	3	
PARAFORMALDEHYDE	2213	4.1	
PARALDEHYDE	1264	3	
PCBs, see	2315 3432	9 9	
PENTABORANE	1380	4.2	
PENTACHLOROETHANE	1669	6.1	
PENTACHLOROPHENOL	3155	6.1	
PENTAERYTHRITE TETRANITRATE with not less than 7% wax, by mass	0411	1	
PENTAERYTHRITE TETRANITRATE, DESENSITIZED with not less than 15% phlegmatizer, by mass	0150	1	
PENTAERYTHRITE TETRANITRATE MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	3344	4.1	
PENTAERYTHRITE TETRANITRATE, WETTED with not less than 25% water, by mass	0150	1	
PENTAERYTHRITOL TETRANITRATE, see	0150 0411 3344	1 1 4.1	
PENTAFLUOROETHANE	3220	2	
Pentafluoroethane, 1,1,1-trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane, see	3337	2	
PENTAMETHYLHEPTANE	2286	3	
Pentanal, see	2058	3	
PENTANE-2,4-DIONE	2310	3	
PENTANES, liquid	1265	3	
n-Pentane, see	1265	3	
PENTANOLS	1105	3	
n-Pentanol, see	1105	3	
3-Pentanol, see	1105	3	
1-PENTENE	1108	3	
1-PENTOL	2705	8	
PENTOLITE, dry or wetted with less than 15% water, by mass	0151	1	
Pentyl nitrite, see	1113	3	
PERCHLORATES, INORGANIC, N.O.S.	1481	5.1	
PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3211	5.1	
PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass	1873	5.1	
PERCHLORIC ACID with not more than 50% acid, by mass	1802	8	
Perchlorobenzene, see	2729	6.1	
Perchlorocyclopentadiene, see	2646	6.1	
Perchloroethylene, see	1897	6.1	
PERCHLOROMETHYL MERCAPTAN	1670	6.1	
PERCHLORYL FLUORIDE	3083	2	
Perfluoroacetylchloride, see	3057	2	
PERFLUORO(ETHYL VINYL ETHER)	3154	2	
PERFLUORO(METHYL VINYL ETHER)	3153	2	
Perfluoropropane, see	2424	2	

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PERFUMERY PRODUCTS with flammable solvents	1266	3	
PERMANGANATES, INORGANIC, N.O.S.	1482	5.1	
PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3214	5.1	
PEROXIDES, INORGANIC, N.O.S.	1483	5.1	
PERSULPHATES, INORGANIC, N.O.S.	3215	5.1	
PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3216	5.1	
PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S., flash-point less than 23 °C	3021	3	
PESTICIDE, LIQUID, TOXIC, N.O.S.	2902	6.1	
PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	2903	6.1	
PESTICIDE, SOLID, TOXIC, N.O.S.	2588	6.1	
Pesticide, toxic, under compressed gas, n.o.s, see	1950	2	
PETN, see	0150	1	
	0411	1	
	3344	4.1	
PETN/TNT, see	0151	1	
PETROL	1203	3	
Petrol and ethanol mixture, with more than 10% ethanol, see	3475	3	
PETROLEUM CRUDE OIL	1267	3	
PETROLEUM DISTILLATES, N.O.S.	1268	3	
Petroleum ether, see	1268	3	
PETROLEUM GASES, LIQUEFIED	1075	2	
Petroleum naphtha, see	1268	3	
Petroleum oil, see	1268	3	
PETROLEUM PRODUCTS, N.O.S.	1268	3	
Petroleum raffinate, see	1268	3	
PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3494	3	
Petroleum spirit, see	1268	3	
PHENACYL BROMIDE	2645	6.1	
PHENETIDINES	2311	6.1	
PHENOLATES, LIQUID	2904	8	
PHENOLATES, SOLID	2905	8	
PHENOL, MOLTEN	2312	6.1	
PHENOL, SOLID	1671	6.1	
PHENOL SOLUTION	2821	6.1	
PHENOLSULPHONIC ACID, LIQUID	1803	8	
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3346	3	
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	3348	6.1	
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3347	6.1	
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	3345	6.1	
PHENYLACETONITRILE, LIQUID	2470	6.1	
PHENYLACETYL CHLORIDE	2577	8	
Phenylamine, see	1547	6.1	
1-Phenylbutane, see	2709	3	
2-Phenylbutane, see	2709	3	
PHENYLCARBYLAMINE CHLORIDE	1672	6.1	
PHENYL CHLOROFORMATE	2746	6.1	
Phenyl cyanide, see	2224	6.1	
PHENYLENEDIAMINES (o-, m-, p-)	1673	6.1	
Phenylethylene, see	2055	3	
PHENYLHYDRAZINE	2572	6.1	
PHENYL ISOCYANATE	2487	6.1	
Phenylisocyanodichloride, see	1672	6.1	
PHENYL MERCAPTAN	2337	6.1	

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Name and description	UN No.	Class	Remarks
PHENYLMERCURIC ACETATE	1674	6.1	
PHENYLMERCURIC COMPOUND, N.O.S.	2026	6.1	
PHENYLMERCURIC HYDROXIDE	1894	6.1	
PHENYLMERCURIC NITRATE	1895	6.1	
PHENYLPHOSPHORUS DICHLORIDE	2798	8	
PHENYLPHOSPHORUS THIODICHLORIDE	2799	8	
2-Phenylpropene, see	2303	3	
PHENYLTRICHLOROSILANE	1804	8	
PHOSGENE	1076	2	
9-PHOSPHABICYCLONONANES	2940	4.2	
PHOSPHINE	2199	2	
PHOSPHINE, ADSORBED	3525	2	
Phosphoretted hydrogen, see	2199	2	
PHOSPHORIC ACID, SOLUTION	1805	8	
PHOSPHORIC ACID, SOLID	3453	8	
Phosphoric acid, anhydrous, see	1807	8	
PHOSPHOROUS ACID	2834	8	
PHOSPHORUS, AMORPHOUS	1338	4.1	
Phosphorus bromide, see	1808	8	
Phosphorus chloride, see	1809	6.1	
PHOSPHORUS HEPTASULPHIDE, free from yellow and white phosphorus	1339	4.1	
PHOSPHORUS OXYBROMIDE	1939	8	
PHOSPHORUS OXYBROMIDE, MOLTEN	2576	8	
PHOSPHORUS OXYCHLORIDE	1810	6.1	
PHOSPHORUS PENTABROMIDE	2691	8	
PHOSPHORUS PENTACHLORIDE	1806	8	
PHOSPHORUS PENTAFLUORIDE	2198	2	
PHOSPHORUS PENTAFLUORIDE, ADSORBED	3524	2	
PHOSPHORUS PENTASULPHIDE, free from yellow and white phosphorus	1340	4.3	
PHOSPHORUS PENTOXIDE	1807	8	
PHOSPHORUS SESQUISULPHIDE, free from yellow and white phosphorus	1341	4.1	
Phosphorus (V) sulphide, free from yellow and white phosphorus, see	1340	4.3	
Phosphorus sulphochloride, see	1837	8	
PHOSPHORUS TRIBROMIDE	1808	8	
PHOSPHORUS TRICHLORIDE	1809	6.1	
PHOSPHORUS TRIOXIDE	2578	8	
PHOSPHORUS TRISULPHIDE, free from yellow and white phosphorus	1343	4.1	
PHOSPHORUS, WHITE, DRY	1381	4.2	
PHOSPHORUS, WHITE IN SOLUTION	1381	4.2	
PHOSPHORUS, WHITE, MOLTEN	2447	4.2	
PHOSPHORUS, WHITE, UNDER WATER	1381	4.2	
PHOSPHORUS, YELLOW, DRY	1381	4.2	
PHOSPHORUS, YELLOW, IN SOLUTION	1381	4.2	
PHOSPHORUS, YELLOW, UNDER WATER	1381	4.2	
Phosphoryl chloride, see	1810	6.1	
PHTHALIC ANHYDRIDE with more than 0.05% of maleic anhydride	2214	8	
PICOLINES	2313	3	
PICRAMIDE, see	0153	1	
PICRIC ACID WETTED, see	1344 3364	4.1 4.1	
PICRITE, see	0282	1	
PICRITE, WETTED, see	1336	4.1	
Picrotoxin, see	3172 3462	6.1 6.1	
PICRYL CHLORIDE, see	0155	1	
PICRYL CHLORIDE, WETTED, see	3365	4.1	
alpha-PINENE	2368	3	
PINE OIL	1272	3	
PIPERAZINE	2579	8	

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Name and description	UN No.	Class	Remarks
PIPERIDINE	2401	8	
Pivaloyl chloride, see	2438	6.1	
Plastic explosives , see	0084	1	
PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour	3314	9	
PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.	2006	4.2	
Polish, see	1263	3	
	3066	8	
	3469	3	
	3470	8	
POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	2733	3	
POLYAMINES, LIQUID, CORROSIVE, N.O.S.	2735	8	
POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	2734	8	
POLYAMINES, SOLID, CORROSIVE, N.O.S.	3259	8	
POLYCHLORINATED BIPHENYLS, LIQUID	2315	9	
POLYCHLORINATED BIPHENYLS, SOLID	3432	9	
POLYESTER RESIN KIT, liquid base material	3269	3	
POLYESTER RESIN KIT, solid base material	3527	4.1	
POLYHALOGENATED BIPHENYLS, LIQUID	3151	9	
POLYHALOGENATED BIPHENYLS, SOLID	3152	9	
POLYHALOGENATED TERPHENYLS, LIQUID	3151	9	
POLYHALOGENATED TERPHENYLS, SOLID	3152	9	
POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour	2211	9	
POLYMERIZING SUBSTANCE, LIQUID, STABILIZED, N.O.S.	3532	4.1	
POLYMERIZING SUBSTANCE, LIQUID, TEMPERATURE CONTROLLED, N.O.S.	3534	4.1	
POLYMERIZING SUBSTANCE, SOLID, STABILIZED, N.O.S.	3531	4.1	
POLYMERIZING SUBSTANCE, SOLID, TEMPERATURE CONTROLLED, N.O.S.	3533	4.1	
Polystyrene beads, expandable, see	2211	9	
POTASSIUM	2257	4.3	
POTASSIUM ARSENATE	1677	6.1	
POTASSIUM ARSENITE	1678	6.1	
Potassium bifluoride, see	1811	8	
Potassium bisulphate, see	2509	8	
Potassium bisulphite solution, see	2693	8	
POTASSIUM BOROHYDRIDE	1870	4.3	
POTASSIUM BROMATE	1484	5.1	
POTASSIUM CHLORATE	1485	5.1	
POTASSIUM CHLORATE, AQUEOUS SOLUTION	2427	5.1	
Potassium chlorate mixed with mineral oil, see	0083	1	
POTASSIUM CUPROCYANIDE	1679	6.1	
POTASSIUM CYANIDE, SOLID	1680	6.1	
POTASSIUM CYANIDE, SOLUTION	3413	6.1	
Potassium dicyanocuprate (I), see	1679	6.1	
POTASSIUM DITHIONITE	1929	4.2	
POTASSIUM FLUORIDE, SOLID	1812	6.1	
POTASSIUM FLUORIDE, SOLUTION	3422	6.1	
POTASSIUM FLUOROACETATE	2628	6.1	
POTASSIUM FLUOROSILICATE	2655	6.1	
Potassium hexafluorosilicate, see	2655	6.1	
Potassium hydrate, see	1814	8	
POTASSIUM HYDROGENDIFLUORIDE, SOLID	1811	8	
POTASSIUM HYDROGENDIFLUORIDE, SOLUTION	3421	8	
POTASSIUM HYDROGEN SULPHATE	2509	8	
POTASSIUM HYDROSULPHITE, see	1929	4.2	

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Potassium hydroxide, liquid, see	1814	8	
POTASSIUM HYDROXIDE, SOLID	1813	8	
POTASSIUM HYDROXIDE SOLUTION	1814	8	
POTASSIUM METAL ALLOYS, LIQUID	1420	4.3	
POTASSIUM METAL ALLOYS, SOLID	3403	4.3	
POTASSIUM METAVANADATE	2864	6.1	
POTASSIUM MONOXIDE	2033	8	
POTASSIUM NITRATE	1486	5.1	
Potassium nitrate and sodium nitrate mixture, see	1499	5.1	
POTASSIUM NITRATE AND SODIUM NITRITE MIXTURE	1487	5.1	
POTASSIUM NITRITE	1488	5.1	
POTASSIUM PERCHLORATE	1489	5.1	
POTASSIUM PERMANGANATE	1490	5.1	
POTASSIUM PEROXIDE	1491	5.1	
POTASSIUM PERSULPHATE	1492	5.1	
POTASSIUM PHOSPHIDE	2012	4.3	
Potassium selenate, see	2630	6.1	
Potassium selenite, see	2630	6.1	
Potassium silicofluoride, see	2655	6.1	
POTASSIUM SODIUM ALLOYS, LIQUID	1422	4.3	
POTASSIUM SODIUM ALLOYS, SOLID	3404	4.3	
POTASSIUM SULPHIDE with less than 30% water of crystallization	1382	4.2	
POTASSIUM SULPHIDE, ANHYDROUS	1382	4.2	
POTASSIUM SULPHIDE, HYDRATED with not less than 30% water of crystallization	1847	8	
POTASSIUM SUPEROXIDE	2466	5.1	
Potassium tetracyano-mercurate (II), see	1626	6.1	
POWDER CAKE, WETTED with not less than 17% alcohol, by mass	0433	1	
POWDER CAKE, WETTED with not less than 25% water, by mass	0159	1	
POWDER PASTE, see	0159	1	
	0433	1	
POWDER, SMOKELESS	0160	1	
	0161	1	
	0509	1	
Power devices, explosive, see	0275	1	
	0276	1	
	0323	1	
	0381	1	
PRIMERS, CAP TYPE	0044	1	
	0377	1	
	0378	1	
Primers, small arms, see	0044	1	
PRIMERS, TUBULAR	0319	1	
	0320	1	
	0376	1	
PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable	1210	3	
Projectiles, illuminating, see	0171	1	
	0254	1	
	0297	1	
PROJECTILES, inert with tracer	0345	1	
	0424	1	
	0425	1	
PROJECTILES with burster or expelling charge	0346	1	
	0347	1	
	0426	1	
	0427	1	
	0434	1	
	0435	1	
PROJECTILES with bursting charge	0167	1	
	0168	1	
	0169	1	
	0324	1	
	0344	1	
PROPADIENE, STABILIZED	2200	2	
Propadiene and methyl acetylene mixture, stabilized, see	1060	2	
PROPANE	1978	2	
PROPANETHIOLS	2402	3	
n-PROPANOL	1274	3	
PROPELLANT, LIQUID	0495	1	
	0497	1	

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PROPELLANT, SOLID	0498 0499 0501	1 1 1	
Propellant with a single base, Propellant with a double base, Propellant with a triple base, see	0160 0161	1 1	
Propene, see	1077	2	
PROPIONALDEHYDE	1275	3	
PROPIONIC ACID with not less than 10% and less than 90% acid by mass	1848	8	
PROPIONIC ACID with not less than 90% acid by mass	3463	8	
PROPIONIC ANHYDRIDE	2496	8	
PROPIONITRILE	2404	3	
PROPIONYL CHLORIDE	1815	3	
n-PROPYL ACETATE	1276	3	
PROPYL ALCOHOL, NORMAL, see	1274	3	
PROPYLAMINE	1277	3	
n-PROPYLBENZENE	2364	3	
Propyl chloride, see	1278	3	
n-PROPYL CHLOROFORMATE	2740	6.1	
PROPYLENE	1077	2	
PROPYLENE CHLOROHYDRIN	2611	6.1	
1,2-PROPYLENEDIAMINE	2258	8	
Propylene dichloride, see	1279	3	
PROPYLENEIMINE, STABILIZED	1921	3	
PROPYLENE OXIDE	1280	3	
PROPYLENE TETRAMER	2850	3	
Propylene trimer, see	2057	3	
PROPYL FORMATES	1281	3	
n-PROPYL ISOCYANATE	2482	6.1	
Propyl mercaptan, see	2402	3	
n-PROPYL NITRATE	1865	3	
PROPYLTRICHLOROSILANE	1816	8	
Pyrazine hexahydride, see	2579	8	
PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3350	3	
PYRETHROID PESTICIDE, LIQUID, TOXIC	3352	6.1	
PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3351	6.1	
PYRETHROID PESTICIDE, SOLID, TOXIC	3349	6.1	
PYRIDINE	1282	3	
Pyrophoric organometallic compound, water-reactive, n.o.s., liquid, see	3394	4.2	
Pyrophoric organometallic compound, water-reactive, n.o.s., solid, see	3393	4.2	
PYROPHORIC ALLOY, N.O.S.	1383	4.2	
PYROPHORIC LIQUID, INORGANIC, N.O.S.	3194	4.2	
PYROPHORIC LIQUID, ORGANIC, N.O.S.	2845	4.2	
PYROPHORIC METAL, N.O.S.	1383	4.2	
PYROPHORIC SOLID, INORGANIC, N.O.S.	3200	4.2	
PYROPHORIC SOLID, ORGANIC, N.O.S.	2846	4.2	
PYROSULPHURYL CHLORIDE	1817	8	
Pyroxylin solution, see	2059	3	
PYRROLIDINE	1922	3	
QUINOLINE	2656	6.1	
Quinone, see	2587	6.1	
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM	2909	7	
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING	2908	7	
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES	2911	7	

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RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL	2910	7	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non fissile or fissile-excepted	2912	7	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE	3324	7	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted	3321	7	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE	3325	7	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted	3322	7	
RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE	3326	7	
RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), non fissile or fissile-excepted	2913	7	
RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE	3331	7	
RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non fissile or fissile-excepted	2919	7	
RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form	3327	7	
RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non fissile or fissile-excepted	2915	7	
RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE	3333	7	
RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted	3332	7	
RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE	3329	7	
RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non fissile or fissile-excepted	2917	7	
RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE	3328	7	
RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non fissile or fissile-excepted	2916	7	
RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE	3330	7	
RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted	3323	7	
RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE	2977	7	
RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non fissile or fissile-excepted	2978	7	
Rags, oily	1856	4.2	Not subject to ADN
RDX, see	0072 0391 0483	1 1 1	
RECEPTACLES, SMALL, CONTAINING GAS without a release device, non-refillable	2037	2	
Red phosphorus, see	1338	4.1	
REFRIGERANT GAS, N.O.S., such as mixture F1, mixture F2 or mixture P2	1078	2	
REFRIGERANT GAS R 12, see	1028	2	
REFRIGERANT GAS R 12B1, see	1974	2	
REFRIGERANT GAS R 13, see	1022	2	
REFRIGERANT GAS R 13B1, see	1009	2	
REFRIGERANT GAS R 14, see	1982	2	
REFRIGERANT GAS R 21, see	1029	2	
REFRIGERANT GAS R 22, see	1018	2	
REFRIGERANT GAS R 23, see	1984	2	
REFRIGERANT GAS R 32, see	3252	2	
REFRIGERANT GAS R 40, see	1063	2	
REFRIGERANT GAS R 41, see	2454	2	
REFRIGERANT GAS R 114, see	1958	2	

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Name and description	UN No.	Class	Remarks
REFRIGERANT GAS R 115, see	1020	2	
REFRIGERANT GAS R 116, see	2193	2	
REFRIGERANT GAS R 124, see	1021	2	
REFRIGERANT GAS R 125, see	3220	2	
REFRIGERANT GAS R 133a, see	1983	2	
REFRIGERANT GAS R 134a, see	3159	2	
REFRIGERANT GAS R 142b, see	2517	2	
REFRIGERANT GAS R 143a, see	2035	2	
REFRIGERANT GASR 152a, see	1030	2	
REFRIGERANT GAS R 161, see	2453	2	
REFRIGERANT GAS R 218, see	2424	2	
REFRIGERANT GAS R 227, see	3296	2	
REFRIGERANT GAS R 404A	3337	2	
REFRIGERANT GAS R 407A	3338	2	
REFRIGERANT GAS R 407B	3339	2	
REFRIGERANT GAS R 407C	3340	2	
REFRIGERANT GAS R 500, see	2602	2	
REFRIGERANT GAS R 502, see	1973	2	
REFRIGERANT GAS R 503, see	2599	2	
REFRIGERANT GAS R 1132a, see	1959	2	
REFRIGERANT GAS R 1216, see	1858	2	
REFRIGERANT GAS R 1318, see	2422	2	
REFRIGERANT GAS RC 318, see	1976	2	
REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas	3358	2	
REFRIGERATING MACHINES containing non-flammable, non-toxic, gases or ammonia solutions (UN 2672)	2857	2	
REGULATED MEDICAL WASTE, N.O.S.	3291	6.2	
RELEASE DEVICES, EXPLOSIVE	0173	1	
RESIN SOLUTION, flammable	1866	3	
Resorcin, see	2876	6.1	
RESORCINOL	2876	6.1	
RIVETS, EXPLOSIVE	0174	1	
Road oil, with a flash-point not greater than 60 °C, see	1999	3	
Road oil, with a flash-point above 60 °C, at or above its flash-point, see	3256	3	
Road oil, at or above 100 °C and below its flash-point, see	3257	9	
ROCKET MOTORS	0186 0280 0281 0510	1 1 1 1	
ROCKET MOTORS, LIQUID FUELLED	0395 0396	1 1	
ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	0250 0322	1 1	
ROCKETS with bursting charge	0180 0181 0182 0295	1 1 1 1	
ROCKETS with expelling charge	0436 0437 0438	1 1 1	
ROCKETS with inert head	0183 0502	1 1	
ROCKETS, LINE-THROWING	0238 0240 0453	1 1 1	
ROCKETS, LIQUID FUELLED with bursting charge	0397 0398	1 1	
ROSIN OIL	1286	3	
RUBBER SCRAP, powdered or granulated	1345	4.1	
RUBBER SHODDY, powdered or granulated	1345	4.1	
RUBBER SOLUTION	1287	3	
RUBIDIUM	1423	4.3	
RUBIDIUM HYDROXIDE	2678	8	
RUBIDIUM HYDROXIDE SOLUTION	2677	8	
Rubidium nitrate, see	1477	5.1	
SAFETY DEVICES, electrically initiated	3268	9	
SAFETY DEVICES, PYROTECHNIC	0503	1	
Saltpetre, see	1486	5.1	

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SAMPLES, EXPLOSIVE, other than initiating explosive	0190	1	
Sand acid, see	1778	8	
Seat-belt pretensioners, see	0503 3268	1 9	
SEED CAKE with more than 1.5% oil and not more than 11% moisture	1386	4.2	
SEED CAKE with not more than 1.5% oil and not more than 11% moisture	2217	4.2	
Seed expellers, see	1386 2217	4.2 4.2	
SELENATES	2630	6.1	
SELENIC ACID	1905	8	
SELENITES	2630	6.1	
SELENIUM COMPOUND, LIQUID, N.O.S.	3440	6.1	
SELENIUM COMPOUND, SOLID, N.O.S.	3283	6.1	
SELENIUM DISULPHIDE	2657	6.1	
SELENIUM HEXAFLUORIDE	2194	2	
SELENIUM OXYCHLORIDE	2879	8	
SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	3188	4.2	
SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	3185	4.2	
SELF-HEATING LIQUID, INORGANIC, N.O.S.	3186	4.2	
SELF-HEATING LIQUID, ORGANIC, N.O.S.	3183	4.2	
SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	3187	4.2	
SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	3184	4.2	
SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	3192	4.2	
SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	3126	4.2	
SELF-HEATING SOLID, INORGANIC, N.O.S.	3190	4.2	
SELF-HEATING SOLID, ORGANIC, N.O.S.	3088	4.2	
SELF-HEATING SOLID, OXIDIZING, N.O.S	3127	4.2	Carriage prohi-bited
SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	3191	4.2	
SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.	3128	4.2	
SELF-REACTIVE LIQUID TYPE B	3221	4.1	
SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED	3231	4.1	
SELF-REACTIVE LIQUID TYPE C	3223	4.1	
SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED	3233	4.1	
SELF-REACTIVE LIQUID TYPE D	3225	4.1	
SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED	3235	4.1	
SELF-REACTIVE LIQUID TYPE E	3227	4.1	
SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED	3237	4.1	
SELF-REACTIVE LIQUID TYPE F	3229	4.1	
SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED	3239	4.1	
SELF-REACTIVE SOLID TYPE B	3222	4.1	
SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED	3232	4.1	
SELF-REACTIVE SOLID TYPE C	3224	4.1	
SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED	3234	4.1	
SELF-REACTIVE SOLID TYPE D	3226	4.1	
SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED	3236	4.1	
SELF-REACTIVE SOLID TYPE E	3228	4.1	

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Name and description	UN No.	Class	Remarks
SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED	3238	4.1	
SELF-REACTIVE SOLID TYPE F	3230	4.1	
SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED	3240	4.1	
SHALE OIL	1288	3	
Shaped charges, see	0059	1	
	0439	1	
	0440	1	
	0441	1	
Shellac, see	1263	3	
	3066	8	
	3469	3	
	3470	8	
SIGNAL DEVICES, HAND	0191	1	
	0373	1	
SIGNALS, DISTRESS, ship	0194	1	
	0195	1	
	0505	1	
	0506	1	
Signals, distress, ship, water-activated, see	0249	1	
SIGNALS, RAILWAY TRACK, EXPLOSIVE	0192	1	
	0193	1	
	0492	1	
	0493	1	
SIGNALS, SMOKE	0196	1	
	0197	1	
	0313	1	
	0487	1	
	0507	1	
SILANE	2203	2	
Silicofluoric acid, see	1778	8	
Silicofluorides, n.o.s., see	2856	6.1	
Silicon chloride, see	1818	8	
SILICON POWDER, AMORPHOUS	1346	4.1	
SILICON TETRACHLORIDE	1818	8	
SILICON TETRAFLUORIDE	1859	2	
SILICON TETRAFLUORIDE, ADSORBED	3521	2	
SILVER ARSENITE	1683	6.1	
SILVER CYANIDE	1684	6.1	
SILVER NITRATE	1493	5.1	
SILVER PICRATE, WETTED with not less than 30% water, by mass	1347	4.1	
SLUDGE ACID	1906	8	
SODA LIME with more than 4% sodium hydroxide	1907	8	
SODIUM	1428	4.3	
Sodium aluminate, solid	2812	8	Not subject to ADN
SODIUM ALUMINATE SOLUTION	1819	8	
SODIUM ALUMINIUM HYDRIDE	2835	4.3	
SODIUM AMMONIUM VANADATE	2863	6.1	
SODIUM ARSANILATE	2473	6.1	
SODIUM ARSENATE	1685	6.1	
SODIUM ARSENITE, AQUEOUS SOLUTION	1686	6.1	
SODIUM ARSENITE, SOLID	2027	6.1	
SODIUM AZIDE	1687	6.1	
Sodium bifluoride, see	2439	8	
Sodium binoxide, see	1504	5.1	
Sodium bisulphite solution, see	2693	8	
SODIUM BOROHYDRIDE	1426	4.3	
SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE SOLUTION, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide by mass	3320	8	
SODIUM BROMATE	1494	5.1	
SODIUM CACODYLATE	1688	6.1	
SODIUM CARBONATE PEROXYHYDRATE	3378	5.1	
SODIUM CHLORATE	1495	5.1	
SODIUM CHLORATE, AQUEOUS SOLUTION	2428	5.1	
Sodium chlorate mixed with dinitrotoluene, see	0083	1	
SODIUM CHLORITE	1496	5.1	
SODIUM CHLOROACETATE	2659	6.1	

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Name and description	UN No.	Class	Remarks
SODIUM CUPROCYANIDE, SOLID	2316	6.1	
SODIUM CUPROCYANIDE SOLUTION	2317	6.1	
SODIUM CYANIDE, SOLID	1689	6.1	
SODIUM CYANIDE, SOLUTION	3414	6.1	
Sodium dicyanocuprate (I), solid, see	2316	6.1	
Sodium dicyanocuprate (I) solution, see	2317	6.1	
Sodium dimethylarsenate, see	1688	6.1	
SODIUM DINITRO-o-CRESOLATE, dry or wetted with less than 15% water, by mass	0234	1	
SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 10% water, by mass	3369	4.1	
SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 15% water, by mass	1348	4.1	
Sodium dioxide, see	1504	5.1	
SODIUM DITHIONITE	1384	4.2	
SODIUM FLUORIDE, SOLID	1690	6.1	
SODIUM FLUORIDE, SOLUTION	3415	6.1	
SODIUM FLUOROACETATE	2629	6.1	
SODIUM FLUOROSILICATE	2674	6.1	
Sodium hexafluorosilicate, see	2674	6.1	
Sodium hydrate, see	1824	8	
SODIUM HYDRIDE	1427	4.3	
Sodium hydrogen 4-amino-phenylarsenate, see	2473	6.1	
SODIUM HYDROGENDIFLUORIDE	2439	8	
SODIUM HYDROSULPHIDE with less than 25% water of crystallization	2318	4.2	
SODIUM HYDROSULPHIDE, HYDRATED with not less than 25% water of crystallization	2949	8	
SODIUM HYDROSULPHITE, see	1384	4.2	
SODIUM HYDROXIDE, SOLID	1823	8	
SODIUM HYDROXIDE SOLUTION	1824	8	
Sodium metasilicate pentahydrate, see	3253	8	
SODIUM METHYLATE	1431	4.2	
SODIUM METHYLATE SOLUTION in alcohol	1289	3	
SODIUM MONOXIDE	1825	8	
SODIUM NITRATE	1498	5.1	
SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	1499	5.1	
SODIUM NITRITE	1500	5.1	
Sodium nitrite and potassium nitrate mixture, see	1487	5.1	
SODIUM PENTACHLOROPHENATE	2567	6.1	
SODIUM PERBORATE MONOHYDRATE	3377	5.1	
SODIUM PERCHLORATE	1502	5.1	
SODIUM PERMANGANATE	1503	5.1	
SODIUM PEROXIDE	1504	5.1	
SODIUM PEROXOBORATE, ANHYDROUS	3247	5.1	
SODIUM PERSULPHATE	1505	5.1	
SODIUM PHOSPHIDE	1432	4.3	
SODIUM PICRAMATE, dry or wetted with less than 20% water, by mass	0235	1	
SODIUM PICRAMATE, WETTED with not less than 20% water, by mass	1349	4.1	
Sodium potassium alloys, liquid, see	1422	4.3	
Sodium selenate, see	2630	6.1	
Sodium selenite, see	2630	6.1	
Sodium silicofluoride, see	2674	6.1	
SODIUM SULPHIDE, ANHYDROUS	1385	4.2	
SODIUM SULPHIDE with less than 30% water of crystallization	1385	4.2	
SODIUM SULPHIDE, HYDRATED with not less than 30% water	1849	8	
SODIUM SUPEROXIDE	2547	5.1	

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Name and description	UN No.	Class	Remarks
SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.	3244	8	
SOLIDS or mixtures of solids (such as preparations and wastes) CONTAINING FLAMMABLE LIQUID, N.O.S. having a flash-point up to 60°C	3175	4.1	
SOLIDS CONTAINING TOXIC LIQUID, N.O.S.	3243	6.1	
Solvents, flammable, n.o.s., see	1993	3	
Solvents, flammable, toxic, n.o.s., see	1992	3	
SOUNDING DEVICES, EXPLOSIVE	0204	1	
	0296	1	
	0374	1	
	0375	1	
Squibs, see	0325	1	
	0454	1	
Stain, see	1263	3	
	3066	8	
	3469	3	
	3470	8	
STANNIC CHLORIDE, ANHYDROUS	1827	8	
STANNIC CHLORIDE PENTAHYDRATE	2440	8	
STANNIC PHOSPHIDES	1433	4.3	
Steel swarf, see	2793	4.2	
STIBINE	2676	2	
Straw	1327	4.1	Not subject to ADN
Strontium alloys, pyrophoric, see	1383	4.2	
STRONTIUM ARSENITE	1691	6.1	
STRONTIUM CHLORATE	1506	5.1	
Strontium dioxide, see	1509	5.1	
STRONTIUM NITRATE	1507	5.1	
STRONTIUM PERCHLORATE	1508	5.1	
STRONTIUM PEROXIDE	1509	5.1	
STRONTIUM PHOSPHIDE	2013	4.3	
STRYCHNINE	1692	6.1	
STRYCHNINE SALTS	1692	6.1	
STYPHNIC ACID, see	0219	1	
	0394	1	
STYRENE MONOMER, STABILIZED	2055	3	
SUBSTANCES, EVI, N.O.S., see	0482	1	
SUBSTANCES, EXPLOSIVE, N.O.S.	0357	1	
	0358	1	
	0359	1	
	0473	1	
	0474	1	
	0475	1	
	0476	1	
	0477	1	
	0478	1	
	0479	1	
	0480	1	
	0481	1	
	0485	1	
SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE, N.O.S.	0482	1	
Substances liable to spontaneous combustion, n.o.s., see	2845	4.2	
	2846	4.2	
	3194	4.2	
	3200	4.2	
SUBSTANCES WITH A FLASH-POINT ABOVE 60 ºC which are carried heated within a limiting range of 15K below their flash-point	9001	3	Dangerous in tank vessels only
SUBSTANCES WITH A FLASH-POINT ABOVE 60 ºC AND NOT MORE THAN 100 ºC, which do not belong to another Class	9003	9	Dangerous in tank vessels only
SUBSTANCES WITH AN AUTO-IGNITION TEMPERATURE OF 200 ºC AND BELOW, n.o.s.	9002	3	Dangerous in tank vessels only
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2780	3	
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	3014	6.1	
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3013	6.1	
SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	2779	6.1	
SULPHAMIC ACID	2967	8	
SULPHUR	1350	4.1	
SULPHUR CHLORIDES	1828	8	

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Sulphur dichloride, see	1828	8	
SULPHUR DIOXIDE	1079	2	
Sulphuretted hydrogen, see	1053	2	
SULPHUR HEXAFLUORIDE	1080	2	
SULPHURIC ACID with more than 51% acid	1830	8	
SULPHURIC ACID with not more than 51% acid	2796	8	
SULPHURIC ACID, FUMING	1831	8	
SULPHURIC ACID, SPENT	1832	8	
Sulphuric and hydrofluoric acid mixture, see	1786	8	
SULPHUR, MOLTEN	2448	4.1	
Sulphur monochloride, see	1828	8	
SULPHUROUS ACID	1833	8	
SULPHUR TETRAFLUORIDE	2418	2	
SULPHUR TRIOXIDE, STABILIZED	1829	8	
SULPHURYL CHLORIDE	1834	6.1	
SULPHURYL FLUORIDE	2191	2	
Table Tennis Balls, see	2000	4.1	
Talcum with tremolite and/or actinolite, see	2212	9	
TARS, LIQUID, including road oils and cutback bitumens, with a flash-point not greater than 60 °C	1999	3	
Tars, liquid, with a flash-point above 60 °C, at or above its flash-point, see	3256	3	
Tars, liquid, at or above 100 °C and below its flash-point, see	3257	9	
Tartar emetic, see	1551	6.1	
TEAR GAS CANDLES	1700	6.1	
TEAR GAS SUBSTANCE, LIQUID, N.O.S.	1693	6.1	
TEAR GAS SUBSTANCE, SOLID, N.O.S.	3448	6.1	
TELLURIUM COMPOUND, N.O.S.	3284	6.1	
TELLURIUM HEXAFLUORIDE	2195	2	
TERPENE HYDROCARBONS, N.O.S.	2319	3	
TERPINOLENE	2541	3	
TETRABROMOETHANE	2504	6.1	
1,1,2,2-TETRACHLOROETHANE	1702	6.1	
TETRACHLOROETHYLENE	1897	6.1	
TETRAETHYL DITHIO-PYROPHOSPHATE	1704	6.1	
TETRAETHYLENEPENTAMINE	2320	8	
Tetraethyl lead, see	1649	6.1	
TETRAETHYL SILICATE	1292	3	
Tetraethyoxysilane, see	1292	3	
Tetrafluorodichloroethane, see	1958	2	
1,1,1,2-TETRAFLUOROETHANE	3159	2	
TETRAFLUOROETHYLENE, STABILIZED	1081	2	
TETRAFLUOROMETHANE	1982	2	
1,2,3,6-TETRAHYDRO-BENZALDEHYDE	2498	3	
TETRAHYDROFURAN	2056	3	
TETRAHYDRO-FURFURYLAMINE	2943	3	
Tetrahydro-1,4-oxazine, see	2054	3	
TETRAHYDROPHTHALIC ANHYDRIDES with more than 0.05% of maleic anhydride	2698	8	
1,2,3,6-TETRAHYDROPYRIDINE	2410	3	
TETRAHYDROTHIOPHENE	2412	3	
Tetramethoxysilane, see	2606	6.1	
TETRAMETHYLAMMONIUM HYDROXIDE, SOLID	3423	8	
TETRAMETHYLAMMONIUM HYDROXIDE, SOLUTION	1835	8	
Tetramethylene, see	2601	2	
Tetramethylene cyanide, see	2205	6.1	
Tetramethyl lead, see	1649	6.1	
TETRAMETHYLSILANE	2749	3	
TETRANITROANILINE	0207	1	

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TETRANITROMETHANE	1510	6.1	
TETRAPROPYL ORTHOTITANATE	2413	3	
TETRAZENE, WETTED with not less than 30% water, or mixture of alcohol and water, by mass, see	0114	1	
TETRAZOL-1-ACETIC ACID	0407	1	
1H-TETRAZOLE	0504	1	
TETRYL, see	0208	1	
Textile waste, wet	1857	4.2	Not subject to ADN
THALLIUM CHLORATE	2573	5.1	
Thallium (I) chlorate, see	2573	5.1	
THALLIUM COMPOUND, N.O.S.	1707	6.1	
THALLIUM NITRATE	2727	6.1	
Thallium (I) nitrate, see	2727	6.1	
Thallous chlorate, see	2573	5.1	
4-THIAPENTANAL	2785	6.1	
Thia-4-pentanal, see	2785	6.1	
THIOACETIC ACID	2436	3	
THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2772	3	
THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	3006	6.1	
THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3005	6.1	
THIOCARBAMATE PESTICIDE, SOLID, TOXIC	2771	6.1	
THIOGLYCOL	2966	6.1	
THIOGLYCOLIC ACID	1940	8	
THIOLACTIC ACID	2936	6.1	
THIONYL CHLORIDE	1836	8	
THIOPHENE	2414	3	
Thiophenol, see	2337	6.1	
THIOPHOSGENE	2474	6.1	
THIOPHOSPHORYL CHLORIDE	1837	8	
THIOUREA DIOXIDE	3341	4.2	
Tin (IV) chloride, anhydrous, see	1827	8	
Tin (IV) chloride pentahydrate, see	2440	8	
TINCTURES, MEDICINAL	1293	3	
Tin tetrachloride, see	1827	8	
TITANIUM DISULPHIDE	3174	4.2	
TITANIUM HYDRIDE	1871	4.1	
TITANIUM POWDER, DRY	2546	4.2	
TITANIUM POWDER, WETTED with not less than 25% water	1352	4.1	
TITANIUM SPONGE GRANULES	2878	4.1	
TITANIUM SPONGE POWDERS	2878	4.1	
TITANIUM TETRACHLORIDE	1838	6.1	
TITANIUM TRICHLORIDE MIXTURE	2869	8	
TITANIUM TRICHLORIDE MIXTURE, PYROPHORIC	2441	4.2	
TITANIUM TRICHLORIDE, PYROPHORIC	2441	4.2	
TNT, see	0209 0388 0389	1 1 1	
TNT mixed with aluminium, see	0390	1	
TNT, WETTED with not less than 30% water, by mass, see	1356	4.1	
TNT, WETTED with not less than 10% water, by mass, see	3366	4.1	
Toe puffs, nitrocellulose base, see	1353	4.1	
TOLUENE	1294	3	
TOLUENE DIISOCYANATE	2078	6.1	
TOLUIDINES, LIQUID	1708	6.1	
TOLUIDINES, SOLID	3451	6.1	
Toluol, see	1294	3	
2,4-TOLUYLENEDIAMINE, SOLID	1709	6.1	
2,4-TOLUYLENEDIAMINE, SOLUTION	3418	6.1	
Toluylene diisocyanate, see	2078	6.1	
Tolylene diisocyanate, see	2078	6.1	

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Tolylethylene, inhibited, see	2618	3	
TORPEDOES with bursting charge	0329 0330 0451	1 1 1	
TORPEDOES, LIQUID FUELLED with inert head	0450	1	
TORPEDOES, LIQUID FUELLED with or without bursting charge	0449	1	
TOXIC BY INHALATION LIQUID, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	3381	6.1	
TOXIC BY INHALATION LIQUID, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	3382	6.1	
TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	3389	6.1	
TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	3390	6.1	
TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	3383	6.1	
TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	3384	6.1	
TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3488	6.1	
TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3489	6.1	
TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	3387	6.1	
TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	3388	6.1	
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	3385	6.1	
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}	3386	6.1	
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3490	6.1	
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC_{50} lower than or equal to 1000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3491	6.1	
TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	3289	6.1	
TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	2927	6.1	
TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	2929	6.1	
TOXIC LIQUID, INORGANIC, N.O.S.	3287	6.1	
TOXIC LIQUID, ORGANIC, N.O.S.	2810	6.1	
TOXIC LIQUID, OXIDIZING, N.O.S.	3122	6.1	
TOXIC LIQUID, WATER-REACTIVE, N.O.S.	3123	6.1	
TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	3290	6.1	
TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	2928	6.1	

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TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.	3535	6.1	
TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	2930	6.1	
TOXIC SOLID, INORGANIC, N.O.S.	3288	6.1	
TOXIC SOLID, ORGANIC, N.O.S.	2811	6.1	
TOXIC SOLID, OXIDIZING, N.O.S.	3086	6.1	
TOXIC SOLID, SELF-HEATING, N.O.S.	3124	6.1	
TOXIC SOLID, WATER-REACTIVE, N.O.S.	3125	6.1	
TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	3172	6.1	
TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	3462	6.1	
TRACERS FOR AMMUNITION	0212 0306	1 1	
Tremolite, see	2212	9	
TRIALLYLAMINE	2610	3	
TRIALLYL BORATE	2609	6.1	
TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2764	3	
TRIAZINE PESTICIDE, LIQUID, TOXIC	2998	6.1	
TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	2997	6.1	
TRIAZINE PESTICIDE, SOLID, TOXIC	2763	6.1	
Tribromoborane, see	2692	8	
TRIBUTYLAMINE	2542	6.1	
TRIBUTYLPHOSPHANE	3254	4.2	
Trichloroacetaldehyde, see	2075	6.1	
TRICHLOROACETIC ACID	1839	8	
TRICHLOROACETIC ACID SOLUTION	2564	8	
Trichlororaceticaldehyde, see	2075	6.1	
TRICHLOROACETYL CHLORIDE	2442	8	
TRICHLOROBENZENES, LIQUID	2321	6.1	
TRICHLOROBUTENE	2322	6.1	
1,1,1-TRICHLOROETHANE	2831	6.1	
TRICHLOROETHYLENE	1710	6.1	
TRICHLOROISOCYANURIC ACID, DRY	2468	5.1	
Trichloronitromethane, see	1580	6.1	
TRICHLOROSILANE	1295	4.3	
1,3,5-Trichloro-s-triazine-2,4,6-trione, see	2468	5.1	
2,4,6-Trichloro-1,3,5- triazine, see	2670	8	
TRICRESYL PHOSPHATE with more than 3% ortho isomer	2574	6.1	
TRIETHYLAMINE	1296	3	
Triethyl borate, see	1176	3	
TRIETHYLENETETRAMINE	2259	8	
Triethyl orthoformate, see	2524	3	
TRIETHYL PHOSPHITE	2323	3	
TRIFLUOROACETIC ACID	2699	8	
TRIFLUOROACETYL CHLORIDE	3057	2	
Trifluorobromomethane, see	1009	2	
Trifluorochloroethane, see	1983	2	
TRIFLUOROCHLOROETHYLENE, STABILIZED, REFRIGERANT GAS R 1113	1082	2	
Trifluorochloromethane, see	1022	2	
1,1,1-TRIFLUOROETHANE	2035	2	
TRIFLUOROMETHANE	1984	2	
TRIFLUOROMETHANE, REFRIGERATED LIQUID	3136	2	
2-TRIFLUOROMETHYLANILINE	2942	6.1	
3-TRIFLUOROMETHYLANILINE	2948	6.1	
TRIISOBUTYLENE	2324	3	
TRIISOPROPYL BORATE	2616	3	
TRIMETHYLACETYL CHLORIDE	2438	6.1	
TRIMETHYLAMINE, ANHYDROUS	1083	2	

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Name and description	UN No.	Class	Remarks
TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	1297	3	
1,3,5-TRIMETHYLBENZENE	2325	3	
TRIMETHYL BORATE	2416	3	
TRIMETHYLCHLOROSILANE	1298	3	
TRIMETHYLCYCLO-HEXYLAMINE	2326	8	
Trimethylene chlorobromide, see	2688	6.1	
TRIMETHYLHEXA-METHYLENEDIAMINES	2327	8	
TRIMETHYLHEXAMETHYLENE DIISOCYANATE	2328	6.1	
2,4,4-Trimethylpentene-1, see	2050	3	
2,4,4-Trimethylpentene-2, see	2050	3	
TRIMETHYL PHOSPHITE	2329	3	
TRINITROANILINE	0153	1	
TRINITROANISOLE	0213	1	
TRINITROBENZENE, dry or wetted with less than 30% water, by mass	0214	1	
TRINITROBENZENE, WETTED with not less than 10% water, by mass	3367	4.1	
TRINITROBENZENE, WETTED with not less than 30% water, by mass	1354	4.1	
TRINITROBENZENE-SULPHONIC ACID	0386	1	
TRINITROBENZOIC ACID, dry or wetted with less than 30% water, by mass	0215	1	
TRINITROBENZOIC ACID, WETTED with not less than 10% water, by mass	3368	4.1	
TRINITROBENZOIC ACID, WETTED with not less than 30% water, by mass	1355	4.1	
TRINITROCHLOROBENZENE	0155	1	
TRINITROCHLOROBENZENE WETTED with not less than 10% water, by mass	3365	4.1	
TRINITRO-m-CRESOL	0216	1	
TRINITROFLUORENONE	0387	1	
TRINITRONAPHTHALENE	0217	1	
TRINITROPHENETOLE	0218	1	
TRINITROPHENOL, dry or wetted with less than 30% water, by mass	0154	1	
TRINITROPHENOL (PICRIC ACID), WETTED with not less than 30% water, by mass	1344	4.1	
TRINITROPHENOL WETTED with not less than 10% water, by mass	3364	4.1	
TRINITROPHENYL-METHYLNITRAMINE	0208	1	
TRINITRORESORCINOL, dry or wetted with less than 20% water, or mixture of alcohol and water, by mass	0219	1	
TRINITRORESORCINOL, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	0394	1	
TRINITROTOLUENE (TNT), dry or wetted with less than 30% water, by mass	0209	1	
TRINITROTOLUENE AND HEXANITROSTILBENE MIXTURE	0388	1	
TRINITROTOLUENE MIXTURE CONTAINING TRINITROBENZENE AND HEXANITROSTILBENE	0389	1	
TRINITROTOLUENE AND TRINITROBENZENE MIXTURE	0388	1	
TRINITROTOLUENE, WETTED with not less than 10% water, by mass	3366	4.1	
TRINITROTOLUENE, WETTED with not less than 30% water, by mass	1356	4.1	
TRIPROPYLAMINE	2260	3	
TRIPROPYLENE	2057	3	
TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	2501	6.1	
TRITONAL	0390	1	
Tropilidene, see	2603	3	
TUNGSTEN HEXAFLUORIDE	2196	2	
TURPENTINE	1299	3	
TURPENTINE SUBSTITUTE	1300	3	

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Name and description	UN No.	Class	Remarks
UNDECANE	2330	3	
URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, less than 0.1 kg per package, non-fissile or fissile-excepted	3507	6.1	
UREA HYDROGEN PEROXIDE	1511	5.1	
UREA NITRATE, dry or wetted with less than 20% water, by mass	0220	1	
UREA NITRATE, WETTED with not less than 10% water, by mass	3370	4.1	
UREA NITRATE, WETTED with not less than 20% water, by mass	1357	4.1	
Valeral, see	2058	3	
VALERALDEHYDE	2058	3	
n-Valeraldehyde, see	2058	3	
Valeric aldehyde, see	2058	3	
VALERYL CHLORIDE	2502	8	
VANADIUM COMPOUND, N.O.S.	3285	6.1	
Vanadium (IV) oxide sulphate, see	2931	6.1	
Vanadium oxysulphate, see	2931	6.1	
VANADIUM OXYTRICHLORIDE	2443	8	
VANADIUM PENTOXIDE, non-fused form	2862	6.1	
VANADIUM TETRACHLORIDE	2444	8	
VANADIUM TRICHLORIDE	2475	8	
VANADYL SULPHATE	2931	6.1	
Varnish, see	1263 3066 3469 3470	3 8 3 8	
VEHICLE, FLAMMABLE GAS POWERED	3166	9	
VEHICLE, FLAMMABLE LIQUID POWERED	3166	9	
VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED	3166	9	
VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED	3166	9	
Villiaumite, see	1690	6.1	
VINYL ACETATE, STABILIZED	1301	3	
Vinylbenzene, see	2055	3	
VINYL BROMIDE, STABILIZED	1085	2	
VINYL BUTYRATE, STABILIZED	2838	3	
VINYL CHLORIDE, STABILIZED	1086	2	
VINYL CHLOROACETATE	2589	6.1	
VINYL ETHYL ETHER, STABILIZED	1302	3	
VINYL FLUORIDE, STABILIZED	1860	2	
VINYLIDENE CHLORIDE, STABILIZED	1303	3	
VINYL ISOBUTYL ETHER, STABILIZED	1304	3	
VINYL METHYL ETHER, STABILIZED	1087	2	
VINYLPYRIDINES, STABILIZED	3073	6.1	
VINYLTOLUENES, STABILIZED	2618	3	
VINYLTRICHLOROSILANE	1305	3	
Warheads for guided missiles, see	0286 0287 0369 0370 0371	1 1 1 1 1	
WARHEADS, ROCKET with burster or expelling charge	0370 0371	1 1	
WARHEADS, ROCKET with bursting charge	0286 0287 0369	1 1 1	
WARHEADS, TORPEDO with bursting charge	0221	1	
WATER-REACTIVE LIQUID, N.O.S.	3148	4.3	
WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	3129	4.3	
WATER-REACTIVE LIQUID, TOXIC, N.O.S.	3130	4.3	
WATER-REACTIVE SOLID, N.O.S.	2813	4.3	
WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	3131	4.3	

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Name and description	UN No.	Class	Remarks
WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	3132	4.3	
WATER-REACTIVE SOLID, OXIDIZING, N.O.S.	3133	4.3	Carriage prohi-bited
WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	3135	4.3	
WATER-REACTIVE SOLID, TOXIC, N.O.S.	3134	4.3	
White arsenic, see	1561	6.1	
White spirit, see	1300	3	
WOOD PRESERVATIVES, LIQUID	1306	3	
Wool waste, wet	1387	4.2	Not subject to ADN
XANTHATES	3342	4.2	
XENON	2036	2	
XENON, REFRIGERATED LIQUID	2591	2	
XYLENES	1307	3	
XYLENOLS, LIQUID	3430	6.1	
XYLENOLS, SOLID	2261	6.1	
XYLIDINES, LIQUID	1711	6.1	
XYLIDINES, SOLID	3452	6.1	
Xylols, see	1307	3	
XYLYL BROMIDE, LIQUID	1701	6.1	
XYLYL BROMIDE, SOLID	3417	6.1	
ZINC AMMONIUM NITRITE	1512	5.1	
ZINC ARSENATE	1712	6.1	
ZINC ARSENATE AND ZINC ARSENITE MIXTURE	1712	6.1	
ZINC ARSENITE	1712	6.1	
ZINC ASHES	1435	4.3	
Zinc bisulphite solution, see	2693	8	
ZINC BROMATE	2469	5.1	
ZINC CHLORATE	1513	5.1	
ZINC CHLORIDE, ANHYDROUS	2331	8	
ZINC CHLORIDE SOLUTION	1840	8	
ZINC CYANIDE	1713	6.1	
ZINC DITHIONITE	1931	9	
ZINC DUST	1436	4.3	
ZINC FLUOROSILICATE	2855	6.1	
Zinc hexafluorosilicate, see	2855	6.1	
ZINC HYDROSULPHITE, see	1931	9	
ZINC NITRATE	1514	5.1	
ZINC PERMANGANATE	1515	5.1	
ZINC PEROXIDE	1516	5.1	
ZINC PHOSPHIDE	1714	4.3	
ZINC POWDER	1436	4.3	
ZINC RESINATE	2714	4.1	
Zinc selenate, see	2630	4.1	
Zinc selenite, see	2630	4.1	
Zinc silicofluoride, see	2855	6.1	
ZIRCONIUM, DRY, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)	2858	4.1	
ZIRCONIUM, DRY, finished sheets, strip or coiled wire	2009	4.2	
ZIRCONIUM HYDRIDE	1437	4.1	
ZIRCONIUM NITRATE	2728	5.1	
ZIRCONIUM PICRAMATE, dry or wetted with less than 20% water, by mass	0236	1	
ZIRCONIUM PICRAMATE, WETTED with not less than 20% water, by mass	1517	4.1	
ZIRCONIUM POWDER, DRY	2008	4.2	
ZIRCONIUM POWDER, WETTED with not less than 25% water	1358	4.1	
ZIRCONIUM SCRAP	1932	4.2	
ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID	1308	3	
ZIRCONIUM TETRACHLORIDE	2503	8	

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3.2.3 (See Volume I)

3.2.4 (See Volume I)

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CHAPTER 3.3

SPECIAL PROVISIONS APPLICABLE TO CERTAIN ARTICLES OR SUBSTANCES

3.3.1 When Column (6) of Table A of Chapter 3.2 indicates that a special provision is relevant to a substance or article, the meaning and requirements of that special provision are as set forth below. Where a special provision includes a requirement for package marking, the provisions of 5.2.1.2 (a) and (b) shall be met. If the required mark is in the form of specific wording indicated in quotation marks, such as “LITHIUM BATTERIES FOR DISPOSAL”, the size of the mark shall be at least 12 mm, unless otherwise indicated in the special provision or elsewhere in ADN.

16 Samples of new or existing explosive substances or articles may be carried as directed by the competent authorities (see 2.2.1.1.3) for purposes including: testing, classification, research and development, quality control, or as a commercial sample. Explosive samples which are not wetted or desensitised shall be limited to 10 kg in small packages as specified by the competent authorities. Explosive samples which are wetted or desensitised shall be limited to 25 kg.

23 Even though this substance has a flammability hazard, it only exhibits such hazard under extreme fire conditions in confined areas.

32 This substance is not subject to the requirements of ADN when in any other form.

37 This substance is not subject to the requirements of ADN when coated.

38 This substance is not subject to the requirements of ADN when it contains not more than 0.1% calcium carbide.

39 This substance is not subject to the requirements of ADN when it contains less than 30% or not less than 90% silicon.

43 When offered for carriage as pesticides, these substances shall be carried under the relevant pesticide entry and in accordance with the relevant pesticide provisions (see 2.2.61.1.10 to 2.2.61.1.11.2).

45 Antimony sulphides and oxides which contain not more than 0.5% of arsenic calculated on the total mass are not subject to the requirements of ADN.

47 Ferricyanides and ferrocyanides are not subject to the requirements of ADN.

48 The carriage of this substance, when it contains more than 20% hydrocyanic acid, is prohibited.

59 These substances are not subject to the requirements of ADN when they contain not more than 50% magnesium.

60 If the concentration is more than 72%, the carriage of this substance is prohibited.

61 The technical name which shall supplement the proper shipping name shall be the ISO common name (see also ISO 1750:1981 "*Pesticides and other agrochemicals - common names*", as amended), other names listed in the WHO "*Recommended Classification of Pesticides by Hazard and Guidelines to Classification*" or the name of the active substance (see also 3.1.2.8.1 and 3.1.2.8.1.1).

62 This substance is not subject to the requirements of ADN when it contains not more than 4% sodium hydroxide.

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65 Hydrogen peroxide aqueous solutions with less than 8% hydrogen peroxide are not subject to the requirements of ADN.

66 Cinnabar is not subject to the requirements of ADN.

103 The carriage of ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt is prohibited.

105 Nitrocellulose meeting the descriptions of UN No. 2556 or UN No. 2557 may be classified in Class 4.1.

113 The carriage of chemically unstable mixtures is prohibited.

119 Refrigerating machines include machines or other appliances which have been designed for the specific purpose of keeping food or other items at a low temperature in an internal compartment, and air conditioning units. Refrigerating machines and refrigerating machine components are not subject to the provisions of ADN if they contain less than 12 kg of gas in Class 2, group A or O according to 2.2.2.1.3, or if they contain less than 12 litres ammonia solution (UN No. 2672).

122 The subsidiary hazards, control and emergency temperatures if any, and the UN number (generic entry) for each of the currently assigned organic peroxide formulations are given in 2.2.52.4, 4.1.4.2 packing instruction IBC520 and 4.2.5.2.6 portable tank instruction T23 of ADR.

123 *(Reserved)*

127 Other inert material or inert material mixture may be used, provided this inert material has identical phlegmatizing properties.

131 The phlegmatized substance shall be significantly less sensitive than dry PETN.

135 The dihydrated sodium salt of dichloroisocyanuric acid does not meet the criteria for inclusion in Class 5.1 and is not subject to ADN unless meeting the criteria for inclusion in another Class.

138 p-Bromobenzyl cyanide is not subject to the requirements of ADN.

141 Products which have undergone sufficient heat treatment so that they present no hazard during carriage are not subject to the requirements of ADN.

142 Solvent extracted soya bean meal containing not more than 1.5% oil and 11% moisture, which is substantially free of flammable solvent, is not subject to the requirements of ADN.

144 An aqueous solution containing not more than 24% alcohol by volume is not subject to the requirements of ADN.

145 Alcoholic beverages of packing group III, when carried in receptacles of 250 litres or less, are not subject to the requirements of ADN.

152 The classification of this substance will vary with particle size and packaging, but borderlines have not been experimentally determined. Appropriate classifications shall be made in accordance with 2.2.1.

153 This entry applies only if it is demonstrated, on the basis of tests, that the substances when in contact with water are not combustible nor show a tendency to auto-ignition and that the mixture of gases evolved is not flammable.

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163 A substance mentioned by name in Table A of Chapter 3.2 shall not be carried under this entry. Substances carried under this entry may contain 20% or less nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen (by dry mass).

168 Asbestos which is immersed or fixed in a natural or artificial binder (such as cement, plastics, asphalt, resins or mineral ore) in such a way that no escape of hazardous quantities of respirable asbestos fibres can occur during carriage is not subject to the requirements of ADN. Manufactured articles containing asbestos and not meeting this provision are nevertheless not subject to the requirements of ADN when packed so that no escape of hazardous quantities of respirable asbestos fibres can occur during carriage.

169 Phthalic anhydride in the solid state and tetrahydrophthalic anhydrides, with not more than 0.05% maleic anhydride, are not subject to the requirements of ADN. Phthalic anhydride molten at a temperature above its flash-point, with not more than 0.05% maleic anhydride, shall be classified under UN No. 3256.

172 Where a radioactive material has (a) subsidiary hazard(s):

(a) The substance shall be allocated to packing group I, II or III, if appropriate, by application of the packing group criteria provided in Part 2 corresponding to the nature of the predominant subsidiary hazard;

(b) Packages shall be labelled with subsidiary risk labels corresponding to each subsidiary hazard exhibited by the material; corresponding placards shall be affixed to cargo transport units in accordance with the relevant provisions of 5.3.1;

(c) For the purposes of documentation and package marking, the proper shipping name shall be supplemented with the name of the constituents which most predominantly contribute to this (these) subsidiary hazard(s) and which shall be enclosed in parenthesis;

(d) The dangerous goods transport document shall indicate the label model number(s) corresponding to each subsidiary hazard in parenthesis after the Class number "7" and, where assigned the packing group as required by 5.4.1.1.1 (d).

For packing, see also 4.1.9.1.5 of ADR.

177 Barium sulphate is not subject to the requirements of ADN.

178 This designation shall be used only when no other appropriate designation exists in Table A of Chapter 3.2, and only with the approval of the competent authority of the country of origin (see 2.2.1.1.3).

181 Packages containing this type of substance shall bear a label conforming to model No. 1 (see 5.2.2.2.2) unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.2.2.1.9).

182 The group of alkali metals includes lithium, sodium, potassium, rubidium and caesium.

183 The group of alkaline earth metals includes magnesium, calcium, strontium and barium.

186 *(Deleted)*

188 Cells and batteries offered for carriage are not subject to other provisions of ADN if they meet the following:

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(a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium-ion cell, the Watt-hour rating is not more than 20 Wh;

NOTE: *When lithium batteries in conformity with 2.2.9.1.7 (f) are carried in accordance with this special provision, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh (see special provision 387).*

(b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium-ion battery, the Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case except those manufactured before 1 January 2009;

NOTE: *When lithium batteries in conformity with 2.2.9.1.7 (f) are carried in accordance with this special provision, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh (see special provision 387).*

(c) Each cell or battery meets the provisions of 2.2.9.1.7 (a), (e), (f) if applicable, and (g);

(d) Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit. The inner packagings shall be packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.5 of ADR;

(e) Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. This requirement does not apply to devices which are intentionally active in carriage (radio frequency identification (RFID) transmitters, watches, sensors, etc.) and which are not capable of generating a dangerous evolution of heat. When batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;

(f) Each package shall be marked with the appropriate lithium battery mark, as illustrated in 5.2.1.9;

This requirement does not apply to:

(i) packages containing only button cell batteries installed in equipment (including circuit boards); and

(ii) packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

When packages are placed in an overpack, the lithium battery mark shall either be clearly visible or be reproduced on the outside of the overpack and the

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overpack shall be marked with the word “OVERPACK”. The lettering of the “OVERPACK” mark shall be at least 12 mm high.

NOTE: *Packages containing lithium batteries packed in conformity with the provisions of Part 4, Chapter 11, packing instructions 965 or 968 Section IB of the ICAO Technical Instructions that bear the mark as shown in 5.2.1.9 (lithium battery mark) and the label shown in 5.2.2.2.2, model No. 9A shall be deemed to meet the provisions of this special provision.*

(g) Except when batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and

(h) Except when batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass.

As used above and elsewhere in ADN, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell. As used in this special provision “equipment” means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

Separate entries exist for lithium metal batteries and lithium ion batteries to facilitate the carriage of these batteries for specific modes of carriage and to enable the application of different emergency response actions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the *Manual of Tests and Criteria* is considered a “cell” and shall be carried according to the requirements for “cells” for the purpose of this special provision.

190 Aerosol dispensers shall be provided with protection against inadvertent discharge. Aerosols with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to the requirements of ADN.

191 Receptacles, small, with a capacity not exceeding 50 ml, containing only non-toxic constituents are not subject to the requirements of ADN.

193 This entry may only be used for ammonium nitrate based compound fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39. Fertilizers meeting the criteria for this UN number are subject to the requirements of ADN only when carried in bulk.

194 The control and emergency temperatures, if any, and the UN number (generic entry) for each of the currently assigned self-reactive substances are given in 2.2.41.4.

196 Formulations which in laboratory testing neither detonate in the cavitated state nor deflagrate, which show no effect when heated under confinement and which exhibit no explosive power may be carried under this entry. The formulation must also be thermally stable (i.e. the SADT is 60 °C or higher for a 50 kg package). Formulations not meeting these criteria shall be carried under the provisions of Class 5.2, (see 2.2.52.4).

198 Nitrocellulose solutions containing not more than 20 % nitrocellulose may be carried as paint, perfumery products or printing ink, as applicable (see UN Nos. 1210, 1263, 1266, 3066, 3469 and 3470).

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199 Lead compounds which, when mixed in a ratio of 1:1000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23 °C ± 2 °C, exhibit a solubility of 5 % or less (see ISO 3711:1990 *"Lead chromate pigments and lead chromate-molybdate pigments – Specifications and methods of test"*) are considered insoluble and are not subject to the requirements of ADN unless they meet the criteria for inclusion in another class.

201 Lighters and lighter refills shall comply with the provisions of the country in which they were filled. They shall be provided with protection against inadvertent discharge. The liquid portion of the gas shall not exceed 85% of the capacity of the receptacle at 15 °C. The receptacles, including the closures, shall be capable of withstanding an internal pressure of twice the pressure of the liquefied petroleum gas at 55 °C. The valve mechanisms and ignition devices shall be securely sealed, taped or otherwise fastened or designed to prevent operation or leakage of the contents during carriage. Lighters shall not contain more than 10 g of liquefied petroleum gas. Lighter refills shall not contain more than 65 g of liquefied petroleum gas.

NOTE: *For waste lighters collected separately see Chapter 3.3, special provision 654.*

203 This entry shall not be used for polychlorinated biphenyls, liquid, UN No. 2315 and polychlorinated biphenyls, solid, UN No. 3432.

204 *(Deleted)*

205 This entry shall not be used for UN No. 3155 PENTACHLOROPHENOL.

207 Plastics moulding compounds may be made from polystyrene, poly(methyl methacrylate) or other polymeric material.

208 The commercial grade of calcium nitrate fertilizer, when consisting mainly of a double salt (calcium nitrate and ammonium nitrate) containing not more than 10% ammonium nitrate and at least 12% water of crystallization, is not subject to the requirements of ADN.

210 Toxins from plant, animal or bacterial sources which contain infectious substances, or toxins that are contained in infectious substances, shall be classified in Class 6.2.

215 This entry only applies to the technically pure substance or to formulations derived from it having an SADT higher than 75 °C and therefore does not apply to formulations which are self-reactive substances (for self-reactive substances, see 2.2.41.4). Homogeneous mixtures containing not more than 35 % by mass of azodicarbonamide and at least 65 % of inert substance are not subject to the requirements of ADN unless criteria of other classes are met.

216 Mixtures of solids which are not subject to the requirements of ADN and flammable liquids may be carried under this entry without first applying the classification criteria of Class 4.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. Sealed packets and articles containing less than 10 ml of a packing group II or III flammable liquid absorbed into a solid material are not subject to ADN provided there is no free liquid in the packet or article.

217 Mixtures of solids which are not subject to the requirements of ADN and toxic liquids may be carried under this entry without first applying the classification criteria of Class 6.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. This entry shall not be used for solids containing a packing group I liquid.

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218 Mixtures of solids which are not subject to the requirements of ADN and corrosive liquids may be carried under this entry without first applying the classification criteria of Class 8, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed.

219 Genetically modified microorganisms (GMMOs) and genetically modified organisms (GMOs) packed and marked in accordance with packing instruction P904 of 4.1.4.1 of ADR are not subject to any other requirements of ADN.

If GMMOs or GMOs meet the criteria for inclusion in Class 6.1 or 6.2 (see 2.2.61.1 and 2.2.62.1) the requirements in ADN for the carriage of toxic substances or infectious substances apply.

220 Only the technical name of the flammable liquid component of this solution or mixture shall be shown in parentheses immediately following the proper shipping name.

221 Substances included under this entry shall not be of packing group I.

224 Unless it can be demonstrated by testing that the sensitivity of the substance in its frozen state is no greater than in its liquid state, the substance shall remain liquid during normal transport conditions. It shall not freeze at temperatures above -15 °C.

225 Fire extinguishers under this entry may include installed actuating cartridges (cartridges, power device of classification code 1.4C or 1.4S), without changing the classification of Class 2, group A or O according to 2.2.2.1.3 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per extinguishing unit.

Fire extinguishers shall be manufactured, tested, approved and labelled according to the provisions applied in the country of manufacture.

NOTE: *Provisions applied in the country of manufacture" means the provisions applicable in the country of manufacture or those applicable in the country of use.*

Fire extinguishers under this entry include:

(a) portable fire extinguishers for manual handling and operation;

(b) fire extinguishers for installation in aircraft;

(c) fire extinguishers mounted on wheels for manual handling;

(d) fire extinguishing equipment or machinery mounted on wheels or wheeled platforms or units carried similar to (small) trailers, and

(e) fire extinguishers composed of a non-rollable pressure drum and equipment, and handled e.g. by fork lift or crane when loaded or unloaded.

NOTE: *Pressure receptacles which contain gases for use in the above-mentioned fire extinguishers or for use in stationary fire-fighting installations shall meet the requirements of Chapter 6.2 of ADR and all requirements applicable to the relevant dangerous goods when these pressure receptacles are carried separately.*

226 Formulations of this substance containing not less than 30% non-volatile, non-flammable phlegmatizer are not subject to the requirements of ADN.

227 When phlegmatized with water and inorganic inert material the content of urea nitrate may not exceed 75% by mass and the mixture shall not be capable of being detonated by the Series 1, type (a), test in the *Manual of Tests and Criteria*, Part 1.

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228 Mixtures not meeting the criteria for flammable gases (see 2.2.2.1.5) shall be carried under UN No. 3163.

230 Lithium cells and batteries may be carried under this entry if they meet the provisions of 2.2.9.1.7.

235 This entry applies to articles which contain Class 1 explosive substances and which may also contain dangerous goods of other classes. These articles are used to enhance safety in vehicles, vessels or aircraft – e.g. air bag inflators, air bag modules, seat-belt pretensioners, and pyromechanical devices.

236 Polyester resin kits consist of two components: a base material (either Class 3 or Class 4.1, packing group II or III) and an activator (organic peroxide). The organic peroxide shall be type D, E, or F, not requiring temperature control. The packing group shall be II or III, according to the criteria of either Class 3 or Class 4.1, as appropriate, applied to the base material. The quantity limit shown in column (7a) of Table A of Chapter 3.2 applies to the base material.

237 The membrane filters, including paper separators, coating or backing materials, etc., that are present in carriage, shall not be liable to propagate a detonation as tested by one of the tests described in the *Manual of Tests and Criteria*, Part I, Test series 1 (a).

In addition, the competent authority may determine, on the basis of the results of suitable burning rate tests taking account of the standard tests in the *Manual of Tests and Criteria*, Part III, sub-section 33.2.1, that nitrocellulose membrane filters in the form in which they are to be carried are not subject to the requirements applicable to flammable solids in Class 4.1.

238 (a) Batteries can be considered as non-spillable provided that they are capable of withstanding the vibration and pressure differential tests given below, without leakage of battery fluid.

Vibration test: The battery is rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.8 mm (1.6 mm maximum total excursion) is applied. The frequency is varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Hz. The entire range of frequencies and return is traversed in 95 ± 5 minutes for each mounting position (direction of vibration) of the battery. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for equal time periods.

Pressure differential test: Following the vibration test, the battery is stored for six hours at 24 °C ± 4 °C while subjected to a pressure differential of at least 88 kPa. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for at least six hours in each position.

(b) Non-spillable batteries are not subject to the requirements of ADN if, at a temperature of 55 °C, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, as packaged for carriage, the terminals are protected from short circuit.

239 Batteries or cells shall not contain dangerous substances other than sodium, sulphur or sodium compounds (e.g. sodium polysulphides and sodium tetrachloroaluminate). Batteries or cells shall not be offered for carriage at a temperature such that liquid elemental sodium is present in the battery or cell unless approved and under the conditions established by the competent authority of the country of origin. If the country of origin is not a Contracting Party to ADN, the approval and conditions of carriage

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shall be recognized by the competent authority of the first country Contracting Party to ADN reached by the consignment.

Cells shall consist of hermetically sealed metal casings which fully enclose the dangerous substances and which are so constructed and closed as to prevent the release of the dangerous substances under normal conditions of carriage.

Batteries shall consist of cells secured within and fully enclosed by a metal casing so constructed and closed as to prevent the release of the dangerous substances under normal conditions of carriage.

240 *(Deleted)*

241 The formulation shall be prepared so that it remains homogeneous and does not separate during carriage. Formulations with low nitrocellulose contents and not showing dangerous properties when tested for their liability to detonate, deflagrate or explode when heated under defined confinement by tests of Test series 1 (a), 2 (b) and 2 (c) respectively in the *Manual of Tests and Criteria*, Part I and not being a flammable solid when tested in accordance with Test No. 1 in the *Manual of Tests and Criteria*, Part III, sub-section 33.2.1.4 (chips, if necessary, crushed and sieved to a particle size of less than 1.25 mm) are not subject to the requirements of ADN.

242 Sulphur is not subject to the requirements of ADN when it has been formed to a specific shape (e.g. prills, granules, pellets, pastilles or flakes).

243 Gasoline, motor spirit and petrol for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of variations in volatility.

244 This entry includes e.g. aluminium dross, aluminium skimmings, spent cathodes, spent potliner, and aluminium salt slags.

247 Alcoholic beverages containing more than 24% alcohol but not more than 70% by volume, when carried as part of the manufacturing process, may be carried in wooden barrels with a capacity of more than 250 litres and not more than 500 litres meeting the general requirements of 4.1.1 of ADR, as appropriate, on the following conditions:

(a) The wooden barrels shall be checked and tightened before filling;

(b) Sufficient ullage (not less than 3%) shall be left to allow for the expansion of the liquid;

(c) The wooden barrels shall be carried with the bungholes pointing upwards;

(d) The wooden barrels shall be carried in containers meeting the requirements of the CSC. Each wooden barrel shall be secured in custom-made cradles and be wedged by appropriate means to prevent it from being displaced in any way during carriage.

249 Ferrocerium, stabilized against corrosion, with a minimum iron content of 10% is not subject to the requirements of ADN.

250 This entry may only be used for samples of chemicals taken for analysis in connection with the implementation of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. The carriage of substances under this entry shall be in accordance with the chain of custody and security procedures specified by the Organisation for the Prohibition of Chemical Weapons.

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The chemical sample may only be carried providing prior approval has been granted by the competent authority or the Director General of the Organisation for the Prohibition of Chemical Weapons and providing the sample complies with the following provisions:

(a) It shall be packed according to packing instruction 623 in the ICAO Technical Instructions; and

(b) During carriage, a copy of the document of approval for transport, showing the quantity limitations and the packing provisions shall be attached to the transport document.

251 The entry CHEMICAL KIT or FIRST AID KIT is intended to apply to boxes, cases etc. containing small quantities of various dangerous goods which are used for example for medical, analytical or testing or repair purposes.

Such kits shall only contain dangerous goods that are permitted as:

(a) Excepted quantities not exceeding the quantity indicated by the code in column (7b) of Table A of Chapter 3.2, provided that the net quantity per inner packaging and net quantity per package are as prescribed in 3.5.1.2 and 3.5.1.3; or;

(b) Limited quantities as indicated in column (7a) of Table A of Chapter 3.2, provided that the net quantity per inner packaging does not exceed 250 ml or 250 g.

Components shall not react dangerously (see "dangerous reaction" in 1.2.1). The total quantity of dangerous goods in any one kit shall not exceed either 1 *l* or 1 kg.

For the purposes of completion of the transport document as set out in 5.4.1.1.1, the packing group shown on the document shall be the most stringent packing group assigned to any individual substance in the kit. Where the kit contains only dangerous goods to which no packing group is assigned, no packing group need be indicated on the dangerous goods transport document.

Kits which are carried on board vessels for first-aid or operating purposes are not subject to the requirements of ADN.

Chemical kits and first aid kits containing dangerous goods in inner packagings which do not exceed the quantity limits for limited quantities applicable to individual substances as specified in Column (7a) of Table A of Chapter 3.2 may be carried in accordance with Chapter 3.4.

252 Provided the ammonium nitrate remains in solution under all conditions of carriage, aqueous solutions of ammonium nitrate, with not more than 0.2% combustible material, in a concentration not exceeding 80%, are not subject to the requirements of ADN.

266 This substance, when containing less alcohol, water or phlegmatizer than specified, shall not be carried unless specifically authorized by the competent authority (see 2.2.1.1).

267 Any explosives, blasting, type C containing chlorates shall be segregated from explosives containing ammonium nitrate or other ammonium salts.

270 Aqueous solutions of Class 5.1 inorganic solid nitrate substances are considered as not meeting the criteria of Class 5.1 if the concentration of the substances in solution at the minimum temperature encountered during carriage is not greater than 80% of the saturation limit.

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271 Lactose or glucose or similar materials may be used as a phlegmatizer provided that the substance contains not less than 90%, by mass, of phlegmatizer. The competent authority may authorize these mixtures to be classified in Class 4.1 on the basis of a test Series 6 (c) of Section 16 of Part I of the *Manual of Tests and Criteria* on at least three packages as prepared for carriage. Mixtures containing at least 98%, by mass, of phlegmatizer are not subject to the requirements of ADN. Packages containing mixtures with not less than 90%, by mass, of phlegmatizer need not bear a label conforming to model No. 6.1.

272 This substance shall not be carried under the provisions of Class 4.1 unless specifically authorized by the competent authority (see UN No. 0143 or UN No. 0150 as appropriate).

273 Maneb and maneb preparations stabilized against self-heating need not be classified in Class 4.2 when it can be demonstrated by testing that a cubic volume of 1 m^3 of substance does not self-ignite and that the temperature at the centre of the sample does not exceed 200 °C, when the sample is maintained at a temperature of not less than 75 °C ± 2 °C for a period of 24 hours.

274 The provisions of 3.1.2.8 apply.

278 These substances shall not be classified and carried unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6(c) test of Part I of the *Manual of Tests and Criteria* on packages as prepared for carriage (see 2.2.1.1). The competent authority shall assign the packing group on the basis of 2.2.3 criteria and the package type used for the Series 6(c) test.

279 The substance is assigned to this classification or packing group based on human experience rather than the strict application of classification criteria set out in ADN.

280 This entry applies to safety devices for vehicles, vessels or aircraft, e.g. air bag inflators, air bag modules, seat-belt pretensioners, and pyromechanical devices, which contain dangerous goods of Class 1 or of other classes, when carried as component parts and if these articles as presented for carriage have been tested in accordance with Test Series 6(c) of Part 1 of the Manual of Tests and Criteria, with no explosion of the device, no fragmentation of device casing or pressure receptacle, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or emergency response efforts in the immediate vicinity. This entry does not apply to life saving appliances described in special provision 296 (UN Nos. 2990 and 3072).

283 Articles containing gas, intended to function as shock absorbers, including impact energy-absorbing devices, or pneumatic springs are not subject to the requirements of ADN provided:

(a) Each article has a gas space capacity not exceeding 1.6 litres and a charge pressure not exceeding 280 bar where the product of the capacity (litres) and charge pressure (bars) does not exceed 80 (i.e. 0.5 litres gas space and 160 bar charge pressure, 1 litre gas space and 80 bar charge pressure, 1.6 litres gas space and 50 bar charge pressure, 0.28 litres gas space and 280 bar charge pressure);

(b) Each article has a minimum burst pressure of 4 times the charge pressure at 20 °C for products not exceeding 0.5 litres gas space capacity and 5 times charge pressure for products greater than 0.5 litres gas space capacity;

(c) Each article is manufactured from material which will not fragment upon rupture;

(d) Each article is manufactured in accordance with a quality assurance standard acceptable to the competent authority; and

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(e) The design type has been subjected to a fire test demonstrating that the article relieves its pressure by means of a fire degradable seal or other pressure relief device, such that the article will not fragment and that the article does not rocket.

See also 1.1.3.2 (d) of ADR for equipment used for the operation of the vehicle.

284 An oxygen generator, chemical, containing oxidizing substances shall meet the following conditions:

(a) The generator when containing an explosive actuating device shall only be carried under this entry when excluded from Class 1 in accordance with the NOTE under paragraph 2.2.1.1.1 (b);

(b) The generator, without its packaging, shall be capable of withstanding a 1.8 m drop test onto a rigid, non-resilient, flat and horizontal surface, in the position most likely to cause damage, without loss of its contents and without actuation;

(c) When a generator is equipped with an actuating device, it shall have at least two positive means of preventing unintentional actuation.

286 Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5 g, are not subject to the requirements of ADN when contained individually in an article or a sealed packet.

288 These substances shall not be classified and carried unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6 (c) test of Part I of the *Manual of Tests and Criteria* on packages as prepared for carriage (see 2.2.1.1).

289 Safety devices, electrically initiated and safety devices, pyrotechnic installed in vehicles, wagons, vessels or aircraft or in completed components such as steering columns, door panels, seats, etc. are not subject to ADN.

290 When this radioactive material meets the definitions and criteria of other classes as defined in Part 2, it shall be classified in accordance with the following:

(a) Where the substance meets the criteria for dangerous goods in excepted quantities as set out in Chapter 3.5, the packagings shall be in accordance with 3.5.2 and meet the testing requirements of 3.5.3. All other requirements applicable to radioactive material, excepted packages as set out in 1.7.1.5 shall apply without reference to the other class;

(b) Where the quantity exceeds the limits specified in 3.5.1.2 the substance shall be classified in accordance with the predominant subsidiary hazard. The transport document shall describe the substance with the UN number and proper shipping name applicable to the other class supplemented with the name applicable to the radioactive excepted package according to Column (2) of Table A of Chapter 3.2, and the substance shall be carried in accordance with the provisions applicable to that UN number. An example of the information shown on the transport document is:

"UN 1993, Flammable liquid, N.O.S. (ethanol and toluene mixture), Radioactive material, excepted package – limited quantity of material, 3, PG II".

In addition, the requirements of 2.2.7.2.4.1 shall apply;

(c) The provisions of Chapter 3.4 for the carriage of dangerous goods packed in limited quantities shall not apply to substances classified in accordance with sub-paragraph (b);

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(d) When the substance meets a special provision that exempts this substance from all dangerous goods provisions of the other classes it shall be classified in accordance with the applicable UN number of Class 7 and all requirements specified in 1.7.1.5 shall apply.

291 Flammable liquefied gases shall be contained within refrigerating machine components. These components shall be designed and tested to at least three times the working pressure of the machinery. The refrigerating machines shall be designed and constructed to contain the liquefied gas and preclude the risk of bursting or cracking of the pressure retaining components during normal conditions of carriage. Refrigerating machines and refrigerating-machine components are not subject to the requirements of ADN if they contain less than 12 kg of gas.

292 *(Deleted)*

293 The following definitions apply to matches:

(a) Fusee matches are matches the heads of which are prepared with a friction-sensitive igniter composition and a pyrotechnic composition which burns with little or no flame, but with intense heat;

(b) Safety matches are matches that are combined with or attached to the box, book or card that can be ignited by friction only on a prepared surface;

(c) Strike anywhere matches are matches that can be ignited by friction on a solid surface;

(d) Wax Vesta matches are matches that can be ignited by friction either on a prepared surface or on a solid surface.

295 Batteries need not be individually marked and labelled if the pallet bears the appropriate mark and label.

296 These entries apply for life-saving appliances such as life rafts, personal flotation devices and self-inflating slides. UN No. 2990 applies to self-inflating appliances and UN No. 3072 applies to life-saving appliances that are not self-inflating. Life-saving appliances may contain:

(a) Signal devices (Class 1) which may include smoke and illumination signal flares packed in packagings that prevent them from being inadvertently activated;

(b) For UN No. 2990 only, cartridges, power devices of Division 1.4, compatibility group S, may be contained for purposes of the self-inflating mechanism and provided that the quantity of explosives per appliance does not exceed 3.2 g;

(c) Class 2 compressed or liquefied gases, group A or O, according to 2.2.2.1.3;

(d) Electric storage batteries (Class 8) and lithium batteries (Class 9);

(e) First aid kits or repair kits containing small quantities of dangerous goods (e.g.: substances of Class 3, 4.1, 5.2, 8 or 9); or

(f) "Strike anywhere" matches packed in packagings that prevent them from being inadvertently activated.

Life-saving appliances packed in strong rigid outer packagings with a total maximum gross mass of 40 kg, containing no dangerous goods other than compressed or liquefied gases of Class 2, group A or group O, in receptacles with a capacity not exceeding 120

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ml, installed solely for the purpose of the activation of the appliance, are not subject to the requirements of ADN.

300 Fish meal, fish scrap and krill meal shall not be loaded if the temperature at the time of loading exceeds 35 °C or 5 °C above the ambient temperature whichever is higher.

301 This entry only applies to machinery or apparatus containing dangerous goods as a residue or an integral element of the machinery or apparatus. It shall not be used for machinery or apparatus for which a proper shipping name already exists in Table A of Chapter 3.2. Machinery and apparatus carried under this entry shall only contain dangerous goods which are authorized to be carried in accordance with the provisions of Chapter 3.4 (Limited quantities). The quantity of dangerous goods in machinery or apparatus shall not exceed the quantity specified in Column (7a) of Table A of Chapter 3.2 for each item of dangerous goods contained. If the machinery or apparatus contains more than one item of dangerous goods, the individual dangerous goods shall be enclosed to prevent them reacting dangerously with one another during carriage (see 4.1.1.6 of ADR). When it is required to ensure liquid dangerous goods remain in their intended orientation, orientation arrows shall be displayed on at least two opposite vertical sides with the arrows pointing in the correct direction in accordance with 5.2.1.10.

NOTE: *In this special provision the reference to "a proper shipping name which already exists" excludes specific n.o.s. entries for UN Nos. 3537 to 3548.*

302 Fumigated cargo transport units containing no other dangerous goods are only subject to the provisions of 5.5.2.

303 Receptacles shall be assigned to the classification code of the gas or mixture of gases contained therein determined in accordance with the provisions of section 2.2.2.

304 This entry may only be used for the transport of non-activated batteries which contain dry potassium hydroxide and which are intended to be activated prior to use by addition of an appropriate amount of water to the individual cells.

305 These substances are not subject to the requirements of ADN when in concentrations of not more than 50 mg/kg.

306 This entry may only be used for substances that are too insensitive for acceptance into Class 1 when tested in accordance with Test Series 2 (see *Manual of Tests and Criteria*, Part I).

307 This entry may only be used for ammonium nitrate based fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39 subject to the restrictions of 2.2.51.2.2, thirteenth and fourteenth indents. When used in the said Section 39, the term "competent authority" means the competent authority of the country of origin. If the country of origin is not a Contracting Party to ADN, the classification and conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADN reached by the consignment.

309 This entry applies to non-sensitized emulsions, suspensions and gels consisting primarily of a mixture of ammonium nitrate and fuel, intended to produce a Type E blasting explosive only after further processing prior to use.

The mixture for emulsions typically has the following composition: 60-85% ammonium nitrate, 5-30% water, 2-8% fuel, 0.5-4% emulsifier agent, 0-10% soluble flame suppressants, and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate.

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The mixture for suspensions and gels typically has the following composition: 60-85% ammonium nitrate, 0-5% sodium or potassium perchlorate, 0-17% hexamine nitrate or monomethylamine nitrate, 5-30% water, 2-15% fuel, 0.5-4% thickening agent, 0-10% soluble flame suppressants, and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate.

Substances shall satisfactorily pass Tests 8 (a), (b) and (c) of Test Series 8 of the *Manual of Tests and Criteria*, Part I, Section 18 and be approved by the competent authority.

310 The testing requirements in the Manual of Tests and Criteria, part III sub-section 38.3 do not apply to production runs, consisting of not more than 100 cells or batteries, or to pre-production prototypes of cells or batteries when these prototypes are carried for testing when packaged in accordance with packing instruction P910 of 4.1.4.1 of ADR or LP905 of 4.1.4.3 of ADR, as applicable.

The transport document shall include the following statement: “Carriage in accordance with special provision 310”.

Damaged or defective cells, batteries, or cells and batteries contained in equipment shall be carried in accordance with special provision 376 and packaged in accordance with packing instructions P908 of 4.1.4.1 or LP904 of 4.1.4.3 of ADR, as applicable.

Cells, batteries or cells and batteries contained in equipment carried for disposal or recycling may be packaged in accordance with special provision 377 and packing instruction P909 of 4.1.4.1 of ADR.

311 Substances shall not be carried under this entry unless approved by the competent authority on the basis of the results of appropriate tests according to Part I of the *Manual of Tests and Criteria*. Packaging shall ensure that the percentage of diluent does not fall below that stated in the competent authority approval, at any time during carriage.

312 *(Deleted)*

313 *(Deleted)*

314 (a) These substances are liable to exothermic decomposition at elevated temperatures. Decomposition can be initiated by heat or by impurities (e.g. powdered metals (iron, manganese, cobalt, magnesium) and their compounds);

(b) During the course of carriage, these substances shall be shaded from direct sunlight and all sources of heat and be placed in adequately ventilated areas.

315 This entry shall not be used for Class 6.1 substances which meet the inhalation toxicity criteria for packing group I described in 2.2.61.1.8.

316 This entry applies only to calcium hypochlorite, dry, when carried in non-friable tablet form.

317 "Fissile-excepted" applies only to those fissile material and packages containing fissile material which are excepted in accordance with 2.2.7.2.3.5.

318 For the purposes of documentation, the proper shipping name shall be supplemented with the technical name (see 3.1.2.8). When the infectious substances to be carried are unknown, but suspected of meeting the criteria for inclusion in category A and assignment to UN No. 2814 or 2900, the words "suspected category A infectious substance" shall be shown, in parentheses, following the proper shipping name on the transport document.

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319 Substances packed and packages marked in accordance with packing instruction P650 of ADR are not subject to any other requirements of ADN.

321 These storage systems shall always be considered as containing hydrogen.

322 When carried in non-friable tablet form, these goods are assigned to packing group III.

323 *(Reserved)*

324 This substance needs to be stabilized when in concentrations of not more than 99%.

325 In the case of non-fissile or fissile excepted uranium hexafluoride, the material shall be classified under UN No. 2978.

326 In the case of fissile uranium hexafluoride, the material shall be classified under UN No. 2977.

327 Waste aerosols consigned in accordance with 5.4.1.1.3 may be carried under this entry for the purposes of reprocessing or disposal. They need not be protected against movement and inadvertent discharge provided that measures to prevent dangerous build up of pressure and dangerous atmospheres are addressed. Waste aerosols, other than those leaking or severely deformed, shall be packed in accordance with packing instruction P207 of ADR and special provision PP87 of ADR, or packing instruction LP200 of ADR and special packing provision L2 of ADR. Leaking or severely deformed aerosols shall be carried in salvage packagings provided appropriate measures are taken to ensure there is no dangerous build up of pressure.

NOTE: *For maritime carriage, waste aerosols shall not be carried in closed containers.*

328 This entry applies to fuel cell cartridges including when contained in equipment or packed with equipment. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridge means an article that stores fuel for discharge into the fuel cell through (a) valve(s) that control(s) the discharge of fuel into the fuel cell. Fuel cell cartridges, including when contained in equipment, shall be designed and constructed to prevent fuel leakage under normal conditions of carriage.

Fuel cell cartridge design types using liquids as fuels shall pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage.

Except for fuel cell cartridges containing hydrogen in metal hydride which shall be in compliance with special provision 339, each fuel cell cartridge design type shall be shown to pass a 1.2 meter drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents.

When lithium metal or lithium ion batteries are contained in the fuel cell system, the consignment shall be consigned under this entry and under the appropriate entries for UN 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT.

329 *(Reserved*)

331 *(Reserved)*

332 Magnesium nitrate hexahydrate is not subject to the requirements of ADN.

333 Ethanol and gasoline, motor spirit or petrol mixtures for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of variations in volatility.

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334 A fuel cell cartridge may contain an activator provided it is fitted with two independent means of preventing unintended mixing with the fuel during carriage.

335 Mixtures of solids which are not subject to the requirements of ADN and environmentally hazardous liquids or solids shall be classified as UN 3077 and may be carried under this entry provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. Each cargo transport unit shall be leakproof when used for carriage in bulk. If free liquid is visible at the time the mixture is loaded or at the time the packaging or cargo transport unit is closed, the mixture shall be classified as UN 3082. Sealed packets and articles containing less than 10 ml of an environmentally hazardous liquid, absorbed into a solid material but with no free liquid in the packet or article, or containing less than 10 g of an environmentally hazardous solid, are not subject to the requirements of ADN.

336 A single package of non-combustible solid LSA-II or LSA-III material, if carried by air, shall not contain an activity greater than 3 000 A_2.

337 Type B(U) and Type B(M) packages, if carried by air, shall not contain activities greater than the following:

(a) For low dispersible radioactive material: as authorized for the package design as specified in the certificate of approval;

(b) For special form radioactive material: 3 000 A_1 or 100 000 A_2, whichever is the lower; or

(c) For all other radioactive material: 3 000 A_2.

338 Each fuel cell cartridge carried under this entry and designed to contain a liquefied flammable gas shall:

(a) Be capable of withstanding, without leakage or bursting, a pressure of at least two times the equilibrium pressure of the contents at 55 ºC;

(b) Not contain more than 200 ml liquefied flammable gas, the vapour pressure of which shall not exceed 1 000 kPa at 55 °C; and

(c) Pass the hot water bath test prescribed in 6.2.6.3.1 of ADR.

339 Fuel cell cartridges containing hydrogen in a metal hydride carried under this entry shall have a water capacity less than or equal to 120 ml.

The pressure in the fuel cell cartridge shall not exceed 5 MPa at 55 °C. The design type shall withstand, without leaking or bursting, a pressure of twice the design pressure of the cartridge at 55 °C or 200 kPa more than the design pressure of the cartridge at 55 °C, whichever is greater. The pressure at which this test is conducted is referred to in the drop test and the hydrogen cycling test as the “minimum shell burst pressure”.

Fuel cell cartridges shall be filled in accordance with procedures provided by the manufacturer. The manufacturer shall provide the following information with each fuel cell cartridge:

(a) Inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge;

(b) Safety precautions and potential hazards to be aware of;

(c) Method for determining when the rated capacity has been achieved;

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(d) Minimum and maximum pressure range;

(e) Minimum and maximum temperature range; and

(f) Any other requirements to be met for initial filling and refilling including the type of equipment to be used for initial filling and refilling.

The fuel cell cartridges shall be designed and constructed to prevent fuel leakage under normal conditions of carriage. Each cartridge design type, including cartridges integral to a fuel cell, shall be subjected to and shall pass the following tests:

Drop test

A 1.8 metre drop test onto an unyielding surface in four different orientations:

(a) Vertically, on the end containing the shut-off valve assembly;

(b) Vertically, on the end opposite to the shut-off valve assembly;

(c) Horizontally, onto a steel apex with a diameter of 38 mm, with the steel apex in the upward position; and

(d) At a 45° angle on the end containing the shut-off valve assembly.

There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations, when the cartridge is charged to its rated charging pressure. The fuel cell cartridge shall then be hydrostatically pressurized to destruction. The recorded burst pressure shall exceed 85% of the minimum shell burst pressure.

Fire test

A fuel cell cartridge filled to rated capacity with hydrogen shall be subjected to a fire engulfment test. The cartridge design, which may include a vent feature integral to it, is deemed to have passed the fire test if:

(a) The internal pressure vents to zero gauge pressure without rupture of the cartridge; or

(b) The cartridge withstands the fire for a minimum of 20 minutes without rupture.

Hydrogen cycling test

This test is intended to ensure that a fuel cell cartridge design stress limits are not exceeded during use.

The fuel cell cartridge shall be cycled from not more than 5% rated hydrogen capacity to not less than 95% rated hydrogen capacity and back to not more than 5% rated hydrogen capacity. The rated charging pressure shall be used for charging and temperatures shall be held within the operating temperature range. The cycling shall be continued for at least 100 cycles.

Following the cycling test, the fuel cell cartridge shall be charged and the water volume displaced by the cartridge shall be measured. The cartridge design is deemed to have passed the hydrogen cycling test if the water volume displaced by the cycled cartridge does not exceed the water volume displaced by an uncycled cartridge charged to 95% rated capacity and pressurized to 75% of its minimum shell burst pressure.

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Production leak test

Each fuel cell cartridge shall be tested for leaks at 15 °C ± 5 °C, while pressurized to its rated charging pressure. There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations.

Each fuel cell cartridge shall be permanently marked with the following information:

(a) The rated charging pressure in MPa;

(b) The manufacturer's serial number of the fuel cell cartridges or unique identification number; and

(c) The date of expiry based on the maximum service life (year in four digits; month in two digits).

340 Chemical kits, first aid kits and polyester resin kits containing dangerous substances in inner packagings which do not exceed the quantity limits for excepted quantities applicable to individual substances as specified in column (7b) of Table A of Chapter 3.2, may be carried in accordance with Chapter 3.5. Class 5.2 substances, although not individually authorized as excepted quantities in column (7b) of Table A of Chapter 3.2, are authorized in such kits and are assigned Code E2 (see 3.5.1.2).

341 *(Reserved)*

342 Glass inner receptacles (such as ampoules or capsules) intended only for use in sterilization devices, when containing less than 30 ml of ethylene oxide per inner packaging with not more than 300 ml per outer packaging, may be carried in accordance with the provisions in Chapter 3.5, irrespective of the indication of "E0" in column (7b) of Table A of Chapter 3.2 provided that:

(a) After filling, each glass inner receptacle has been determined to be leak-tight by placing the glass inner receptacle in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55 °C is achieved. Any glass inner receptacle showing evidence of leakage, distortion or other defect under this test shall not be carried under the terms of this special provision;

(b) In addition to the packaging required by 3.5.2, each glass inner receptacle is placed in a sealed plastics bag compatible with ethylene oxide and capable of containing the contents in the event of breakage or leakage of the glass inner receptacle; and

(c) Each glass inner receptacle is protected by a means of preventing puncture of the plastics bag (e.g. sleeves or cushioning) in the event of damage to the packaging (e.g. by crushing).

343 This entry applies to crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard. The packing group assigned shall be determined by the flammability hazard and inhalation hazard, in accordance with the degree of danger presented.

344 The provisions of 6.2.6 of ADR shall be met.

345 This gas contained in open cryogenic receptacles with a maximum capacity of 1 litre constructed with glass double walls having the space between the inner and outer wall evacuated (vacuum insulated) is not subject to ADN provided each receptacle is carried

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in an outer packaging with suitable cushioning or absorbent materials to protect it from impact damage.

346 Open cryogenic receptacles conforming to the requirements of packing instruction P203 of 4.1.4.1 of ADR and containing no dangerous goods except for UN No. 1977 nitrogen, refrigerated liquid, which is fully absorbed in a porous material, are not subject to any other requirements of ADN.

347 This entry shall only be used if the results of Test series 6 (d) of Part I of the *Manual of Tests and Criteria* have demonstrated that any hazardous effects arising from functioning are confined within the package.

348 Batteries manufactured after 31 December 2011 shall be marked with the Watt-hour rating on the outside case.

349 Mixtures of a hypochlorite with an ammonium salt are not to be accepted for carriage. UN No. 1791 hypochlorite solution is a substance of Class 8.

350 Ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt are not to be accepted for carriage.

351 Ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt are not to be accepted for carriage.

352 Ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt are not to be accepted for carriage.

353 Ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt are not to be accepted for carriage.

354 This substance is toxic by inhalation.

355 Oxygen cylinders for emergency use carried under this entry may include installed actuating cartridges (cartridges, power device of Division 1.4, Compatibility Group C or S), without changing the classification in Class 2 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per oxygen cylinder. The cylinders with the installed actuating cartridges as prepared for carriage shall have an effective means of preventing inadvertent activation.

356 Metal hydride storage systems intended to be installed in vehicles, wagons, vessels or aircraft shall be approved by the competent authority of the country of manufacture[1] before acceptance for carriage. The transport document shall include an indication that the package was approved by the competent authority of the country of manufacture[1] or a copy of the competent authority of the country of manufacture[1] approval shall accompany each consignment.

357 Petroleum crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard shall be consigned under the entry UN 3494 PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC.

358 Nitroglycerin solution in alcohol with more than 1% but not more than 5% nitroglycerin may be classified in Class 3 and assigned to UN No. 3064 provided all the requirements of packing instruction P300 of 4.1.4.1 of ADR are complied with.

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[1] *If the country of manufacture is not a Contracting Party to ADN, the approval shall be recognized by the competent authority of a Contracting Party to ADN.*

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359 Nitroglycerin solution in alcohol with more than 1% but not more than 5% nitroglycerin shall be classified in Class 1 and assigned to UN No. 0144 if not all the requirements of packing instruction P300 of 4.1.4.1 of ADR are complied with.

360 Vehicles only powered by lithium metal batteries or lithium ion batteries shall be classified under the entry UN 3171 battery-powered vehicle.

361 This entry applies to electric double layer capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to ADN. Energy storage capacity means the energy held by a capacitor, as calculated using the nominal voltage and capacitance. All capacitors to which this entry applies, including capacitors containing an electrolyte that does not meet the classification criteria of any class of dangerous goods, shall meet the following conditions:

(a) Capacitors not installed in equipment shall be carried in an uncharged state. Capacitors installed in equipment shall be carried either in an uncharged state or protected against short circuit;

(b) Each capacitor shall be protected against a potential short circuit hazard in carriage as follows:

(i) When a capacitor's energy storage capacity is less than or equal to 10Wh or when the energy storage capacity of each capacitor in a module is less than or equal to 10 Wh, the capacitor or module shall be protected against short circuit or be fitted with a metal strap connecting the terminals; and

(ii) When the energy storage capacity of a capacitor or a capacitor in a module is more than 10 Wh, the capacitor or module shall be fitted with a metal strap connecting the terminals;

(c) Capacitors containing dangerous goods shall be designed to withstand a 95 kPa pressure differential;

(d) Capacitors shall be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid which is released upon venting shall be contained by the packaging or by the equipment in which a capacitor is installed; and

(e) Capacitors shall be marked with the energy storage capacity in Wh.

Capacitors containing an electrolyte not meeting the classification criteria of any class of dangerous goods, including when installed in equipment, are not subject to other provisions of ADN.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods, with an energy storage capacity of 10 Wh or less are not subject to other provisions of ADN when they are capable of withstanding a 1.2 metre drop test unpackaged on an unyielding surface without loss of contents.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods that are not installed in equipment and with an energy storage capacity of more than 10 Wh are subject to ADN.

Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class of dangerous goods are not subject to other provisions of ADN provided the equipment is packaged in a strong outer packaging constructed of suitable material and of adequate strength and design, in relation to the packaging's

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intended use and in such a manner as to prevent accidental functioning of capacitors during carriage. Large robust equipment containing capacitors may be offered for carriage unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained.

NOTE: *Capacitors which by design maintain a terminal voltage (e.g. asymmetrical capacitors) do not belong to this entry.*

362 *(Reserved).*

363 This entry may only be used when the conditions of this special provision are met. No other requirements of ADN apply.

(a) This entry applies to engines or machinery, powered by fuels classified as dangerous goods via internal combustion systems or fuel cells (e.g. combustion engines, generators, compressors, turbines, heating units, etc.), except vehicle equipment assigned to UN No. 3166 referred to in special provision 666;

NOTE: *This entry does not apply to equipment referred to in 1.1.3.2 (a), (d) and (e), 1.1.3.3 and 1.1.3.7.*

(b) Engines or machinery which are empty of liquid or gaseous fuels and which do not contain other dangerous goods, are not subject to ADN.

NOTE 1: *An engine or machinery is considered to be empty of liquid fuel when the liquid fuel tank has been drained and the engine or machinery cannot be operated due to a lack of fuel. Engine or machinery components such* as *fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty of liquid fuels. In addition, the liquid fuel tank does not need to be cleaned or purged.*

NOTE 2: *An engine or machinery is considered to be empty of gaseous fuels when the gaseous fuel tanks are empty of liquid (for liquefied gases), the pressure in the tanks does not exceed 2 bar and the fuel shut-off or isolation valve is closed and secured.*

(c) Engines and machinery containing fuels meeting the classification criteria of Class 3, shall be assigned to the entries UN No. 3528 ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or UN No. 3528 ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or UN No. 3528 MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or UN No. 3528 MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate.

(d) Engines and machinery containing fuels meeting the classification criteria of flammable gases of Class 2, shall be assigned to the entries UN No. 3529 ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or UN No. 3529 ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or UN No. 3529 MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or UN No. 3529 MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED, as appropriate.

Engines and machinery powered by both a flammable gas and a flammable liquid shall be assigned to the appropriate UN No. 3529 entry.

(e) Engines and machinery containing liquid fuels meeting the classification criteria of 2.2.9.1.10 for environmentally hazardous substances and not meeting the classification criteria of any other class shall be assigned to the entries UN No.

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3530 ENGINE, INTERNAL COMBUSTION or UN No. 3530 MACHINERY, INTERNAL COMBUSTION, as appropriate.

(f) Engines or machinery may contain other dangerous goods than fuels (e.g. batteries, fire extinguishers, compressed gas accumulators or safety devices) required for their functioning or safe operation without being subject to any additional requirements for these other dangerous goods, unless otherwise specified in ADN. However, lithium batteries shall meet the provisions of 2.2.9.1.7, except as provided for in special provision 667.

(g) The engine or machinery, including the means of containment containing dangerous goods, shall be in compliance with the construction requirements specified by the competent authority of the country of manufacture[2];

(h) Any valves or openings (e.g. venting devices) shall be closed during carriage;

(i) The engines or machinery shall be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during carriage which would change the orientation or cause them to be damaged;

(j) For UN No. 3528 and UN No. 3530:

Where the engine or machinery contains more than 60 l of liquid fuel and has a capacity of more than 450 l but not more than 3 000 l, it shall be labelled on two opposite sides in accordance with 5.2.2.

Where the engine or machinery contains more than 60 l of liquid fuel and has a capacity of more than 3 000 l, it shall be placarded on two opposite sides. Placards shall correspond to the labels required in Column (5) of Table A of Chapter 3.2 and shall conform to the specifications given in 5.3.1.7. Placards shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line.

(k) For UN No. 3529:

Where the fuel tank of the engine or machinery has a water capacity of more than 450 l but not more than 1 000 l, it shall be labelled on two opposite sides in accordance with 5.2.2.

Where the fuel tank of the engine or machinery has a water capacity of more than 1 000 l, it shall be placarded on two opposite sides. Placards shall correspond to the labels required in Column (5) of Table A of Chapter 3.2 and shall conform to the specifications given in 5.3.1.7. Placards shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line.

(l) When the engine or machinery contains more than 1 000 *l* of liquid fuels, for UN No. 3528 and UN No. 3530, or the fuel tank has a water capacity of more than 1 000 *l*, for UN No. 3529:

- A transport document in accordance with 5.4.1 is required. This transport document shall contain the following additional statement "Transport in accordance with special provision 363".

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[2] *For example, compliance with the relevant provisions of Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (Official Journal of the European Union No. L 157 of 9 June 2006, pp. 0024-0086).*

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(m) The requirements specified in packing instruction P005 of 4.1.4.1 of ADR shall be met.

364 This article may only be carried under the provisions of Chapter 3.4 if, as presented for carriage, the package is capable of passing the test in accordance with Test Series 6(d) of Part I of the *Manual of Tests and Criteria* as determined by the competent authority.

365 For manufactured instruments and articles containing mercury, see UN No. 3506.

366 Manufactured instruments and articles containing not more than 1 kg of mercury are not subject to ADN.

367 For the purposes of documentation:

The proper shipping name “Paint related material” may be used for consignments of packages containing “Paint” and “Paint related material” in the same package;

The proper shipping name “Paint related material, corrosive, flammable” may be used for consignments of packages containing “Paint, corrosive, flammable” and “Paint related material, corrosive, flammable” in the same package;

The proper shipping name “Paint related material, flammable, corrosive” may be used for consignments of packages containing “Paint, flammable, corrosive” and “Paint related material, flammable, corrosive” in the same package; and

The proper shipping name “Printing ink related material” may be used for consignments of packages containing “Printing ink” and “Printing ink related material” in the same package.

368 In the case of non-fissile or fissile-excepted uranium hexafluoride, the material shall be classified under UN No. 3507 or UN No. 2978.

369 In accordance with 2.1.3.5.3 (a), this radioactive material in an excepted package possessing toxic and corrosive properties is classified in Class 6.1 with radioactivity and corrosivity subsidiary hazards.

Uranium hexafluoride may be classified under this entry only if the conditions of 2.2.7.2.4.1.2, 2.2.7.2.4.1.5, 2.2.7.2.4.5.2 and, for fissile-excepted material, of 2.2.7.2.3.5 are met.

In addition to the provisions applicable to the carriage of Class 6.1 substances with a corrosivity subsidiary hazard, the provisions of 5.1.3.2, 5.1.5.2.2, 5.1.5.4.1 (b), 7.5.11 CV33 (3.1), (5.1) to (5.4) and (6) of ADR shall apply.

No Class 7 label is required to be displayed.

370 This entry applies to:

- ammonium nitrate with more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any added substance; and

- ammonium nitrate with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any added substance, that gives a positive result when tested in accordance with Test Series 2 (see Manual of Tests and Criteria, Part I). See also UN No. 1942.

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371 (1) This entry also applies to articles, containing a small pressure receptacle with a release device. Such articles shall comply with the following requirements:

(i) The water capacity of the pressure receptacle shall not exceed 0.5 litres and the working pressure shall not exceed 25 bar at 15 °C;

(ii) The minimum burst pressure of the pressure receptacle shall be at least four times the pressure of the gas at 15 °C;

(iii) Each article shall be manufactured in such a way that unintentional firing or release is avoided under normal conditions of handling, packing, carriage and use. This may be fulfilled by an additional locking device linked to the activator;

(iv) Each article shall be manufactured in such a way as to prevent hazardous projections of the pressure receptacle or parts of the pressure receptacle;

(v) Each pressure receptacle shall be manufactured from material which will not fragment upon rupture;

(vi) The design type of the article shall be subjected to a fire test. For this test, the provisions of paragraphs 16.6.1.2 except letter g, 16.6.1.3.1 to 16.6.1.3.6, 16.6.1.3.7 (b) and 16.6.1.3.8 of the *Manual of Tests and Criteria* shall be applied. It shall be demonstrated that the article relieves its pressure by means of a fire degradable seal or other pressure relief device, in such a way that the pressure receptacle will not fragment and that the article or fragments of the article do not rocket more than 10 metres;

(vii) The design type of the article shall be subjected to the following test. A stimulating mechanism shall be used to initiate one article in the middle of the packaging. There shall be no hazardous effects outside the package such as disruption of the package, metal fragments or a receptacle which passes through the packaging.

(2) The manufacturer shall produce technical documentation of the design type, manufacture as well as the tests and their results. The manufacturer shall apply procedures to ensure that articles produced in series are made of good quality, conform to the design type and are able to meet the requirements in (1). The manufacturer shall provide such information to the competent authority on request.

372 This entry applies to asymmetric capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to ADN.

Energy storage capacity means the energy stored in a capacitor, as calculated according to the following equation,

$Wh = 1/2C_N(U_R^2-U_L^2) \times (1/3600)$,

using the nominal capacitance (C_N), rated voltage (U_R) and rated lower limit voltage (U_L).

All asymmetric capacitors to which this entry applies shall meet the following conditions:

(a) Capacitors or modules shall be protected against short circuit;

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(b) Capacitors shall be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid which is released upon venting shall be contained by packaging or by equipment in which a capacitor is installed;

(c) Capacitors shall be marked with the energy storage capacity in Wh; and

(d) Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods shall be designed to withstand a 95 kPa pressure differential;

Capacitors containing an electrolyte not meeting the classification criteria of any class of dangerous goods, including when configured in a module or when installed in equipment are not subject to other provisions of ADN.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods, with an energy storage capacity of 20 Wh or less, including when configured in a module, are not subject to other provisions of ADN when the capacitors are capable of withstanding a 1.2 metre drop test unpackaged on an unyielding surface without loss of contents.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods that are not installed in equipment and with an energy storage capacity of more than 20 Wh are subject to ADN.

Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class of dangerous goods, are not subject to other provisions of ADN provided that the equipment is packaged in a strong outer packaging constructed of suitable material, and of adequate strength and design, in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during carriage. Large robust equipment containing capacitors may be offered for carriage unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained.

NOTE: *Notwithstanding the provisions of this special provision, nickel-carbon asymmetric capacitors containing Class 8 alkaline electrolytes shall be carried as UN 2795 BATTERIES, WET, FILLED WITH ALKALI, electric storage.*

373 Neutron radiation detectors containing non-pressurized boron trifluoride gas may be carried under this entry provided that the following conditions are met:

(a) Each radiation detector shall meet the following conditions.

(i) The pressure in each detector shall not exceed 105 kPa absolute at 20°C;

(ii) The amount of gas shall not exceed 13 g per detector;

(iii) Each detector shall be manufactured under a registered quality assurance programme;

NOTE: *ISO 9001 may be used for this purpose.*

(iv) Each neutron radiation detector shall be of welded metal construction with brazed metal to ceramic feed through assemblies. These detectors shall have a minimum burst pressure of 1800 kPa as demonstrated by design type qualification testing; and

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(v) Each detector shall be tested to a 1 x 10^{-10} cm^3/s leaktightness standard before filling.

(b) Radiation detectors carried as individual components shall be carried as follows:

(i) Detectors shall be packed in a sealed intermediate plastics liner with sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;

(ii) They shall be packed in strong outer packaging. The completed package shall be capable of withstanding a 1.8 m drop test without leakage of gas contents from detectors;

(iii) The total amount of gas from all detectors per outer packaging shall not exceed 52 g.

(c) Completed neutron radiation detection systems containing detectors meeting the conditions of paragraph (a) shall be carried as follows:

(i) The detectors shall be contained in a strong sealed outer casing;

(ii) The casing shall contain sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;

(iii) The completed systems shall be packed in strong outer packagings capable of withstanding a 1.8 m drop test without leakage unless a system's outer casing affords equivalent protection.

Packing instruction P200 of 4.1.4.1 of ADR is not applicable.

The transport document shall include the following statement "Transport in accordance with special provision 373".

Neutron radiation detectors containing not more than 1 g of boron trifluoride, including those with solder glass joints, are not subject to ADN provided they meet the requirements in paragraph (a) and are packed in accordance with paragraph (b). Radiation detection systems containing such detectors are not subject to ADN provided they are packed in accordance with paragraph (c).

374 *(Reserved)*

375 These substances when carried in single or combination packagings containing a net quantity per single or inner packaging of 5 l or less for liquids or having a net mass per single or inner packaging of 5 kg or less for solids, are not subject to any other provisions of ADN provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 of ADR.

376 Lithium ion cells or batteries and lithium metal cells or batteries identified as being damaged or defective such that they do not conform to the type tested according to the applicable provisions of the Manual of Tests and Criteria shall comply with the requirements of this special provision.

For the purposes of this special provision, these may include, but are not limited to:

- Cells or batteries identified as being defective for safety reasons;

- Cells or batteries that have leaked or vented;

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- Cells or batteries that cannot be diagnosed prior to carriage; or

- Cells or batteries that have sustained physical or mechanical damage.

NOTE: *In assessing a battery as damaged or defective, the type of battery and its previous use and misuse shall be taken into account.*

Cells and batteries shall be carried according to the provisions applicable to UN No. 3090, UN No. 3091, UN No. 3480 and No. UN 3481, except special provision 230 and as otherwise stated in this special provision.

Cells and batteries shall be packed in accordance with packing instructions P908 of 4.1.4.1 of ADR or LP904 of 4.1.4.3 of ADR, as applicable.

Cells and batteries identified as damaged or defective and liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage shall be packed and carried in accordance with packing instruction P911 of 4.1.4.1 of ADR or LP906 of 4.1.4.3 of ADR, as applicable. Alternative packing and/or carriage conditions may be authorized by the competent authority of any ADN Contracting Party who may also recognize an approval granted by the competent authority of a country which is not an ADN Contracting Party provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions. In both cases the cells and batteries are assigned to transport category 0.

Packages shall be marked "DAMAGED/DEFECTIVE LITHIUM-ION BATTERIES" or "DAMAGED/DEFECTIVE LITHIUM METAL BATTERIES", as applicable.

The transport document shall include the following statement “Transport in accordance with special provision 376”.

If applicable, a copy of the competent authority approval shall accompany the carriage.

377 Lithium ion and lithium metal cells and batteries and equipment containing such cells and batteries carried for disposal or recycling, either packed together with or packed without non-lithium batteries, may be packaged in accordance with packing instruction P909 of 4.1.4.1 of ADR.

These cells and batteries are not subject to the provisions of 2.2.9.1.7 (a) to (g).

Packages shall be marked “LITHIUM BATTERIES FOR DISPOSAL” or “LITHIUM BATTERIES FOR RECYCLING”.

Identified damaged or defective batteries shall be carried in accordance with special provision 376 and packaged in accordance with P908 of 4.1.4.1 or LP904 of 4.1.4.3 of ADR, as applicable.

378 Radiation detectors containing this gas in non-refillable pressure receptacles not meeting the requirements of Chapter 6.2 and packing instruction P200 of 4.1.4.1 of ADR may be carried under this entry provided:

(a) The working pressure in each receptacle does not exceed 50 bar;

(b) The receptacle capacity does not exceed 12 litres;

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(c) Each receptacle has a minimum burst pressure of at least 3 times the working pressure when a relief device is fitted and at least 4 times the working pressure when no relief device is fitted;

(d) Each receptacle is manufactured from material which will not fragment upon rupture;

(e) Each detector is manufactured under a registered quality assurance programme;

NOTE: *ISO 9001 may be used for this purpose.*

(f) Detectors are carried in strong outer packagings. The complete package shall be capable of withstanding a 1.2 metre drop test without breakage of the detector or rupture of the outer packaging. Equipment that includes a detector shall be packed in a strong outer packaging unless the detector is afforded equivalent protection by the equipment in which it is contained; and

(g) The transport document includes the following statement "Transport in accordance with special provision 378".

Radiation detectors, including detectors in radiation detection systems, are not subject to any other requirements of ADN if the detectors meet the requirements in (a) to (f) above and the capacity of detector receptacles does not exceed 50 ml.

379 Anhydrous ammonia adsorbed or absorbed on a solid contained in ammonia dispensing systems or receptacles intended to form part of such systems are not subject to the other provisions of ADN if the following conditions are observed:

(a) The adsorption or absorption presents the following properties:

(i) The pressure at a temperature of 20 °C in the receptacle is less than 0.6 bar;

(ii) The pressure at a temperature of 35 °C in the receptacle is less than 1 bar;

(iii) The pressure at a temperature of 85 °C in the receptacle is less than 12 bar.

(b) The adsorbent or absorbent material shall not have dangerous properties listed in classes 1 to 8;

(c) The maximum contents of a receptacle shall be 10 kg; and

(d) Receptacles containing adsorbed or absorbed ammonia shall meet the following conditions:

(i) Receptacles shall be made of a material compatible with ammonia as specified in ISO 11114-1:2012;

(ii) Receptacles and their means of closure shall be hermetically sealed and able to contain the generated ammonia;

(iii) Each receptacle shall be able to withstand the pressure generated at 85 °C with a volumetric expansion no greater than 0.1%;

(iv) Each receptacle shall be fitted with a device that allows for gas evacuation once pressure exceeds 15 bar without violent rupture, explosion or projection; and

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(v) Each receptacle shall be able to withstand a pressure of 20 bar without leakage when the pressure relief device is deactivated.

When carried in an ammonia dispenser, the receptacles shall be connected to the dispenser in such a way that the assembly is guaranteed to have the same strength as a single receptacle.

The properties of mechanical strength mentioned in this special provision shall be tested using a prototype of a receptacle and/or dispenser filled to nominal capacity, by increasing the temperature until the specified pressures are reached.

The test results shall be documented, shall be traceable and shall be communicated to the relevant authorities upon request.

380 *(Reserved)*

381 *(Reserved)*

382 Polymeric beads may be made from polystyrene, poly (methyl methacrylate) or other polymeric material. When it can be demonstrated that no flammable vapour, resulting in a flammable atmosphere, is evolved according to test U1 (Test method for substances liable to evolve flammable vapours) of Part III, sub-section 38.4.4 of the Manual of Tests and Criteria, polymeric beads, expandable need not be classified under this UN number. This test should only be performed when de-classification of a substance is considered.

383 Table tennis balls manufactured from celluloid are not subject to ADN where the net mass of each table tennis ball does not exceed 3.0 g and the total net mass of table tennis balls does not exceed 500 g per package.

384 *(Reserved)*

385 *(Deleted)*

386 When substances are stabilized by temperature control, the provisions of 2.2.41.1.17, 7.1.7, special provision V8 of Chapter 7.2 of ADR, special provision S4 of Chapter 8.5 of ADR and the requirements of Chapter 9.6 of ADR apply. When chemical stabilization is employed, the person offering the packaging, IBC or tank for carriage shall ensure that the level of stabilization is sufficient to prevent the substance in the packaging, IBC or tank from dangerous polymerization at a bulk mean loading temperature of 50 °C, or, in the case of a portable tank, 45 °C. Where chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of carriage, temperature control is required. In making this determination factors to be taken into consideration include, but are not limited to, the capacity and geometry of the packaging, IBC or tank and the effect of any insulation present, the temperature of the substance when offered for carriage, the duration of the journey and the ambient temperature conditions typically encountered in the journey (considering also the season of year), the effectiveness and other properties of the stabilizer employed, applicable operational controls imposed by regulation (e.g. requirements to protect from sources of heat, including other cargo carried at a temperature above ambient) and any other relevant factors.

387 Lithium batteries in conformity with 2.2.9.1.7 (f) containing both primary lithium metal cells and rechargeable lithium ion cells shall be assigned to UN Nos. 3090 or 3091 as appropriate. When such batteries are carried in accordance with special provision 188, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh.

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388 UN No. 3166 entries apply to vehicles powered by flammable liquid or gas internal combustion engines or fuel cells.

Vehicles powered by a fuel cell engine shall be assigned to the entries UN No. 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN No. 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.

Other vehicles which contain an internal combustion engine shall be assigned to the entries UN No. 3166 VEHICLE, FLAMMABLE GAS POWERED or UN No. 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.

If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it shall be assigned to UN No. 3166 VEHICLE, FLAMMABLE GAS POWERED.

Entry UN No. 3171 only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries carried with these batteries installed.

For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with a motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles carried in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging.

Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries shall be assigned to the entries UN No. 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or UN No. 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT or UN No. 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or UN No. 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, as appropriate.

Dangerous goods, such as batteries, airbags, fire extinguishers, compressed gas accumulators, safety devices and other integral components of the vehicle that are necessary for the operation of the vehicle or for the safety of its operator or passengers, shall be securely installed in the vehicle and are not otherwise subject to ADN. However, lithium batteries shall meet the provisions of 2.2.9.1.7, except as otherwise provided for in special provision 667.

Where a lithium battery installed in a vehicle or equipment is damaged or defective, the vehicle or equipment shall be carried in accordance with the conditions defined in special provision 667 (c).

389 This entry only applies to cargo transport units in which lithium ion batteries or lithium metal batteries are installed and which are designed only to provide power external to the unit. The lithium batteries shall meet the provisions of 2.2.9.1.7 (a) to (g) and contain the necessary systems to prevent overcharge and over discharge between the batteries.

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The batteries shall be securely attached to the interior structure of the cargo transport unit (e.g., by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and significant movement relative to the cargo transport unit under the shocks, loadings and vibrations normally incident to carriage. Dangerous goods necessary for the safe and proper operation of the cargo transport unit (e.g., fire extinguishing systems and air conditioning systems), shall be properly secured to or installed in the cargo transport unit and are not otherwise subject to ADN. Dangerous goods not necessary for the safe and proper operation of the cargo transport unit shall not be carried within the cargo transport unit.

The batteries inside the cargo transport unit are not subject to marking or labelling requirements. The cargo transport unit shall bear orange-coloured plates in accordance with 5.3.2.2 and placards in accordance with 5.3.1.1 on two opposing sides.

390 *(Reserved)*

391 *(Reserved)*

392 For the carriage of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of 4.1.4.1 and Chapter 6.2 of ADR need not be applied when carried for disposal, recycling, repair, inspection, maintenance or from where they are manufactured to a vehicle assembly plant, provided the following conditions are met:

(a) The fuel gas containment systems shall meet the requirements of the standards or regulations for fuel tanks for vehicles, as applicable. Examples of applicable standards and regulations are:

LPG tanks	
UN Regulation No. 67 Revision 2	Uniform provisions concerning: I. Approval of specific equipment of vehicles of category M and N using liquefied petroleum gases in their propulsion system; II. Approval of vehicles of category M and N fitted with specific equipment for the use of liquefied petroleum gases in their propulsion system with regard to the installation of such equipment
UN Regulation No. 115	Uniform provisions concerning the approval of: I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems; II Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system

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CNG and LNG tanks	
UN Regulation No. 110	Uniform provisions concerning the approval of: I. Specific components of motor vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system II. Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system
UN Regulation No. 115	Uniform provisions concerning the approval of: I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems; II Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system
ISO 11439:2013	Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
ISO 15500-Series	Road vehicles -- Compressed natural gas (CNG) fuel system components – several parts as applicable
ANSI NGV 2	Compressed natural gas vehicle fuel containers
CSA B51 Part 2:2014	Boiler, pressure vessel, and pressure piping code Part 2 Requirements for high-pressure cylinders for on-board storage of fuels for automotive vehicles
Hydrogen pressure tanks	
Global Technical Regulation (GTR) No. 13	Global technical regulation on hydrogen and fuel cell vehicles (ECE/TRANS/180/Add.13).
ISO/TS 15869:2009	Gaseous hydrogen and hydrogen blends - Land vehicle fuel tanks
Regulation (EC) No.79/2009	Regulation (EC) No. 79/2009 of the European Parliament and of the Council of 14 January 2009 on type approval of hydrogen-powered motor vehicles, and amending Directive 2007/46/EC
Regulation (EU) No. 406/2010	Commission Regulation (EU) No 406/2010 of 26 April 2010 implementing Regulation (EC) No 79/2009 of the European Parliament and of the Council on type-approval of hydrogen-powered motor vehicles
UN Regulation No. 134	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen-fuelled vehicles (HFCV)

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CSA B51 Part 2: 2014	Boiler, pressure vessel, and pressure piping code - Part 2: Requirements for high-pressure cylinders for on-board storage of fuels for automotive vehicles

Gas tanks designed and constructed in accordance with previous versions of relevant standards or regulations for gas tanks for motor vehicles, which were applicable at the time of the certification of the vehicles for which the gas tanks were designed and constructed may continue to be carried;

(b) The fuel gas containment systems shall be leakproof and shall not exhibit any signs of external damage which may affect their safety;

NOTE 1: *Criteria may be found in standard ISO 11623:2015 Gas cylinders – Composite construction – Periodic inspection and testing (or ISO 19078:2013 Gas cylinders – Inspection of the cylinder installation, and requalification of high pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles).*

NOTE 2: *If the fuel gas containment systems are not leakproof or are overfilled or if they exhibit damage that could affect their safety (e.g. in case of a safety related recall), they shall only be carried in salvage pressure receptacles in conformity with ADN.*

(c) If a fuel gas containment system is equipped with two valves or more integrated in line, the two valves shall be closed as to be gastight under normal conditions of carriage. If only one valve exists or only one valve works, all openings with the exception of the opening of the pressure relief device shall be closed as to be gastight under normal conditions of carriage;

(d) Fuel gas containment systems shall be carried in such a way as to prevent obstruction of the pressure relief device or any damage to the valves and any other pressurised part of the fuel gas containment systems and unintentional release of the gas under normal conditions of carriage. The fuel gas containment system shall be secured in order to prevent slipping, rolling or vertical movement;

(e) Valves shall be protected by one of the methods described in 4.1.6.8 (a) to (e) of ADR;

(f) Except for the case of fuel gas containment systems removed for disposal, recycling, repair, inspection or maintenance, they shall be filled with not more than 20% of their nominal filling ratio or nominal working pressure, as applicable;

(g) Notwithstanding the provisions of Chapter 5.2, when fuel gas containment systems are consigned in a handling device, marks and labels may be affixed to the handling device; and

(h) Notwithstanding the provisions of 5.4.1.1.1 (f) the information on the total quantity of dangerous goods may be replaced by the following information:

(i) The number of fuel gas containment systems; and

(ii) In the case of liquefied gases the total net mass (kg) of gas of each fuel gas containment system and, in the case of compressed gases, the total water capacity (l) of each fuel gas containment system followed by the nominal working pressure.

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Examples for information in the transport document:

Example 1: “UN 1971 natural gas, compressed, 2.1, 1 fuel gas containment system of 50 *l* in total, 200 bar”.

Example 2: “UN 1965 hydrocarbon gas mixture, liquefied, n.o.s., 2.1, 3 fuel gas containment systems, each of 15 kg net mass of gas”

393-499 *(Reserved)*

500 *(Deleted)*

501 For naphthalene, molten, see UN No. 2304.

502 UN No. 2006 plastics, nitrocellulose-based, self-heating, n.o.s., and UN No. 2002 celluloid scrap are substances of Class 4.2.

503 For phosphorus, white, molten, see UN No. 2447.

504 UN No. 1847 potassium sulphide, hydrated with not less than 30% water of crystallization, UN No. 1849 sodium sulphide, hydrated with not less than 30% water of crystallization and UN No. 2949 sodium hydrosulphide, hydrated with not less than 25% water of crystallization are substances of Class 8.

505 UN No. 2004 magnesium diamide is a substance of Class 4.2.

506 Alkaline earth metals and alkaline earth metal alloys in pyrophoric form are substances of Class 4.2.

UN No. 1869 magnesium or magnesium alloys containing more than 50% magnesium as pellets, turnings or ribbons, are substances of Class 4.1.

507 UN No. 3048 aluminium phosphide pesticides, with additives inhibiting the emission of toxic flammable gases are substances of Class 6.1.

508 UN No. 1871 titanium hydride and UN No. 1437 zirconium hydride are substances of Class 4.1. UN No. 2870 aluminium borohydride is a substance of Class 4.2.

509 UN No. 1908 chlorite solution is a substance of Class 8.

510 UN No. 1755 chromic acid solution is a substance of Class 8.

511 UN No. 1625 mercuric nitrate, UN No. 1627 mercurous nitrate and UN No. 2727 thallium nitrate are substances of Class 6.1. Thorium nitrate, solid, uranyl nitrate hexahydrate solution and uranyl nitrate, solid are substances of Class 7.

512 UN No. 1730 antimony pentachloride, liquid, UN No. 1731 antimony pentachloride solution, UN No. 1732 antimony pentafluoride and UN No. 1733 antimony trichloride are substances of Class 8.

513 UN No. 0224 barium azide, dry or wetted with less than 50% water, by mass, is a substance of Class 1. UN No. 1571 barium azide, wetted with not less than 50% water, by mass, is a substance of Class 4.1. UN No. 1854 barium alloys, pyrophoric, are substances of Class 4.2. UN No. 1445 barium chlorate, solid, UN No. 1446 barium nitrate, UN No. 1447 barium perchlorate, solid, UN No. 1448 barium permanganate, UN No. 1449 barium peroxide, UN No. 2719 barium bromate, UN No. 2741 barium hypochlorite with more than 22% available chlorine, UN No. 3405 barium chlorate,

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solution and UN No. 3406 barium perchlorate, solution, are substances of Class 5.1. UN No. 1565 barium cyanide and UN No. 1884 barium oxide are substances of Class 6.1.

514 UN No. 2464 beryllium nitrate is a substance of Class 5.1.

515 UN No. 1581 chloropicrin and methyl bromide mixture and UN No. 1582 chloropicrin and methyl chloride mixture are substances of Class 2.

516 UN No. 1912 methyl chloride and methylene chloride mixture is a substance of Class 2.

517 UN No. 1690 sodium fluoride, solid, UN No. 1812 potassium fluoride, solid, UN No. 2505 ammonium fluoride, UN No. 2674 sodium fluorosilicate, UN No. 2856 fluorosilicates, n.o.s., UN No. 3415 sodium fluoride, solution and UN No. 3422 potassium fluoride, solution, are substances of Class 6.1.

518 UN No. 1463 chromium trioxide, anhydrous (chromic acid, solid) is a substance of Class 5.1.

519 UN No. 1048 hydrogen bromide, anhydrous, is a substance of Class 2.

520 UN No. 1050 hydrogen chloride, anhydrous, is a substance of Class 2.

521 Solid chlorites and hypochlorites are substances of Class 5.1.

522 UN No. 1873 perchloric acid aqueous solution with more than 50% but not more than 72% pure acid, by mass are substances of Class 5.1. Perchloric acid solutions containing more than 72% pure acid, by mass, or mixtures of perchloric acid with any liquid other than water, are not to be accepted for carriage.

523 UN No. 1382 anhydrous potassium sulphide and UN No. 1385 anhydrous sodium sulphide and their hydrates with less than 30% water of crystallization, and UN No. 2318 sodium hydrosulphide with less than 25% water of crystallization are substances of Class 4.2.

524 UN No. 2858 finished zirconium products of a thickness of 18 μm or more are substances of Class 4.1.

525 Solutions of inorganic cyanides with a total cyanide ion content of more than 30% shall be classified in packing group I, solutions with a total cyanide ion content of more than 3% and not more than 30% in packing group II and solutions with a cyanide ion content of more than 0.3% and not more than 3% in packing group III.

526 UN No. 2000 celluloid is assigned to Class 4.1.

527 (*Reserved*)

528 UN No. 1353 fibres or fabrics impregnated with weakly nitrated cellulose, non-self heating are substances of Class 4.1.

529 UN No. 0135 mercury fulminate, wetted with not less than 20% water, or mixture of alcohol and water, by mass, is a substance of Class 1. Mercurous chloride (calomel) is a substance of Class 6.1 (UN No. 2025).

530 UN No. 3293 hydrazine, aqueous solution with not more than 37% hydrazine, by mass, is a substance of Class 6.1.

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531 Mixtures having a flash-point below 23 °C and containing more than 55% nitrocellulose, whatever its nitrogen content or containing not more than 55% nitrocellulose with a nitrogen content above 12.6% (by dry mass), are substances of Class 1 (see UN Nos. 0340 or 0342) or of Class 4.1 (UN Nos. 2555, 2556 or 2557).

532 UN No. 2672 ammonia solution containing not less than 10% but not more than 35% ammonia is a substance of Class 8.

533 UN No. 1198 formaldehyde solutions, flammable are substances of Class 3. Formaldehyde solutions, non-flammable, with less than 25% formaldehyde are not subject to the requirements of ADN.

534 While in some climatic conditions, petrol (gasoline) may have a vapour pressure at 50 °C of more than 110 kPa (1.10 bar) but not more than 150 kPa (1.50 bar) it is to continue to be considered as a substance having a vapour pressure at 50 °C of not more than 110 kPa (1.10 bar).

535 UN No. 1469 lead nitrate, UN No. 1470 lead perchlorate, solid and UN No. 3408 lead perchlorate, solution are substances of Class 5.1.

536 For naphthalene, solid, see UN No. 1334.

537 UN No. 2869 titanium trichloride mixture, not pyrophoric, is a substance of Class 8.

538 For sulphur (in the solid state), see UN No. 1350.

539 Solutions of isocyanates having a flash-point of not less than 23 °C are substances of Class 6.1.

540 UN No. 1326 hafnium powder, wetted, UN No. 1352 titanium powder, wetted or UN No. 1358 zirconium powder, wetted, with not less than 25% water, are substances of Class 4.1.

541 Nitrocellulose mixtures with a water content, alcohol content or plasticizer content lower than the stated limits are substances of Class 1.

542 Talc containing tremolite and/or actinolite is covered by this entry.

543 UN No. 1005 ammonia, anhydrous, UN No. 3318 ammonia solution with more than 50% ammonia and UN No. 2073 ammonia solution, with more than 35% but not more than 50% ammonia, are substances of Class 2. Ammonia solutions with not more than 10% ammonia are not subject to the requirements of ADN.

544 UN No. 1032 dimethylamine, anhydrous, UN No. 1036 ethylamine, UN No. 1061 methylamine, anhydrous and UN No. 1083 trimethylamine, anhydrous, are substances of Class 2.

545 UN No. 0401 dipicryl sulphide, wetted with less than 10% water by mass is a substance of Class 1.

546 UN No. 2009 zirconium, dry, finished sheets, strip or coiled wire, in thicknesses of less than 18 μm, is a substance of Class 4.2. Zirconium, dry, finished sheets, strip or coiled wire, in thicknesses of 254 μm or more, is not subject to the requirements of ADN.

547 UN No. 2210 maneb or UN No. 2210 maneb preparations in self-heating form are substances of Class 4.2.

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548 Chlorosilanes which, in contact with water, emit flammable gases, are substances of Class 4.3.

549 Chlorosilanes having a flash-point of less than 23 °C and which, in contact with water, do not emit flammable gases are substances of Class 3. Chlorosilanes having a flash-point equal to or greater than 23 °C and which, in contact with water, do not emit flammable gases are substances of Class 8.

550 UN No. 1333 cerium in slabs, rods or ingots is a substance of Class 4.1.

551 Solutions of these isocyanates having a flash-point below 23 °C are substances of Class 3.

552 Metals and metal alloys in powdered or other flammable form, liable to spontaneous combustion, are substances of Class 4.2. Metals and metal alloys in powdered or other flammable form which, in contact with water, emit flammable gases are substances of Class 4.3.

553 This mixture of hydrogen peroxide and peroxyacetic acid shall, in laboratory testing (see *Manual of Tests and Criteria*, Part II, section 20), neither detonate in the cavitated state nor deflagrate at all and shall show no effect when heated under confinement nor any explosive power. The formulation shall be thermally stable (self-accelerating decomposition temperature 60 °C or higher for a 50 kg package), and a liquid compatible with peroxyacetic acid shall be used for desensitization. Formulations not meeting these criteria are to be regarded as substances of Class 5.2 (see *Manual of Tests and Criteria*, Part II, paragraph 20.4.3 (g)).

554 Metal hydrides which, in contact with water, emit flammable gases are substances of Class 4.3. UN No. 2870 aluminium borohydride or UN No. 2870 aluminium borohydride in devices is a substance of Class 4.2.

555 Dust and powder of metals in non-spontaneously combustible form, non-toxic which nevertheless, in contact with water, emit flammable gases, are substances of Class 4.3.

556 Organometallic compounds and their solutions which ignite spontaneously are substances of Class 4.2. Flammable solutions with organometallic compounds in concentrations which, in contact with water, neither emit flammable gases in dangerous quantities nor ignite spontaneously are substances of Class 3.

557 Dust and powder of metals in pyrophoric form are substances of Class 4.2.

558 Metals and metal alloys in pyrophoric form are substances of Class 4.2. Metals and metal alloys which, in contact with water, do not emit flammable gases and are not pyrophoric or self-heating, but which are easily ignited, are substances of Class 4.1.

559 (*Deleted*)

560 An elevated temperature liquid, n.o.s. at or above 100 °C (including molten metals and molten salts) or, for a substance having a flash-point, at a temperature below its flash-point, is a substance of Class 9 (UN No. 3257).

561 Chloroformates having predominantly corrosive properties are substances of Class 8.

562 Spontaneously combustible organometallic compounds are substances of Class 4.2. Water-reactive organometallic compounds, flammable, are substances of Class 4.3.

563 UN No. 1905 selenic acid is a substance of Class 8.

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564 UN No. 2443 vanadium oxytrichloride, UN No. 2444 vanadium tetrachloride and UN No. 2475 vanadium trichloride are substances of Class 8.

565 Unspecified wastes resulting from medical/veterinary treatment of humans/animals or from biological research, and which are unlikely to contain substances of Class 6.2 shall be assigned to this entry. Decontaminated clinical wastes or wastes resulting from biological research which previously contained infectious substances are not subject to the requirements of Class 6.2.

566 UN No. 2030 hydrazine aqueous solution, with more than 37% hydrazine, by mass, is a substance of Class 8.

567 (*Deleted*)

568 Barium azide with a water content lower than the stated limit is a substance of Class 1, UN No. 0224.

569-579 *(Reserved)*

580 (*Deleted*)

581 This entry covers mixtures of propadiene with 1 to 4% methylacetylene as well as the following mixtures:

Mixture	Content, % by volume			Permitted technical name for purposes of 5.4.1.1
	Methylacetylene and propadiene, not more than	Propane and propylene, not more than	C_4-saturated hydrocarbons, not less than	
P1	63	24	14	“Mixture P1”
P2	48	50	5	“Mixture P2”

582 This entry covers, *inter alia*, mixtures of gases indicated by the letter R ..., with the following properties:

Mixture	Maximum vapour pressure at 70 °C (MPa)	Minimum density at 50 °C (kg/l)	Permitted technical name for purposes of 5.4.1.1
F1	1.3	1.30	“Mixture F1”
F2	1.9	1.21	“Mixture F2”
F3	3.0	1.09	“Mixture F3”

NOTE 1: *Trichlorofluoromethane (refrigerant R 11), 1,1,2-trichloro-1,2,2-trifluoroethane (refrigerant R 113), 1,1,1-trichloro-2,2,2-trifluoroethane (refrigerant R 113a), 1-chloro-1,2,2-trifluoroethane (refrigerant R 133) and 1-chloro-1,1,2-trifluoroethane (refrigerant R 133 b) are not substances of Class 2. They may, however, enter into the composition of mixtures F 1 to F 3.*

NOTE 2: *The reference densities correspond to the densities of dichlorofluoromethane (1.30 kg/l), dichloridifluoromethane (1.21 kg/l) and chlorodifluoromethane (1.09 kg/l).*

583 This entry covers, *inter alia*, mixtures of gases, with the following properties:

Mixture	Maximun vapour pressure at 70 °C (MPa)	Minimun density at 50 °C (kg/l)	Permitted technical name[a] for purposes of 5.4.1.1
A	1.1	0.525	“Mixture A” or “Butane”
A01	1.6	0.516	“Mixture A01” or “Butane”
A02	1.6	0.505	“Mixture A02” or “Butane”
A0	1.6	0.495	“Mixture A0” or “Butane”

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Mixture	Maximun vapour pressure at 70 °C (MPa)	Minimun density at 50 °C (kg/l)	Permitted technical name[a] for purposes of 5.4.1.1
A1	2.1	0.485	"Mixture A1"
B1	2.6	0.474	"Mixture B1"
B2	2.6	0.463	"Mixture B2"
B	2.6	0.450	"Mixture B"
C	3.1	0.440	"Mixture C" or "Propane"

[a] *For carriage in tanks, the trade names "Butane" or "Propane" may be used only as a complement.*

584 This gas is not subject to the requirements of ADN when:

– it contains not more than 0.5% air in the gaseous state;

– it is contained in metal capsules (sodors, sparklets) free from defects which may impair their strength;

– the leakproofness of the closure of the capsule is ensured;

– a capsule contains not more than 25 g of this gas;

– a capsule contains not more than 0.75 g of this gas per cm^3 of capacity.

585 (*Deleted*).

586 Hafnium, titanium and zirconium powders shall contain a visible excess of water. Hafnium, titanium and zirconium powders, wetted, mechanically produced, of a particle size of 53 μm and over, or chemically produced, of a particle size of 840 μm and over, are not subject to the requirements of ADN.

587 Barium stearate and barium titanate are not subject to the requirements of ADN.

588 Solid hydrated forms of aluminium bromide and aluminium chloride are not subject to the requirements of ADN.

589 (*Deleted*)

590 Ferric chloride hexahydrate is not subject to the requirements of ADN.

591 Lead sulphate with not more than 3% free acid is not subject to the requirements of ADN.

592 Uncleaned empty packagings (including empty IBCs and large packagings), empty tank-vehicles, empty tank wagons, empty demountable tanks, empty portable tanks, empty tank-containers and empty small containers which have contained this substance are not subject to the requirements of ADN.

593 This gas, intended for the cooling of e.g. medical or biological specimens, if contained in double wall receptacles which comply with the provisions of packing instruction P203, paragraph (6) for open cryogenic receptacles of 4.1.4.1 of ADR is not subject to the requirements of ADN except as specified in 5.5.3.

594 The following articles, manufactured and filled according to the provisions applied in the country of manufacture, are not subject to the requirements of ADN:

(a) UN No. 1044 fire extinguishers provided with protection against inadvertent discharge, when:

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– they are packaged in a strong outer packaging; or

– they are large fire extinguishers which meet the requirements of special packing provision PP91 of packing instruction P003 in 4.1.4.1 of ADR;

(b) UN No. 3164 articles, pressurized pneumatic or hydraulic, designed to withstand stresses greater than the internal gas pressure by virtue of transmission of force, intrinsic strength or construction, when they are packaged in a strong outer packaging.

NOTE: *"Provisions applied in the country of manufacture" means the provisions applicable in the country of manufacture or those applicable in the country of use.*

596 Cadmium pigments, such as cadmium sulphides, cadmium sulphoselenides and cadmium salts of higher fatty acids (e.g. cadmium stearate), are not subject to the requirements of ADN.

597 Acetic acid solutions with not more than 10% pure acid by mass are not subject to the requirements of ADN.

598 The following are not subject to the requirements of ADN:

(a) New storage batteries when:

– they are secured in such a way that they cannot slip, fall or be damaged;

– they are provided with carrying devices, unless they are suitably stacked, e.g. on pallets;

– there are no dangerous traces of alkalis or acids on the outside;

– they are protected against short circuits;

(b) Used storage batteries when:

– their cases are undamaged;

– they are secured in such a way that they cannot leak, slip, fall or be damaged, e.g. by stacking on pallets;

– there are no dangerous traces of alkalis or acids on the outside of the articles;

– they are protected against short circuits.

"Used storage batteries" means storage batteries carried for recycling at the end of their normal service life.

599 (*Deleted*)

600 Vanadium pentoxide, fused and solidified, is not subject to the requirements of ADN.

601 Pharmaceutical products (medicines) ready for use, which are substances manufactured and packaged for retail sale or distribution for personal or household consumption are not subject to the requirements of ADN.

602 Phosphorus sulphides which are not free from yellow and white phosphorus are not to be accepted for carriage.

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603 Anhydrous hydrogen cyanide not meeting the description for UN No. 1051 or UN No. 1614 is not to be accepted for carriage. Hydrogen cyanide (hydrocyanic acid) containing less than 3% water is stable, if the pH-value is 2.5 ± 0.5 and the liquid is clear and colourless.

604-606 *(Deleted)*

607 Mixtures of potassium nitrate and sodium nitrite with an ammonium salt are not to be accepted for carriage.

608 *(Deleted)*

609 Tetranitromethane not free from combustible impurities is not to be accepted for carriage.

610 The carriage of this substance, when it contains more than 45% hydrogen cyanide is prohibited.

611 Ammonium nitrate containing more than 0.2% combustible substances (including any organic substance calculated as carbon) is not to be accepted for carriage unless it is a constituent of a substance or article of Class 1.

612 *(Reserved)*

613 Chloric acid solution containing more than 10% chloric acid and mixtures of chloric acid with any liquid other than water is not to be accepted for carriage.

614 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in concentrations considered highly toxic according to the criteria in 2.2.61.1 is not to be accepted for carriage.

615 *(Reserved)*

616 Substances containing more than 40% liquid nitric esters shall satisfy the exudation test specified in 2.3.1.

617 In addition to the type of explosive, the commercial name of the particular explosive shall be marked on the package.

618 In receptacles containing 1,2-butadiene, the oxygen concentration in the gaseous phase shall not exceed 50 ml/m^3.

619-622 *(Reserved)*

623 UN No. 1829 sulphur trioxide shall be inhibited. Sulphur trioxide, 99.95% pure or above, may be carried without inhibitor in tanks provided that its temperature is maintained at or above 32.5 °C. For the carriage of this substance without inhibitor in tanks at a minimum temperature of 32.5 °C, the specification "**Transport under minimum temperature of the product of 32.5 °C**" shall appear in the transport document.

625 Packages containing these articles shall be clearly marked as follows:

"**UN 1950 AEROSOLS**"

626-631 *(Reserved)*

632 Considered to be spontaneously flammable (pyrophoric).

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633 Packages and small containers containing this substance shall bear the following mark: "**Keep away from any source of ignition**". This mark shall be in an official language of the forwarding country, and also, if that language is not English, French or German, in English, French or German, unless any agreements concluded between the countries concerned in the transport operation provide otherwise.

635 Packages containing these articles need not bear a label conforming to model No. 9 unless the article is fully enclosed by packaging, crates or other means that prevent the ready identification of the article.

636 Up to the intermediate processing facility, lithium cells and batteries with a gross mass of not more than 500 g each, lithium ion cells with a Watt-hour rating of not more than 20 Wh, lithium ion batteries with a Watt-hour rating of not more than 100 Wh, lithium metal cells with a lithium content of not more than 1 g and lithium metal batteries with an aggregate lithium content of not more than 2 g, not contained in equipment, collected and handed over for carriage for sorting, disposal or recycling, together with or without other non-lithium cells or batteries**,** are not subject to the other provisions of ADN including special provision 376 and 2.2.9.1.7, if the following conditions are met:

(a) The cells and batteries are packed according to packing instruction P909 of 4.1.4.1 of ADR except for the additional requirements 1 and 2;

(b) A quality assurance system is in place to ensure that the total amount of lithium cells and batteries per transport unit does not exceed 333 kg;

NOTE: *The total quantity of lithium cells and batteries in the mix may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.*

(c) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" as appropriate.

637 Genetically modified microorganisms and genetically modified organisms are those which are not dangerous for humans and animals, but which could alter animals, plants, microbiological substances and ecosystems in such a way as cannot occur naturally. Genetically modified microorganisms and genetically modified organisms are not subject to the requirements of ADN when authorized for use by the competent authorities of the countries of origin, transit and destination[3].

Live vertebrate or invertebrate animals shall not be used to carry these substances classified under this UN number unless the substance can be carried in no other way.

For the carriage of easily perishable substances under this UN number appropriate information shall be given, e.g.: "**Cool at +2 °/+4 °C**" or "**Carry in frozen state**" or "**Do not freeze**".

638 Substances related to self-reactive substances (see 2.2.41.1.19).

639 See 2.2.2.3, classification code 2F, UN No. 1965, Note 2.

[3] *See in particular Part C of Directive 2001/18/EC of the European Parliament and of the Council on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC (Official Journal of the European Communities, No. L 106, of 17 April 2001, pp. 8-14), which sets out the authorization procedures for the European Community*.

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640 The physical and technical characteristics mentioned in column (2) of Table A of Chapter 3.2 determine different tank codes for the carriage of substances of the same packing group in tanks conforming to Chapter 6.8 of RID or ADR.

In order to identify these physical and technical characteristics of the product carried in the tank, the following shall be added to the particulars required in the transport document only in case of carriage in tanks conforming to Chapter 6.8 of ADR or RID:

"Special provision 640X" where "X" is the applicable capital letter appearing after the reference to special provision 640 in column (6) of Table A of Chapter 3.2.

These particulars may, however, be dispensed with in the case of carriage in the type of tank which, for substances of a specific packing group of a specific UN number, meets at least the most stringent requirements.

643 Stone or aggregate asphalt mixture is not subject to the requirements for Class 9.

644 This substance is admitted for carriage provided that:

– The pH is between 5 and 7 measured in an aqueous solution of 10% of the substance carried;

– The solution does not contain more than 0.2% combustible material or chlorine compounds in quantities such that the chlorine level exceeds 0.02%.

645 The classification code as mentioned in Column (3b) of Table A of Chapter 3.2 shall be used only with the approval of the competent authority of a Contracting Party to ADN prior to carriage. The approval shall be given in writing as a classification approval certificate (see 5.4.1.2.1 (g)) and shall be provided with a unique reference. When assignment to a division is made in accordance with the procedure in 2.2.1.1.7.2, the competent authority may require the default classification to be verified on the basis of test data derived from Test Series 6 of the *Manual of Tests and Criteria*, Part I, Section 16.

646 Carbon made by steam activation process is not subject to the requirements of ADN.

647 Except for carriage in tank vessels, the carriage of vinegar and acetic acid with not more than 25 % pure acid by mass is subject only to the following requirements:

(a) Packagings, including IBCs and large packagings, and tanks shall be manufactured from stainless steel or plastic material which is permanently resistant to corrosion of vinegar/acetic acid food grade;

(b) Packagings, including IBCs and large packagings, and tanks shall be subjected to a visual inspection by the owner at least once a year. The results of the inspections shall be recorded and the records kept for at least one year. Damaged packagings, including IBCs and large packagings, and tanks shall not be filled;

(c) Packagings, including IBCs and large packagings, and tanks shall be filled in a way that no product is spilled or adheres to the outer surface;

(d) Seals and closures shall be resistant to vinegar/acetic acid food grade. Packagings, including IBCs and large packagings, and tanks shall be hermetically sealed by the person in charge of packaging and/or filling so that under normal conditions of carriage there will be no leakage;

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(e) Combination packagings with inner packaging made of glass or plastic (see packing instruction P001 in 4.1.4.1 of ADR) which fulfil the general packing requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.5, 4.1.1.6, 4.1.1.7 and 4.1.1.8 of ADR may be used;

The other provisions of ADN do not apply except those relating to carriage in tank vessels.

648 Articles impregnated with this pesticide, such as fibreboard plates, paper strips, cotton-wool balls, sheets of plastics material, in hermetically closed wrappings, are not subject to the provisions of ADN.

649 *(Deleted)*

650 Waste consisting of packaging residues, solidified residues and liquid residues of paint may be carried under the conditions of packing group II. In addition to the provisions of UN No. 1263, packing group II, the waste may also be packed and carried as follows:

(a) The waste may be packed in accordance with packing instruction P002 of 4.1.4.1 of ADR or to packing instruction IBC006 of 4.1.4.2 of ADR;

(b) The waste may be packed in flexible IBCs of types 13H3, 13H4 and 13H5 in overpacks with complete walls;

(c) Testing of packagings and IBCs indicated under (a) or (b) may be carried out in accordance with the requirements of Chapters 6.1 or 6.5 of ADR, as appropriate, in relation to solids, at the packing group II performance level.

The tests shall be carried out on packagings and IBCs, filled with a representative sample of the waste, as prepared for carriage;

(d) Carriage in bulk in sheeted wagons, movable roof wagons/sheeted vehicles, closed containers or sheeted large containers, all with complete walls is allowed. The wagons, containers or body of vehicles shall be leakproof or rendered leakproof, for example by means of a suitable and sufficiently stout inner lining;

(e) If the waste is carried under the conditions of this special provision, the goods shall be declared in accordance with 5.4.1.1.3 in the transport document, as follows: "UN 1263 WASTE PAINT, 3, II", or "UN 1263 WASTE PAINT, 3, PG II".

651 Special provision V2 (1) of ADR is only applicable for a net explosive content of more than 3,000 kg (4,000 kg with trailer).

652 *(Reserved)*

653 The carriage of this gas in cylinders having a test pressure capacity product of maximum 15.2 MPa.litre (152 bar.litre) is not subject to the other provisions of ADN if the following conditions are met:

− The provisions for construction and testing of cylinders are observed;

− The cylinders are contained in outer packagings which at least meet the requirements of Part 4 for combination packagings. The general provisions of packing of 4.1.1.1, 4.1.1.2 and 4.1.1.5 to 4.1.1.7 of ADR shall be observed;

− The cylinders are not packed together with other dangerous goods;

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- The total gross mass of a package does not exceed 30 kg; and

- Each package is clearly and durably marked with "UN 1006" for argon compressed, "UN 1013" for carbon dioxide, "UN 1046" for helium compressed or "UN 1066" for nitrogen compressed. This mark is displayed within a diamond-shaped area surrounded by a line that measures at least 100 mm by 100 mm.

654 Waste lighters collected separately and consigned in accordance with 5.4.1.1.3 may be carried under this entry for the purposes of disposal. They need not be protected against inadvertent discharge provided that measures are taken to prevent the dangerous build up of pressure and dangerous atmospheres.

Waste lighters, other than those leaking or severely deformed, shall be packed in accordance with packing instruction P003 of ADR. In addition the following provisions shall apply:

– only rigid packagings of a maximum capacity of 60 litres shall be used;

– the packagings shall be filled with water or any other appropriate protection material to avoid any ignition;

– under normal conditions of carriage all ignition devices of the lighters shall fully be covered by the protection material;

– the packagings shall be adequately vented to prevent the creation of flammable atmosphere and the build up of pressure;

– the packages shall only be carried in ventilated or open wagons/vehicles or containers.

Leaking or severely deformed lighters shall be carried in salvage packagings, provided appropriate measures are taken to ensure there is no dangerous build up of pressure.

***NOTE**: Special provision 201 and special packing provisions PP84 and RR5 of packing instruction P002 in 4.1.4.1 of ADR do not apply to waste lighters.*

655 Cylinders and their closures designed, constructed, approved and marked in accordance with Directive 97/23/EC[4] or Directive 2014/68/EU[5] and used for breathing apparatus may be carried without conforming to Chapter 6.2 of ADR, provided that they are subject to inspections and tests specified in 6.2.1.6.1 of ADR and the interval between tests specified in packing instruction P200 in 4.1.4.1 of ADR is not exceeded. The pressure used for the hydraulic pressure test is the pressure marked on the cylinder in accordance with Directive 97/23/EC[4] or Directive 2014/68/EU[5].

656 *(Deleted)*

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4 *Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment (PED) (Official Journal of the European Communities No. L 181 of 9 July 1997, p. 1 - 55).*

5 *Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment (PED) (Official Journal of the European Union No. L 189 of 27 June 2014, p. 164 - 259).*

4 *Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment (PED) (Official Journal of the European Communities No. L 181 of 9 July 1997, p. 1 - 55).*

5 *Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment (PED) (Official Journal of the European Union No. L 189 of 27 June 2014, p. 164 - 259).*

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657 This entry shall be used for the technically pure substance only; for mixtures of LPG components, see UN 1965 or see UN 1075 in conjunction with NOTE 2 in 2.2.2.3.

658 UN No. 1057 LIGHTERS complying with standard EN ISO 9994:2006 + A1:2008 "Lighters – Safety Specification" and UN No. 1057 LIGHTER REFILLS, may be carried subject only to the provisions of 3.4.1 (a) to (f), 3.4.2 (except for the total gross mass of 30 kg), 3.4.3 (except for the total gross mass of 20 kg), 3.4.11 and 3.4.12, provided the following conditions are met:

(a) The total gross mass of each package is not more than 10 kg;

(b) Not more than 100 kg gross mass of such packages is carried in a wagon or vehicle or large container; and

(c) Each outer packaging is clearly and durably marked with "UN 1057 LIGHTERS" or "UN 1057 LIGHTER REFILLS", as appropriate.

659 Substances to which PP86 or TP7 are assigned in Column (9a) and Column (11) of Table A in Chapter 3.2 of ADR and therefore require air to be eliminated from the vapour space, shall not be used for carriage under this UN number but shall be carried under their respective UN numbers as listed in Table A of Chapter 3.2.

NOTE: *See also 2.2.2.1.7.*

660 For the carriage of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of 4.1.4.1 and Chapter 6.2 of ADR need not be applied when carried for disposal, recycling, repair, inspection, maintenance or from where they are manufactured to a vehicle assembly plant, provided the conditions described in special provision 392 are met. This also applies for mixtures of gases subject to special provision 392 and gases of group A subject to this special provision.

661 *(Deleted).*

662 Cylinders not conforming to the provisions of Chapter 6.2 which are used exclusively on board a ship or aircraft, may be carried for the purpose of filling or inspection and subsequent return, provided the cylinders are designed and constructed in accordance with a standard recognized by the competent authority of the country of approval and all the other relevant requirements of ADN and other conditions are met including:

(a) The cylinders shall be carried with valve protection in conformity with 4.1.6.8;

(b) The cylinders shall be marked and labelled in conformity with 5.2.1 and 5.2.2; and

(c) All the relevant filling requirements of packing instruction P200 of 4.1.4.1 of ADR are complied with.

The transport document shall include the following statement: “Carriage in accordance with Special Provision 662”.

663 This entry may only be used for packagings, large packagings or IBCs, or parts thereof, which have contained dangerous goods which are carried for disposal, recycling or recovery of their material, other than reconditioning, repair, routine maintenance, remanufacturing or reuse, and which have been emptied to the extent that only residues of dangerous goods adhering to the packaging parts are present when they are handed over for carriage.

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Scope:

Residues present in the packagings, discarded, empty, uncleaned shall only be of dangerous goods of classes 3, 4.1, 5.1, 6.1, 8 or 9. In addition, they shall not be:

- Substances assigned to packing group I or that have "0" assigned in Column (7a) of Table A of Chapter 3.2; nor
- Substances classified as desensitized explosive substances of Class 3 or Class 4.1; nor
- Substances classified as self-reactive substances of Class 4.1; nor
- Radioactive material; nor
- Asbestos (UN 2212 and UN 2590), polychlorinated biphenyls (UN 2315 and UN 3432) and polyhalogenated biphenyls, halogenated monomethyldiphenylmethanes or polyhalogenated terphenyls (UN 3151 and UN 3152).

General provisions:

Packagings, discarded, empty, uncleaned with residues presenting a hazard or a subsidiary hazard of Class 5.1 shall not be packed together with other packagings, discarded, empty, uncleaned, or loaded together with other packagings, discarded, empty, uncleaned in the same container, wagon, vehicle or bulk container.

Documented sorting procedures shall be implemented on the loading site to ensure compliance with the provisions applicable to this entry.

NOTE: *All the other provisions of ADN apply.*

664 *(Reserved)*

665 Except in the case of carriage in bulk, unground hard coal, coke and anthracite, meeting the classification criteria of Class 4.2, packing group III, are not subject to the requirements of ADN.

666 Vehicles and battery powered equipment, referred to by special provision 388, when carried as a load, as well as any dangerous goods they contain that are necessary for their operation or the operation of their equipment, are not subject to any other provisions of ADN, provided the following conditions are met:

(a) For liquid fuels, any valves between the engine or equipment and the fuel tank shall be closed during carriage unless it is essential for the equipment to remain operational. Where appropriate, the vehicles shall be loaded upright and secured against falling;

(b) For gaseous fuels, the valves between the gas tank and engine shall be closed and the electric contact open unless it is essential for the equipment to remain operational;

(c) Metal hydride storage systems shall be approved by the competent authority of the country of manufacture. If the country of manufacture is not a contracting party to ADN the approval shall be recognized by the competent authority of a contracting party to ADN;

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(d) The provisions of (a) and (b) do not apply to vehicles which are empty of liquid or gaseous fuels,

NOTE 1: *A vehicle is considered to be empty of liquid fuel when the liquid fuel tank has been drained and the vehicle cannot be operated due to a lack of fuel. Vehicle components such as fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty of liquid fuels. In addition, the liquid fuel tank does not need to be cleaned or purged.*

NOTE 2: *A vehicle is considered to be empty of gaseous fuels when the gaseous fuel tanks are empty of liquid (for liquefied gases), the pressure in the tanks does not exceed 2 bar and the fuel shut-off or isolation valve is closed and secured.*

667 (a) The provisions of 2.2.9.1.7 (a) do not apply when pre-production prototype lithium cells or batteries or lithium cells or batteries of a small production run, consisting of not more than 100 cells or batteries, are installed in the vehicle, engine, machinery or article;

(b) The provisions of 2.2.9.1.7 do not apply to lithium cells or batteries installed in damaged or defective vehicles, engine, machinery or article. In such cases the following conditions shall be met:

(i) If the damage or defect has no significant impact on the safety of the cell or battery, damaged and defective vehicles, engines, machinery or article, may be carried under the conditions defined in special provisions 363 or 666, as appropriate;

(ii) If the damage or defect has a significant impact on the safety of the cell or battery, the lithium cell or battery shall be removed and carried according to special provision 376.

However if it is not possible to safely remove the cell or battery or it is not possible to verify the status of the cell or battery, the vehicle, engine, machinery or article may be towed or carried as specified in (i).

(c) The procedures described in (b) also apply to damaged lithium cells or batteries in vehicles, engines, machinery or articles.

668 Elevated temperature substances for the purpose of applying road markings are not subject to the requirements of ADN, provided that the following conditions are met:

(a) They do not fulfil the criteria of any class other than Class 9;

(b) The temperature of the outer surface of the boiler does not exceed 70 °C;

(c) The boiler is closed in such a way that any loss of product is prevented during carriage;

(d) The maximum capacity of the boiler is limited to 3 000 l.

669 A trailer fitted with equipment powered by a liquid or gaseous fuel or an electric energy storage and production system, that is intended for use during carriage operated by this trailer as a part of a transport unit, shall be assigned to UN Nos. 3166 or 3171 and be subject to the same conditions as specified for these UN Nos., when carried as a load on a vessel, provided that the total capacity of the tanks containing liquid fuel does not exceed 500 litres.

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670 (a) Lithium cells and batteries installed in equipment from private households collected and handed over for carriage for depollution, dismantling, recycling or disposal are not subject to the other provisions of ADN including special provision 376 and 2.2.9.1.7 when:

(i) They are not the main power source for the operation of the equipment in which they are contained;

(ii) The equipment in which they are contained does not contain any other lithium cell or battery used as the main power source; and

(iii) They are afforded protection by the equipment in which they are contained.

Examples for cells and batteries covered by this paragraph are button cells used for data integrity in household appliances (e.g. refrigerators, washing machines, dishwashers) or in other electrical or electronic equipment;

(b) Up to the intermediate processing facility lithium cells and batteries contained in equipment from private households not meeting the requirements of (a) collected and handed over for carriage for depollution, dismantling, recycling or disposal are not subject to the other provisions of ADN including special provision 376 and 2.2.9.1.7, if the following conditions are met:

(i) The equipment is packed in accordance with packing instruction P909 of 4.1.4.1 of ADR except for the additional requirements 1 and 2; or it is packed in strong outer packagings, e.g. specially designed collection receptacles, which meet the following requirements:

- The packagings shall be constructed of suitable material and be of adequate strength and design in relation to the packaging capacity and its intended use. The packagings need not meet the requirements of 4.1.1.3 of ADR;

- Appropriate measures shall be taken to minimize the damage of the equipment when filling and handling the packaging, e.g. use of rubber mats; and

- The packagings shall be constructed and closed so as to prevent any loss of contents during carriage, e.g. by lids, strong inner liners, covers for transport. Openings designed for filling are acceptable if they are constructed so as to prevent loss of content;

(ii) A quality assurance system is in place to ensure that the total amount of lithium cells and batteries per transport unit does not exceed 333 kg;

NOTE: *The total quantity of lithium cells and batteries in the equipment from private households may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.*

(iii) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" as appropriate.

If equipment containing lithium cells or batteries is carried unpackaged or on pallets in accordance with packing instruction P909 (3) of 4.1.4.1 of ADR, this mark may alternatively be affixed to the external surface of the vehicles, wagons or containers).

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NOTE: *"Equipment from private households" means equipment which comes from private households and equipment which comes from commercial, industrial, institutional and other sources which, because of its nature and quantity, is similar to that from private households. Equipment likely to be used by both private households and users other than private households shall in any event be considered to be equipment from private households.*

671 For the purposes of the exemption related to quantities carried on board vessels (see 1.1.3.6), the transport category shall be determined in relation to the packing group (see paragraph 3 of special provision 251):

- Transport category 3 for kits assigned to packing group III;
- Transport category 2 for kits assigned to packing group II;
- Transport category 1 for kits assigned to packing group I.

672 Machinery and apparatus carried under this entry and in conformity with special provision 301 are not subject to any other provision of ADN provided they are either:

- packed in a strong outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging's capacity and its intended use, and meeting the applicable requirements of 4.1.1.1 of ADR; or
- carried without outer packaging if the machinery or apparatus is constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection.

673 *(Reserved)*

674 This special provision applies to periodic inspection and test of over-moulded cylinders as defined in 1.2.1.

Over-moulded cylinders subject to 6.2.3.5.3.1 of ADR shall be subject to periodic inspection and test in accordance with 6.2.1.6.1 of ADR, adapted by the following alternative method:

- Substitute test required in 6.2.1.6.1 d) of ADR by alternative destructive tests;
- Perform specific additional destructive tests related to the characteristics of over-moulded cylinders.

The procedures and requirements of this alternative method are described below.

Alternative method:

(a) General

The following provisions apply to over-moulded cylinders produced serially and based on welded steel cylinders in accordance with EN 1442:2017, EN 14140:2014 + AC:2015 or annex I, parts 1 to 3 to Council Directive 84/527/EEC. The design of the over-moulding shall prevent water from penetrating on to the inner steel cylinder. The conversion of the steel cylinder to an over-moulded cylinder shall comply with the relevant requirements of EN 1442:2017 and EN 14140:2014 + AC:2015.

Over-moulded cylinders shall be equipped with self-closing valves.

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(b) Basic population

A basic population of over-moulded cylinders is defined as the production of cylinders from only one over-moulding manufacturer using new inner cylinders manufactured by only one manufacturer within one calendar year, based on the same design type, the same materials and production processes.

(c) Sub-groups of a basic population

Within the above defined basic population, over-moulded cylinders belonging to different owners shall be separated into specific sub-groups, one per owner.

If the whole basic population is owned by one owner, the sub-group equals the basic population.

(d) Traceability

Inner steel cylinder marks in accordance with 6.2.3.9 of ADR shall be repeated on the over-moulding. In addition, each over-moulded cylinder shall be fitted with an individual resilient electronic identification device. The detailed characteristics of the over-moulded cylinders shall be recorded by the owner in a central database. The database shall be used to:

- Identify the specific sub-group;
- Make available to inspection bodies, filling centres and competent authorities the specific technical characteristics of the cylinders consisting of at least the following: serial number, steel cylinder production batch, over-moulding production batch, date of over-moulding;
- Identify the cylinder by linking the electronic device to the database with the serial number;
- Check individual cylinder history and determine measures (e.g. filling, sampling, retesting, withdrawal);
- Record performed measures including the date and the address of where it was done.

The recorded data shall be kept available by the owner of the over-moulded cylinders for the entire life of the sub-group.

(e) Sampling for statistical assessment

The sampling shall be random among a sub-group as defined in sub-paragraph (c). The size of each sample per sub-group shall be in accordance with the table in sub-paragraph (g).

(f) Test procedure for destructive testing

The inspection and test required by 6.2.1.6.1 of ADR shall be carried out except (d) which shall be substituted by the following test procedure:

- Burst test (according to EN 1442:2017 or EN 14140:2014 + AC:2015).

In addition, the following tests shall be performed:

- Adhesion test (according to EN 1442:2017 or EN 14140:2014 + AC:2015);

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– Peeling and Corrosion tests (according to EN ISO 4628-3:2016).

Adhesion test, peeling and corrosion tests, and burst test shall be performed on each related sample according to the table in sub-paragraph (g) and shall be conducted after the first 3 years in service and every 5 years thereafter.

(g) Statistical evaluation of test results – Method and minimum requirements

The procedure for statistical evaluation according to the related rejection criteria is described in the following.

Test interval (years)	**Type of test**	**Standard**	**Rejection criteria**	**Sampling out of a sub-group**
After 3 years in service (see (f))	Burst test	EN 1442:2017	Burst pressure point of the representative sample must be above the lower limit of tolerance interval on the Sample Performance Chart $\Omega_m \geq 1 + \Omega_s \times k3(n;p;1-\alpha)$ [a] No individual test result shall be less than the test pressure	$3\sqrt[3]{Q}$ or Q/200 whichever is lower, and with a minimum of 20 per sub-group (Q)
	Peeling and corrosion	EN ISO 4628-3:2016	Max corrosion grade: Ri2	Q/1 000
	Adhesion of Polyurethane	ISO 2859-1:1999 + A1:2011 EN 1442:2017 EN 14140:2014 + AC:2015	Adhesion value > 0.5 N/mm²	See ISO 2859-1:1999 + A1:2011 applied to Q/1000
Every 5 years thereafter (see (f))	Burst test	EN 1442:2017	Burst pressure point of the representative sample must be above the lower limit of tolerance interval on the Sample Performance Chart $\Omega_m \geq 1 + \Omega_s \times k3(n;p;1-\alpha)$ [a] No individual test result shall be less than the test pressure	$6\sqrt[3]{Q}$ or Q/100 whichever is lower, and with a minimum of 40 per sub-group (Q)
	Peeling and corrosion	EN ISO 4628-3:2016	Max corrosion grade: Ri2	Q/1 000
	Adhesion of Polyurethane	ISO 2859-1:1999 + A1:2011 EN 1442:2017 EN 14140:2014 + AC:2015	Adhesion value > 0.5 N/mm²	See ISO 2859-1:1999 + A1:2011 applied to Q/1000

[a] *Burst pressure point (BPP) of the representative sample is used for the evaluation of test results by using a Sample Performance Chart:*

Step 1: Determination of the burst pressure point (BPP) of a representative sample

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Each sample is represented by a point whose coordinates are the mean value of burst test results and the standard deviation of burst test results, each normalised to the relevant test pressure.

$$BPP: (\Omega_s = \frac{s}{PH} ; \Omega_m = \frac{x}{PH})$$

with

x: sample mean value;

s: sample standard deviation;

PH: test pressure

Step 2: Plotting on a Sample Performance Chart

Each BPP is plotted on a Sample Performance Chart with following axis:

- *Abscissa : Standard Deviation normalised to test pressure (Ω_s)*
- *Ordinate : Mean value normalised to test pressure (Ω_m)*

Step 3: Determination of the relevant lower limit of tolerance interval in the Sample Performance Chart

Results for burst pressure shall first be checked according to the Joint Test (multidirectional test) using a significance level of α=0.05 (see paragraph 7 of ISO 5479:1997) to determine whether the distribution of results for each sample is normal or non-normal.

- *For a normal distribution, the determination of the relevant lower limit of tolerance is given in step 3.1.*
- *For a non-normal distribution, the determination of the relevant lower limit of tolerance is given in step 3.2.*

Step 3.1: Lower limit of tolerance interval for results following a normal distribution

In accordance with the standard ISO 16269-6:2014, and considering that the variance is unknown, the unilateral statistical tolerance interval shall be considered for a confidence level of 95% and a fraction of population equal to 99.9999%.

By application in the Sample Performance Chart, the lower limit of tolerance interval is represented by a line of constant survival rate defined by the formula:

$$\Omega_m = 1 + \Omega_s \times k3\,(n; p; 1 - \alpha)$$

with

k3: factor function of n, p and 1-α;

p: proportion of the population selected for the tolerance interval (99.9999%);

1- α: confidence level (95%);

n: sample size.

The value for k3 dedicated to Normal Distributions shall be taken from the table at end of Step 3.

Step 3.2: Lower limit of tolerance interval for results following a non-normal distribution

The unilateral statistical tolerance interval shall be calculated for a confidence level of 95% and a fraction of population equal to 99.9999%.

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The lower limit of tolerance is represented by a line of constant survival rate defined by the formula given in previous step 3.1, with factors k3 based and calculated on the properties of a Weibull Distribution.

The value for k3 dedicated to Weibull Distributions shall be taken from the table below at end of Step 3.

Table for k3 *p=99.9999% and (1- α)=0.95*		
Sample size n	***Normal distribution k3***	***Weibull distribution k3***
20	*6.901*	*16.021*
22	*6.765*	*15.722*
24	*6.651*	*15.472*
26	*6.553*	*15.258*
28	*6.468*	*15.072*
30	*6.393*	*14.909*
35	*6.241*	*14.578*
40	*6.123*	*14.321*
45	*6.028*	*14.116*
50	*5.949*	*13.947*
60	*5.827*	*13.683*
70	*5.735*	*13.485*
80	*5.662*	*13.329*
90	*5.603*	*13.203*
100	*5.554*	*13.098*
150	*5.393*	*12.754*
200	*5.300*	*12.557*
250	*5.238*	*12.426*
300	*5,193*	*12.330*
400	*5.131*	*12.199*
500	*5.089*	*12.111*
1000	*4.988*	*11.897*
∞	*4.753*	*11.408*

NOTE: *If sample size is between two values, the closest lower sample size shall be selected.*

(h) Measures if the acceptance criteria are not met

If a result of the burst test, peeling and corrosion test or adhesion test does not comply with the criteria detailed in the table in paragraph (g), the affected sub-group of over-moulded cylinders shall be segregated by the owner for further investigations and not be filled or made available for transport and use.

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In agreement with the competent authority or the Xa-body which issued the design approval, additional tests shall be performed to determine the root cause of the failure.

If the root cause cannot be proved to be limited to the affected sub-group of the owner, the competent authority or the Xa-body shall take measures concerning the whole basic population and potentially other years of production.

If the root cause can be proved to be limited to a part of the affected sub-group, not affected parts may be authorized by the competent authority to return to service. It shall be proved that no individual over-moulded cylinder returning to service is affected.

(i) Filling centre requirements

The owner shall make available to the competent authority documentary evidence that the filling centres:

- Comply with the provisions of packing instruction P200 (7) of 4.1.4.1 of ADR and that the requirements of the standard on pre-fill inspections referenced in table P200 (11) of 4.1.4.1 of ADR are fulfilled and correctly applied;
- Have the appropriate means to identify over-moulded cylinders through the electronic identification device;
- Have access to the database as defined in (d);
- Have the capacity to update the database;
- Apply a quality system, according to the standard ISO 9000 (series) or equivalent, certified by an accredited independent body recognized by the competent authority.

800 Oil seeds, crushed seeds and seedcake containing vegetable oil, treated with solvents, not subject to spontaneous combustion, are allocated to UN No. 3175. These substances are not subject to ADN when they have been prepared or treated to ensure that they cannot give off dangerous gases in dangerous quantities (no risk of explosion) during carriage and when this is mentioned in the transport document.

801 Ferrosilicon with between 25 and 30% or more than 90% silicon content by mass is a dangerous substance of Class 4.3 for carriage in bulk or without packaging by inland navigation vessel.

802 See 7.1.4.10.

803 Hard coal, coke and anthracite, when carried in bulk, are not subject to the provisions of ADN if:

(a) The temperature of the cargo has been determined using an appropriate procedure and is not higher than 60°C before, during or immediately after loading of the hold;

(b) Depending on the temperature of the cargo before, during and immediately after loading of the hold, the expected duration of carriage without temperature monitoring does not exceed the maximum number of days shown in the table below:

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Maximum temperature on loading (°C)	*Maximum duration of journey (days)*
60	10
50	18
40	32
30	57

(c) Where the effective duration of carriage exceeds the maximum duration shown in sub-paragraph (b), temperature monitoring is carried out from the first day over the maximum duration. The necessary monitoring apparatus shall be on board as from the first day of the carriage following the maximum duration of the journey;

(d) The master is given, at the time of loading and in a traceable form, instructions on how to proceed if there is a significant heating of the cargo.

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CHAPTER 3.4

DANGEROUS GOODS PACKED IN LIMITED QUANTITIES

3.4.1 This Chapter provides the provisions applicable to the carriage of dangerous goods of certain classes packed in limited quantities. The applicable quantity limit for the inner packaging or article is specified for each substance in Column (7a) of Table A of Chapter 3.2. In addition, the quantity "0" has been indicated in this column for each entry not permitted to be carried in accordance with this Chapter.

Limited quantities of dangerous goods packed in such limited quantities, meeting the provisions of this Chapter are not subject to any other provisions of ADN except the relevant provisions of:

(a) Part 1, Chapters 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9;

(b) Part 2;

(c) Part 3, Chapters 3.1, 3.2, 3.3 (except special provisions 61, 178, 181, 220, 274, 625, 633 and 650 (e));

(d) Part 4, paragraphs 4.1.1.1, 4.1.1.2, 4.1.1.4 to 4.1.1.8 of ADR;

(e) Part 5, 5.1.2.1(a) (i) and (b), 5.1.2.2, 5.1.2.3, 5.2.1.10, 5.4.2;

(f) Part 6, construction requirements of 6.1.4 and paragraphs 6.2.5.1 and 6.2.6.1 to 6.2.6.3 of ADR;

3.4.2 Dangerous goods shall be packed only in inner packagings placed in suitable outer packagings. Intermediate packagings may be used. In addition, for articles of Division 1.4, Compatibility Group S, the provisions of section 4.1.5 of ADR shall be fully complied with. The use of inner packagings is not necessary for the carriage of articles such as aerosols or "receptacles, small, containing gas". The total gross mass of the package shall not exceed 30 kg.

3.4.3 Except for articles of Division 1.4, Compatibility Group S, shrink-wrapped or stretch-wrapped trays meeting the conditions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 of ADR are acceptable as outer packagings for articles or inner packagings containing dangerous goods carried in accordance with this Chapter. Inner packagings that are liable to break or be easily punctured, such as those made of glass, porcelain, stoneware or certain plastics, shall be placed in suitable intermediate packagings meeting the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 of ADR, and be so designed that they meet the construction requirements of 6.1.4 of ADR. The total gross mass of the package shall not exceed 20 kg.

3.4.4 Liquid goods of Class 8, packing group II in glass, porcelain or stoneware inner packagings shall be enclosed in a compatible and rigid intermediate packaging.

3.4.5 and 3.4.6 (*Reserved*)

3.4.7 Marking of packages containing limited quantities

3.4.7.1 Except for air transport, packages containing dangerous goods in limited quantities shall bear the mark shown in Figure 3.4.7.1:

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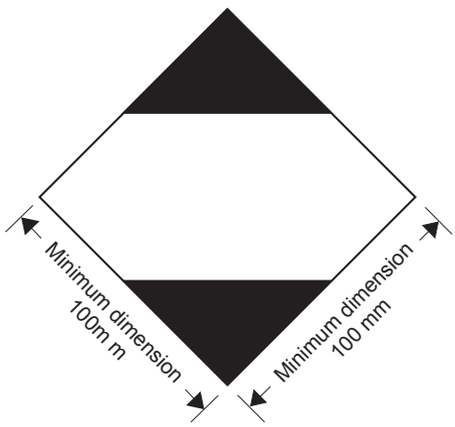
Figure 3.4.7.1



Mark for packages containing limited quantities

The mark shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness.

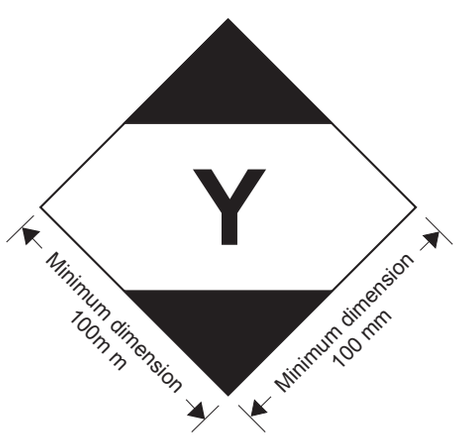
The mark shall be in the form of a square set at an angle of 45° (diamond-shaped). The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background. The minimum dimensions shall be 100 mm x 100 mm and the minimum width of the line forming the diamond shall be 2 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

3.4.7.2 If the size of the package so requires, the minimum outer dimensions shown in Figure 3.4.7.1 may be reduced to be not less than 50 mm x 50 mm provided the mark remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm.

3.4.8 Marking of packages containing limited quantities conforming to Part 3, Chapter 4 of the ICAO Technical Instructions

3.4.8.1 Packages containing dangerous goods packed in conformity with the provisions of Part 3, Chapter 4 of the ICAO Technical Instructions may bear the mark shown in Figure 3.4.8.1 to certify conformity with these provisions:

Figure 3.4.8.1



Mark for packages containing limited quantities
conforming to Part 3, Chapter 4 of the ICAO Technical Instructions

The mark shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness.

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The mark shall be in the form of a square set at an angle of 45° (diamond-shaped). The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background. The minimum dimensions shall be 100 mm x 100 mm and the minimum width of the line forming the diamond shall be 2 mm. The symbol "Y" shall be placed in the centre of the mark and shall be clearly visible. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

3.4.8.2 If the size of the package so requires, the minimum outer dimensions shown in Figure 3.4.8.1 may be reduced to be not less than 50 mm x 50 mm provided the mark remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm. The symbol "Y" shall remain in approximate proportion to that shown in Figure 3.4.8.1.

3.4.9 Packages containing dangerous goods bearing the mark shown in 3.4.8 with or without the additional labels and marks for air transport shall be deemed to meet the provisions of section 3.4.1 as appropriate and of sections 3.4.2 to 3.4.4 and need not bear the mark shown in 3.4.7.

3.4.10 Packages containing dangerous goods in limited quantities bearing the mark shown in 3.4.7 and conforming with the provisions of the ICAO Technical Instructions, including all necessary marks and labels specified in Parts 5 and 6, shall be deemed to meet the provisions of section 3.4.1 as appropriate and of sections 3.4.2 to 3.4.4.

3.4.11 Use of overpacks

For an overpack containing dangerous goods packed in limited quantities, the following applies:

Unless the marks representative of all dangerous goods in an overpack are visible, the overpack shall be:

– marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high. The mark shall be in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise; and

– marked with the marks required by this Chapter.

Except for air transport, the other provisions of 5.1.2.1 apply only if other dangerous goods which are not packed in limited quantities are contained in the overpack and only in relation to these other dangerous goods.

3.4.12 In advance of carriage, consignors of dangerous goods packed in limited quantities shall inform the carrier in a traceable form of the total gross mass of such goods to be consigned.

3.4.13 (a) Transport units with a maximum mass exceeding 12 tonnes carrying dangerous goods packed in limited quantities shall be marked in accordance with 3.4.15 at the front and at the rear except when the transport unit contains other dangerous goods for which orange-coloured plate marking in accordance with 5.3.2 is required. In this latter case, the transport unit may display the required orange-coloured plate marking only, or both the orange-coloured plate marking in accordance with 5.3.2 and the marks in accordance with 3.4.15.

(b) Wagons carrying packages with dangerous goods in limited quantities shall be marked in accordance with 3.4.15 on both sides except when placards in accordance with section 5.3.1 are already affixed.

(c) Containers carrying dangerous goods packed in limited quantities, on transport units with a maximum mass exceeding 12 tonnes, shall be marked in accordance with 3.4.15

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on all four sides except when the container contains other dangerous goods for which placarding in accordance with 5.3.1 is required. In this latter case, the container may display the required placards only, or both the placards in accordance with 5.3.1 and the marks in accordance with 3.4.15.

If the containers are loaded on a transport unit or wagon, the carrying transport unit or wagon need not be marked, except when the marks affixed to the containers are not visible from the outside of this carrying transport unit or wagon. In this latter case, the same marks shall also be affixed at the front and the rear of the carrying transport unit, or on both sides of the carrying wagon.

3.4.14 The marks specified in 3.4.13 may be dispensed with, if the total gross mass of the packages containing dangerous goods packed in limited quantities carried does not exceed 8 tonnes per transport unit or wagon.

3.4.15 The marks specified in 3.4.13 shall be the same as the one required in 3.4.7, except that their minimum dimensions shall be 250 mm x 250 mm. These marks shall be removed or covered if no dangerous goods in limited quantities are carried.

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CHAPTER 3.5

DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES

3.5.1 Excepted quantities

3.5.1.1 Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this Chapter are not subject to any other provisions of ADN except for:

(a) The training requirements in Chapter 1.3;

(b) The classification procedures and packing group criteria in Part 2;

(c) The packaging requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4 and 4.1.1.6 of ADR.

NOTE: *In the case of radioactive material, the requirements for radioactive material in excepted packages in 1.7.1.5 apply.*

3.5.1.2 Dangerous goods which may be carried as excepted quantities in accordance with the provisions of this Chapter are shown in column (7b) of Table A of Chapter 3.2 by means of an alphanumeric code as follows:

Code	**Maximum net quantity per inner packaging** (in grams for solids and ml for liquids and gases)	**Maximum net quantity per outer packaging** (in grams for solids and ml for liquids and gases, or sum of grams and ml in the case of mixed packing)
E0	Not permitted as Excepted Quantity	
E1	30	1000
E2	30	500
E3	30	300
E4	1	500
E5	1	300

For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer packaging.

3.5.1.3 Where dangerous goods in excepted quantities for which different codes are assigned are packaged together the total quantity per outer packaging shall be limited to that corresponding to the most restrictive code.

3.5.1.4 Excepted quantities of dangerous goods assigned to codes E1, E2, E4 and E5 with a maximum net quantity of dangerous goods per inner packaging limited to 1 ml for liquids and gases and 1 g for solids and a maximum net quantity of dangerous goods per outer packaging which does not exceed 100 g for solids or 100 ml for liquids and gases are only subject to:

(a) The provisions of 3.5.2, except that an intermediate packaging is not required if the inner packagings are securely packed in an outer packaging with cushioning material in such a way that, under normal conditions of carriage, they cannot break, be punctured, or leak their contents; and for liquids, the outer packaging contains sufficient absorbent material to absorb the entire contents of the inner packagings; and

(b) The provisions of 3.5.3.

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3.5.2 Packagings

Packagings used for the carriage of dangerous goods in excepted quantities shall be in compliance with the following:

(a) There shall be an inner packaging and each inner packaging shall be constructed of plastic (with a minimum thickness of 0.2 mm when used for liquids), or of glass, porcelain, stoneware, earthenware or metal (see also 4.1.1.2 of ADR) and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leakproof threaded type cap. The closure shall be resistant to the contents;

(b) Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents. For liquid dangerous goods, the intermediate or outer packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packagings. When placed in the intermediate packaging, the absorbent material may be the cushioning material. Dangerous goods shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials. Regardless of its orientation, the package shall completely contain the contents in case of breakage or leakage;

(c) The intermediate packaging shall be securely packed in a strong, rigid outer packaging (wooden, fibreboard or other equally strong material);

(d) Each package type shall be in compliance with the provisions in 3.5.3;

(e) Each package shall be of such a size that there is adequate space to apply all necessary marks; and

(f) Overpacks may be used and may also contain packages of dangerous goods or goods not subject to the requirements of ADN.

3.5.3 Tests for packages

3.5.3.1 The complete package as prepared for carriage, with inner packagings filled to not less than 95% of their capacity for solids or 98% for liquids, shall be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

(a) Drops onto a rigid, non-resilient flat and horizontal surface from a height of 1.8 m:

(i) Where the sample is in the shape of a box, it shall be dropped in each of the following orientations:

- flat on the base;
- flat on the top;
- flat on the longest side;
- flat on the shortest side;
- on a corner.

(ii) Where the sample is in the shape of a drum, it shall be dropped in each of the following orientations:

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– diagonally on the top chime, with the centre of gravity directly above the point of impact;

– diagonally on the base chime;

– flat on the side.

NOTE: *Each of the above drops may be performed on different but identical packages.*

(b) A force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the sample).

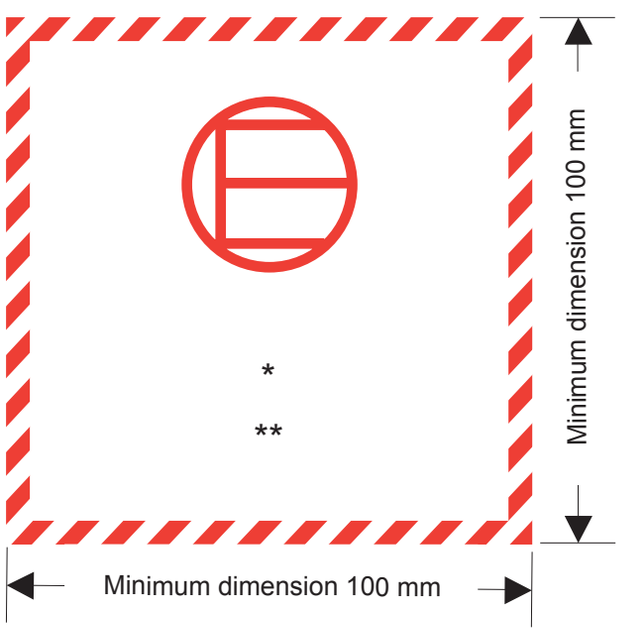
3.5.3.2 For the purposes of testing, the substances to be carried in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it must have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. In the drop tests for liquids, when another substance is used, its relative density (specific gravity) and viscosity should be similar to those of the substance to be carried.

3.5.4 Marking of packages

3.5.4.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this Chapter shall be durably and legibly marked with the mark shown in 3.5.4.2. The first or only label number indicated in column (5) of Table A of Chapter 3.2 for each of the dangerous goods contained in the package shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the package this information shall be included within the mark.

3.5.4.2 *Excepted quantities mark*

Figure 3.5.4.2



Excepted quantities mark

* *The first or only label number indicated in column (5) of Table A of Chapter 3.2 shall be shown in this location.*

** *The name of the consignor or of the consignee shall be shown in this location if not shown elsewhere on the package.*

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The mark shall be in the form of a square. The hatching and symbol shall be of the same colour, black or red, on white or suitable contrasting background. The minimum dimensions shall be 100 mm x 100 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

3.5.4.3 ***Use of overpacks***

For an overpack containing dangerous goods packed in excepted quantities, the following applies:

Unless the marks representative of all dangerous goods in an overpack are visible, the overpack shall be:

– marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high. The mark shall be in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise; and

– marked with the marks required by this Chapter.

The other provisions of 5.1.2.1 apply only if other dangerous goods which are not packed in excepted quantities are contained in the overpack and only in relation to these other dangerous goods.

3.5.5 Maximum number of packages in any vehicle, wagon or container

The number of packages in any vehicle, wagon or container shall not exceed 1 000.

3.5.6 Documentation

If a document or documents (such as a bill of lading, air waybill or CMR/CIM consignment note) accompanies(y) dangerous goods in excepted quantities, at least one of these documents shall include the statement "Dangerous Goods in Excepted Quantities" and indicate the number of packages.