

Economic Commission for Europe

Inland Transport Committee

14 January 2016

Working Party on the Transport of Dangerous Goods

Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) (ADN Safety Committee)

Twenty-eighth session

Geneva, 25 - 29 January 2016

Item 6 of the provisional agenda

Reports of informal working groups

Consolidated version (taking into account the corrections from document ECE/TRANS/WP.15/AC.2/2016/21 corr. 1 and ECE/TRANS/WP.15/AC.2/2016/21 corr. 2)

Report of the tenth Meeting of the Informal Working Group on Explosion Protection on Tank Vessels

Transmitted by the Central Commission for the Navigation of the Rhine

This consolidated version (CCNR-ZKR/ADN/WP.15/AC.2/INF.13) takes into account all corrections mentioned in “ECE/TRANS/WP.15/AC.2/2016/21 corr. 1 and corr. 2” (not visible) and shows in visible mode the last corrections. Indeed, the additional track changes in this document are new corrections, which are not included in corr. 1 or corr. 2).

Introduction

1. The tenth meeting of the informal working group on explosion protection on tank vessels was held on 12 October 2015 at the Physikalisch-Technische Bundesanstalt in Braunschweig in conjunction with the fifth meeting of the informal working group on degassing of cargo tanks.

Participants: Y. Adebahr-Lindner, BAM; B. Beldman, MINIENM; K. den Braven, BLN; D. Gerstenkorn BDB; H. Klopp, DNVGL; F. Krischok, BAM; R. OVERVELD, ESO ; W. van Putten, RSS ; N. Remers, RIVM; T. Speermann, BDB; R. Vermeulen. FUEL EUROP; E. Brandes, PTB

2. The informal working group dealt with the results of the discussion during the 27th meeting of the ADN Safety Committee on Informal document INF.8 (WP.15/AC.2/27/INF.08).

3. Based on the proposal of the ADN Safety Committee, the meeting of the informal working group on explosion protection on tank vessels was combined with the meeting of the informal working group on degassing of cargo tanks to discuss subjects related to both informal working groups.

Result

4. Based on the discussions during the 27th meeting of the ADN Safety Committee concerning WP.15/AC.2/27/INF.08 (Report of the eighth and ninth meetings of the informal working group on explosion protection on tank vessels) the following topics were discussed:

<i>Subject</i>	<i>Decision resp. Proposal concerning the implementation of the modified explosion protection concept</i>
Order of the standards cited:	Taken
1. International standards, 2. European standards	
Applicable directives, documents etc. concerning conformity assessment	Obligatory for EG conformity assessment according to ATEX; therefore cited first Followed by IECEx-System (in case of electrical installations and equipment) and ECE Trade 391
No duplication of requirements in different chapters, paragraphs	Taken
Calibration substance for the gas detection system	Decision on n-Hexane
Maximum allowable capacity of receptacles for residual products and receptacles for slops	Receptacles for residual products: max. 3m ³ Receptacles for slops: max. 450 l
Check if the reference to the list of substances can be modified in chapter 9 to take into account that when building a vessel, the list of substances does not exist	Proposal: <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2</u>
Taking into account the electrical charging and discharging of protective clothing	Proposal for taking into account with the definitions of "explosion protection", "protective gloves", "protective shoes", "protective suits"
Check the conditions for cleaning the flame arrestor stake plate	Proposals in 7.2.4.22 "Opening of openings of cargo tanks"
Proposals for transitional provisions	Prepared
Check whether "documents on board" may be moved to chapter 8	Proposal for chapter 8 prepared

5. The following issues were decided on in cooperation with the informal working group on degassing of cargo tanks:

- The concentration limits for "gas free" and for the oxygen content when entering rooms were parts of the document prepared by the informal working group on degassing of cargo tanks.
- The procedure for the opening of openings of cargo tanks, sampling became part of Annex 1 of this document, 7.2.4.22.
- Work on board became part of Annex 1 of this document, 8.3.5.
- Annex 1 and 2 contain proposals for modifications of ADN to implement the basic concept for a modified, improved explosion protection.
- Annex 3 contains proposals not directly linked to the modified zone concept.

6. The basic concept of the modified explosion protection consists of the following principals:

(a) Basic safety measures which have to be met in case the vessel stays in an onshore assigned zone (for example terminals, locks coupled unit). All vessels – dry cargo vessels, tank vessels –having an ADN certificate of approval have to be equipped as follows:

- (i) Surface temperatures shall not exceed 200 °C.
- (ii) Electrical equipment has to be of the type "limited explosion risk" (comparable to zone 2) as defined in ADN 1.2.1 whereas the surface temperature shall not exceed to 200 °C.
- (iii) If vessels – dry cargo vessels, tank vessels, pushed convoys and side-by-side formations – the equipment of which does not fulfil these requirements mentioned in 1 and 2, such equipment has
 - either to be switched off; or
 - in rooms where such equipment is installed an overpressure of at least 0.1 kPa has to be assured accompanied by a continuous control of the concentration of flammable substances (as just required in **9.3.x.52.3**) if the tank vessel stays in or near to an onshore zone 2. The gas detection system has to be calibrated with n-Hexane. The limiting value for switching off the ventilators etc. (see **9.3.2.52.3**) is 20% of the lower explosion limit of n-Hexane.
 - With pushed convoys and side-by-side formations a vessel which is required to be in possession of a certificate of approval for the carriage of dangerous goods is equal to an onshore assigned zone.

(b) Extended and modified safety measures (in addition to the basic measures in (a) above) for tank vessels, pushed convoys and side-by-side formations of type G, C, N to be complied with if the product list of the vessel contains substances which need explosion safety measures (see also WP.15/AC.2/22/INF.23):

- (i) Specifying a zone 2 on board the vessel.
- (ii) Explosion protection requirements also for non-electrical equipment within the zones on board the vessel.
- (iii) The electrical and the non-electrical equipment used within the respective zone on board the vessel have to fulfil the requirements applicable for that zone.

- (iv) If the product list contains substances of temperature class T4, T5 or T6 the respective maximum surface temperature is applicable.
- (v) Autonomous protective systems (flame arresters, high velocity vent valves etc.) have to be chosen according to the requirements specified in Table C.
- (vi) Additional measures to prevent explosive vapour/air mixtures from the cargo from entering the area of accommodation, wheelhouse etc. outside the cargo area.

7. This concept for a modified explosion protection on inland waterway vessels requires changes to paragraphs 1.2.1, 3.2.3.2, 9.1.0.12.3, 9.1.0.51, 9.1.0.52, 9.3.x.10, 9.3.x.12, 9.3.x.51, 9.3.x.52, 9.3.x.53 and consequential changes to paragraphs 1.4.3.3, 1.4.2.2, 1.4.3.3, 1.4.3.7.1, 1.6.7.2, 3.2.3.1, 3.2.3.2, 3.2.3.3, 3.2.4.3, 5.4.3.4, 7.1 (7.1.2.19.1, 7.1.3.51.1, 7.1.3.51.2, 7.1.3.51.4, 7.1.3.51.5, 7.1.3.52.1, 7.1.3.52.2, 7.1.4.4.4, 7.1.4.13.1, 7.1.4.13.2, 7.1.4.13.3, 7.1.4.41, 7.1.4.53, 7.1.4.75), 7.2 (7.2.2.0, 7.2.2.6, 7.2.2.19.3, 2.2.2.22, 7.2.3.6, 7.2.3.51, 7.2.3.51.1, 7.2.3.51.2, 7.2.3.51.4, 7.2.3.51.5, 7.2.3.51.6, 7.2.3.51.7, 7.2.4.1.1, 7.2.4.15, 7.7.4.15.2, 7.2.4.15.3, 7.2.4.16, 7.2.4.16.3, 7.2.4.16.6, 7.2.4.16.7, 7.2.4.16.8, 7.2.4.17, 7.2.4.17.1 7.2.4.22.1 bis 7.2.4.22.8, 7.2.4.25, 7.2.4.25.7, 7.2.4.41, 7.2.4.51, 7.2.4.51.1, 7.2.4.51.2, 7.2.4.53, 7.2.4.74,) 8.1 (8.1.2.1, 8.1.3, 8.1.3.1, 8.1.3.2, 8.1.5.2, 8.1.6.3, 8.1.7, 8.1.7.1, 8.1.7.2,), 8.3 (8.3.2, 8.3.4, 8.3.5) 8.6 (8.6.1.1 bis 8.6.1.4, 8.6.3), **9.1** (9.1.0.12.1, 9.1.0.12.2, 9.1.0.12.4, 9.1.0.12.5, 9.1.0.51, , 9.1.0.53, 9.1.0.53.1 bis 9.1.0.53.7, 9.1.0.56), 9.3 (9.3.x.8.2, bis 9.3.x.8.4, 9.3.x.11.2, 9.3.x.17.6, 9.3.x.17.8, 9.3.3.20.5, 9.3.x.21.1, 9.3.x.21.7, 9.3.2.22.4, 9.3.2.22.5, 9.3.3.22.4, 9.3.3.22.5, 9.3.x.25.3, 9.3.2.25.9, 9.3.3.25.9, 9.3.2.26, 9.3.2.26.1 bis 9.3.2.26.4, 9.3.3.26, 9.3.3.26.1 bis 9.3.3.26.4, 9.3.2.28, 9.3.3.28, 9.3.2.31.3, 9.3.3.31.3, 9.3.2.31.4, 9.3.3.31.4, 9.3.x.50, 9.3.x.50.1, 9.3.x.50.2, 9.3.x.50.2, 9.3.x.54.1 bis 9.3.x.54.4, 9.3.1.56).

8. The wording regarding the explosion protection topics was chosen as used by ATEX Directives (1999/92 EU und 2014/34 EU), if acceptable. A comparison between the wording in ADN and the wording in ATEX is summarized in the following table:

Comparison of the wording in ADN – ATEX

<i>ADN</i>	<i>ATEX</i>
Cable	electrical cable
... has been tested and approved... regarding its safety of operation in an explosive atmosphere. It has to be proven that the applicable requirements are fulfilled
Anti-explosion protection	Explosion protection
Explosive limit	Explosion limit

9. The informal working group sees this proposed basic concept as feasible for new tankvessels.

10. The informal working group asks the Safety Committee to discuss this proposal.

Annex 1

Proposals to implement the new zone concept in ADN

1.2 Definitions

<i>en, fr, de, ru</i>	<i>Paragraphs</i>	<i>Reason / Explanation</i>
<p><i>Autonomous protective systems</i></p> <p><i>Systèmes de protection autonome</i></p> <p><i>Schutzsysteme, autonom</i></p> <p><i>Система защиты, автономно</i></p>	<p><u>Autonomous protective systems:</u> 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 autonomous systems. This includes flame arresters, high velocity vent valves and deflagration safe vacuum valves. Such protective systems shall be tested according to the European standard EN ISO 16852:2010 and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EU¹, or IECCE Trade 391² or at least equivalent).</p>	New definition
<p><i>Cargo area</i></p> <p><i>Zone de cargaison</i></p> <p><i>Bereich der Ladung</i></p> <p><i>Грузовое пространство</i></p>	<p><u>Cargo area:</u> the whole of the following spaces <u>on board of tank vessels</u></p> <p><i>below deck:</i> 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 .</p> <p>Their intersection line with the deck is referred to as the boundary of the cargo area part below deck</p> <p><i>Cargo area (main part above deck) (when anti-explosion protection is required – comparable to zone 1)</i> means the space which is bounded:</p> <ul style="list-style-type: none"> – at the sides, by the shell plating extending upwards from the decks sides; – fore and aft, by planes inclined at 45° towards the cargo area, starting at the boundary – of the cargo area part below deck; – vertically, 3 m above the deck; <p><u>above deck: the space</u></p> <ul style="list-style-type: none"> - athwart ships, by vertical planes corresponding to the side plating - fore and aft, by vertical planes coinciding with the outer cofferdam bulkheads or the hold end bulkheads 	<p>New zone concept</p> <p>Editorial</p> <p>Like wording of "Protected area"</p>

¹ Official Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

² A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

en, fr, de, ru	Paragraphs	Reason / Explanation
	<p><u>and</u> - upwards, by a horizontal plane 2.50 m above deck</p>	
	<p><u>The boundary plane fore and aft is referred to as the boundary plane of the cargo area</u></p>	
<p><i>Cargo area (additional part above deck)</i> <i>Partie supplémentaire de la zone de cargaison au-dessus du pont</i> <i>Zusätzlicher Teil des Bereichs der Ladung oberhalb des Decks</i> <i>Дополнительная часть надпалубного грузового пространства</i></p>	<p><i>Cargo area (additional part above deck) (when anti-explosion protection is required, comparable to zone 1) means the spaces not included in the main part of the cargo area above deck comprising 1.00 m radius spherical segments centred over the ventilation openings of the cofferdams and the service spaces located in the cargo area part below the deck and 2.00 m spherical segments centred over the ventilation openings of the cargo tanks and the opening of the pump rooms;</i></p>	<p>No longer necessary New zone concept</p>
<p><i>Cargo pump-room</i> <i>Chambre des pompes</i> <i>Pumpenraum</i> Отделение грузовых насосов</p>	<p><i>Cargo pump-room (when anti-explosion protection is required, comparable to zone 1)</i> means a service space where the cargo pumps and stripping pumps are installed together with their operational equipment;</p>	<p>New zone concept</p>
<p><i>Cargo tank</i> <i>Citernes de cargaison</i> <i>Ladetank</i> Грузовой танк</p>	<p><i>Cargo tank (when anti-explosion protection is required, comparable to zone 0)</i> means a tank which is permanently attached to the vessel and intended for the carriage of dangerous goods.</p>	<p>New zone concept</p>
<p><i>Certified safe type electrical apparatus</i> <i>Matériel électrique de type certifié de sécurité</i> <i>Elektrische Einrichtung vom Typ "bescheinigte Sicherheit"</i></p>	<p><i>Certified safe type electrical apparatus</i> means an electrical apparatus which has been tested and approved by the competent authority regarding its safety of operation in an explosive atmosphere, e.g.:</p> <ul style="list-style-type: none"> – intrinsically safe apparatus; – flameproof enclosure apparatus; – apparatus protected by pressurization; – powder filling apparatus; – apparatus protected by encapsulation; – increased safety apparatus. 	<p>New zone concept</p>
<p><i>Электрооборудование гарантированного типа безопасности</i></p>	<p>NOTE: Limited explosion risk apparatus is not covered by this definition</p>	

<i>en, fr, de, ru</i>	<i>Paragraphs</i>	<i>Reason / Explanation</i>
<i>Classification of explosion hazardous areas</i>	<u>Classification of zones explosion hazardous areas</u> (see Directive 1999/92/CE ³)	Wording according to 2014/34 EU
<i>Classement d'atmosphère explosible</i>	Zone 0: areas in which dangerous explosive atmospheres of gases, vapours or <u>mist is present continuously or for long periods or frequently</u> sprays exist permanently or during long periods;	
<i>Einteilung von explosionsge-fährdeten Bereiche</i>	Zone 1: areas in which dangerous explosive atmospheres of gases, vapours or <u>mist is likely to occur in normal operation occasionally</u> sprays are likely to occur occasionally;	
<i>Классификация Взрывоопасные зоны</i>	Zone 2: areas in which dangerous explosive atmospheres of gases, vapours or <u>mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only</u> sprays are likely to occur rarely and if so for short periods only; .	
<i>Cofferdam</i> <i>Cofferdam</i> <i>Kofferdamm:</i> <i>Копфердам</i>	<u>Cofferdam</u> (when anti-explosion protection is required, comparable to zone 1) 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 (<u>outer cofferdam bulkhead</u>) shall extend from one side of the vessel to the other and from the bottom to the deck in one frame plane;	New zone concept
<i>Equipment</i> <i>Appareil</i> <i>Gerät</i> <i>прибор</i>	<u>Equipment</u> (see also Directive 2014/34 EU ⁴) means <u>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;</u> <u>Equipment having a UN or ID number are not included</u>	New zone concept
<i>Equipment category</i> <i>Catégorie d'appareils</i> <i>Gerätekatégorie</i> <i>Категория приборов</i>	<u>Equipment category</u> (see also Directive 2014/34 EC ⁵) means the classification of equipment to be used within <u>potentially explosive atmosphere determining the requisite level of protection to be ensured</u> <u>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.</u> <u>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.</u>	New zone concept

³ Official Journal of the European Communities No. L 23 of 28 January 2000, S. 57

⁴ Official Journal of the European Communities No. L 23 of 26. February 2014, S. 309

⁵ Official Journal of the European Communities No. L 23 of 26. February 2014, S. 309

<i>en, fr, de, ru</i>	<i>Paragraphs</i>	<i>Reason / Explanation</i>
	<p><u>Equipment in this category must ensure the requisite level of protection, even in the event of rare incidents relating to equipment, and is characterised by means of protection such that:</u></p> <ul style="list-style-type: none"> <u>- either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection,</u> <u>- or the requisite level of protection is assured in the event of two faults occurring independently of each other.</u> <p><u>Equipment category 1 according to Directive 2014/34/EC⁶ are marked as II 1 G. Such equipment corresponds to EPL "Ga" according to IEC 60079-0.</u></p> <p><u>Equipment category 1 is suitable to be used in zone 0, 1 and 2</u></p> <p><u>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.</u></p> <p><u>Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists or air/dust mixtures are likely to occur occasionally.</u></p> <p><u>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.</u></p> <p><u>Equipment category 2 according to Directive 2014/34/EC⁷ are marked as II 2 G. Such equipment corresponds to EPL "Gb" according to IEC 60079-0.</u></p> <p><u>Equipment category 2 is suitable to be used in zone 1 and 2</u></p> <p><u>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.</u></p> <p><u>Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists, or 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.</u></p> <p><u>Equipment in this category ensures the requisite level of protection during normal operation.</u></p> <p><u>Equipment category 3 according to Directive 2014/34/EU⁸ are marked as II 3 G. Such equipment corresponds to EPL "Gc" according to IEC 60079-0.</u></p> <p><u>Equipment category 3 is suitable to be used in zone 2</u></p>	

⁶ Official Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

⁷ Official Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

⁸ Official Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

<i>en, fr, de, ru</i>	<i>Paragraphs</i>	<i>Reason / Explanation</i>
<p><i>Equipment intended for use in potentially explosive atmospheres</i> <i>Appareil pour l'utilisation dans atmosphère explosible</i> <i>Gerät zum Einsatz in explosionsgefährdeten Bereichen</i> <i>Прибор, предназначенный для использования во взрывоопасной атмосфере</i></p>	<p><u>Equipment intended for use in potentially explosive atmospheres</u> means electrical and non-electrical equipment where measures are taken to prevent that the equipment's own ignition sources become effective. Such equipment has to fulfil the requirements to be used within the respective zone. They have to be tested according to their type of protection and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EU⁹, or IECEx-System¹⁰ or ECE Trade 391¹¹ or at least equivalent).</p>	New zone concept
<p><i>Equipment protection level</i> <i>Niveau de Protection</i> <i>Geräteschutzniveau</i> <i>Уровень защиты приборов</i></p>	<p><u>Equipment protection level (EPL¹²)</u> (see IEC 60079-0) means level of protection assigned to equipment based on its likelihood of becoming a source of ignition.</p> <p><u>EPL Ga</u></p> <p><u>Equipment for explosive gas atmospheres (gas, vapour, mist), having a "very high" level of protection. Such equipment corresponds to equipment category II 1 G according to Directive 2014/34/EC¹³. Equipment EPL Ga is suitable to be used in zone 0, 1 and 2</u></p> <p><u>EPL Gb</u></p> <p><u>Equipment for explosive gas atmospheres (gas, vapour, mist), having a "high" level of protection. Such equipment corresponds to equipment category II 2 G according to Directive 2014/34/EC¹⁴. Equipment EPL Gb is suitable to be used in zone 1 and 2</u></p> <p><u>EPL Gc</u></p> <p><u>Equipment for explosive gas atmospheres (gas, vapour, mist), having an "enhanced" level of protection. Such equipment corresponds to equipment category II 3 G according to Directive 2014/34/EC¹⁵. Equipment EPL Gc is suitable to be used in zone 2.</u></p>	New zone concept

⁹ Official Journal of the European Communities No. L 23 of 2. February 2014, S. 309.

¹⁰ <http://iecex.com/rules>.

¹¹ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations 2011.

¹² Abbreviation for: Equipment Protection Level.

¹³ Official Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

¹⁴ Official Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

en, fr, de, ru	Paragraphs	Reason / Explanation
<p><i>Explosion hazardous areas</i></p> <p><i>Atmosphère explosible</i></p> <p><i>Explosionsgefährdete Bereiche:</i></p> <p><i>Взрывоопасные зоны</i></p>	<p><u>Explosion danger-hazardous areas</u> means areas in which an explosive atmosphere may occur <u>in such quantities as to require of such a scale that special protection measures are necessary</u> to ensure the safety and health of the persons affected (see Directive 1999/92/EC¹⁶) <u>They are classified in terms of zones on the basis of the frequency and duration of the occurrence of an explosive atmosphere. See classification of explosion hazardous areas, explosion protection zoning with tank vessels and protected area with dry cargo vessels</u></p>	New zone concept
<p><i>Explosion protection</i></p> <p><i>Protection contre les explosions</i></p> <p><i>Explosionsschutz:</i></p> <p><i>Защита против взрывов</i></p>	<p><u>Explosion protection</u></p> <p><u>The whole of the requirements which have to be fulfilled and means which have to be taken to avoid explosions</u></p> <p><u>This includes:</u></p> <p><u>Organizational measures such as for example :</u></p> <p><u>Assigning explosion hazardous areas (zoning): in which dangerous explosive atmospheres of gases, vapours or sprays are likely to occur (see Directive 1999/92 EC¹⁷) either</u></p> <ul style="list-style-type: none"> a) <u>permanently or during long periods (Zone 0)</u> b) <u>occasionally in normal operation (Zone 1)</u> c) <u>rarely and if so for short periods only (Zone 2)</u> <ul style="list-style-type: none"> - <u>Preventing of ignition sources (Use of equipment for which it is proven, that it can be used in the respective explosion hazardous area, no smoking, use of personal protective equipment including shoes, gloves etc.)</u> - <u>Providing working instructions</u> <u>As well as technical means such as for example</u> - <u>Use of equipment for which it is proven that the applicable requirements to be used within the respective zone are fulfilled.</u> - <u>Use of autonomous protective systems</u> - <u>Monitoring of potentially explosive atmospheres by the use of gas detection systems and flammable gas detectors automatically or manually.</u> - <u>Repair of explosion protected installations and equipment as well as autonomous protective systems only by a competent person and inspection after repair by a person qualified for testing.</u> 	New definition

¹⁵ Official Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

¹⁶ Official Journal of the European Communities No. L 23 of 28 January 2000, S. 57

¹⁷ Official Journal of the European Communities No. L 23 of 28 January 2000, S. 57

en, fr, de, ru	Paragraphs	Reason / Explanation
<p><i>Flame arrester</i> <i>Coupe flames</i> <i>Flammdurchschlagsicherung</i> <i>Пламегаситель</i></p>	<p>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. This device shall be tested according to the European standard EN ISO 16852:2010; <u>and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EC¹⁸, or ECE Trade 391¹⁹ or at least equivalent).</u></p>	<p>Wording according to 2014/34 EU</p>
<p><i>Flammable gas detector</i> <i>Détecteur de gaz inflammable</i> <i>Gasspürgerät:</i> <i>Индикатор легковоспламеняющихся газов</i></p>	<p>Flammable Gas detector means a <u>portable</u> device allowing measurement of any significant concentration of flammable gases given off by the cargo below the lower explosive limit LEL and which clearly indicates the presence of higher concentrations of such gases. Flammable Gas detectors may be designed for measuring flammable gases only but also for measuring both flammable gases and oxygen. <u>The detection level of the sensors is 5% of the LEL of n-Hexane as a maximum.</u></p> <p>It has to be certified according to IEC/EN²⁰ 60079-29-1 (and EN50271). <u>If it is used in explosion hazardous areas it has to be 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/EC²¹, or ECE Trade 391²² or at least equivalent).</u></p> <p>This device shall be so designed that measurements are possible without the necessity of entering the spaces to be checked;</p>	<p>Basic safety concept</p> <p>Agreed upon with IWG on degassing of cargo tanks</p>
<p><i>Gas detection system</i> <i>Détection de gaz</i> <i>Gasspüranlage:</i> <i>газодетекторная система</i></p>	<p><i>Gas detection system</i> means a fixed <u>monitoring</u> system capable of detecting in time significant concentrations of flammable gases given off by the cargoes at concentrations below the lower explosion limit LEL and capable of activating the alarms; <u>when a limiting value is exceeded. It has to be calibrated at least according to n-Hexane. The detection level of the sensors is 10% of the LEL of n-Hexane as a maximum. It has to be certified according to IEC/EN²³ 60079-29-1 (and EN50271).</u> If it is used in explosion hazardous areas it has to be suitable to be used in the respective <u>zone and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EC²⁴ or IECEx-System²⁵ or ECE Trade 391²⁶ or at least equivalent).</u></p>	

¹⁸ Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

¹⁹ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

²⁰ IEC/EN means: This standard is available as an IEC standard and as a European standard.

²¹ Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

²² A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

²³ IEC/EN means: This standard is available as an IEC standard and as an European standard

²⁴ Journal of the European Communities No. L 23 of 26 February 2014, S. 309

²⁵ <http://iecex.com/rules>

en, fr, de, ru	Paragraphs	Reason / Explanation
<p><i>Highest class</i> <i>Première cote</i></p> <p><i>Höchste Klasse:</i> <i>Высший класс</i></p>	<p><i>Highest class</i> may be assigned to a vessel when:</p> <ul style="list-style-type: none"> – 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; <p><u>and</u></p> <ul style="list-style-type: none"> – the propulsion plant, together with the essential auxiliary engines, mechanical and electrical installations <u>and equipment</u>, 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; 	
<p><i>High-velocity vent valve</i> <i>Souape de dégagement à grande vitesse</i> <i>Hochgeschwindigkeitsventil:</i> <i>Быстродействующий выпускной клапан</i></p>	<p>High-velocity vent valve means a pressure relief valve designed to have nominal flow velocities which exceed the flame velocity of the flammable mixture, thus preventing flame transmission. This <u>pressure relief device</u> shall be tested in accordance with standard EN ISO 16852:2010 <u>and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EC²⁷, or ECE Trade 391²⁸ or at least equivalent).</u>:</p>	Clarification
<p><i>Hold</i> <i>Cale</i> <i>Laderaum</i> <i>Трюм</i></p>	<p>Hold when anti-explosion protection is required, comparable to zone 1- see Classification of zones 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;</p>	New zone concept
<p><i>Hold space</i> <i>Espace de cale</i> <i>Aufstellungsraum</i> <i>Трюмное помещение</i></p>	<p>Hold space when anti-explosion protection is required, comparable to zone 1) 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.</p>	New zone concept
<p><i>Limited explosion risk electrical apparatus</i> <i>Matériel électrique à risque limité</i></p>	<p>Limited explosion risk electrical apparatus means an electrical apparatus which, during normal operation, does not cause sparks or exhibits surface temperatures which are above <u>200°C the required temperature class</u>, including e.g.:</p> <ul style="list-style-type: none"> - three-phase squirrel cage rotor motors; - brushless generators with contactless excitation; 	Basic safety concept

²⁶ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations 2011

²⁷ Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

²⁸ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

<i>en, fr, de, ru</i>	<i>Paragraphs</i>	<i>Reason / Explanation</i>
<i>Elektrische Einrichtung vom Typ "begrenzte Explosionsgefahr": Электрооборудование с ограниченной опасностью взрыва</i>	- fuses with an enclosed fuse element; - contactless electronic apparatus; or means an electrical apparatus with an enclosure protected against water jets at least hose-proof (degree of protection IP55 or higher) which during normal operation does not exhibit surface temperatures which are above the required temperature class <u>200 °C</u> ;	
<i>Opening pressure Pression d'ouverture Öffnungsdruck Давление срабатывания</i>	Opening pressure means the pressure referred to in a list of substances in Chapter 3-2-3.2.3.2, Table C at which the <u>pressure relief device</u> / 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;	Clarification
<i>Oxygen measuring system Expéditeur d'oxygène Sauerstoffmessanlage: Кислорододетекторная система</i>	Oxygen measuring system means a monitoring system capable of detecting in time significant decreases of oxygen and capable of activating the alarms in case the oxygen concentration reaches <u>19.5 vol %</u> . This device shall be tested according to the European standard IEC/EN ²⁹⁾ 50104:2011. If it is used in explosion hazardous areas it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EC ³⁰⁾ , or ECE Trade 391 ³¹⁾ or at least equivalent). <u>It has to be approved by the competent authority or a recognized classification society.</u>	Basic safety concept
<i>Pressure relief device Soupape de surpression Überdruckventil: Клапан повышенного давления</i>	Pressure relief device 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;	Clarification
<i>Protected area Zone protégée Geschützter Bereich: Защищенная зона</i>	Protected area means the whole of the following spaces on bord of cargo vessels (a) the hold or holds (when anti-explosion protection is required, comparable to zone 1); (b) the space situated above the deck (when anti-explosion protection is required, comparable to 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	Clarification

²⁹ IEC/EN means: This standard is available as an IEC standard and as an European standard. Die Buchstaben IEC/EN bedeuten: Die Norm ist sowohl als IEC-Norm und als EN-Norm verfügbar

³⁰ Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

³¹ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

en, fr, de, ru	Paragraphs	Reason / Explanation
	(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.	
<i>Protective coaming, liquid tight</i> <i>Seuil de protection, étanche aux liquides</i> <i>Schutzsüll, flüssigkeitsdicht</i> <i>Коминг защиты, герметичный</i>	<i>Protective coaming, liquid tight</i> means a liquid tight coaming on deck at the height of the outer cargo tank bulkhead (see drawing zoning) but maximum at a distance of 0.6 m to the outer cofferdam bulkhead or hold end bulkheads which prevents liquid from entering the fore and aft parts of the vessel. <u>The connection between the protective coamings and the spill coaming has to be liquid tight.</u>	New zone concept New definition
<i>Protective gloves</i> <i>Gants de protection</i> <i>Schutzhandschuhe:</i> <i>защитные перчатки</i>	<i>Protective gloves</i> 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. For protective gloves, see for example European standard EN 374-1:2003, EN 374-2:2003 or EN 374-3:2003 + AC:2006; <u>In case of dangers caused by electrostatic charging: European standard EN 16350: 2015</u>	Clarification
<i>Protective shoes (or protective boots)</i> <i>Chaussures de protection (ou bottes de protection)</i> <i>Schutzschuhe (oder Schutzstiefel)</i> <i>Защитная обувь (или защитные сапоги)</i>	<i>Protective shoes (or protective boots)</i> 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 <u>e.g. electrostatic charging</u> . For protective shoes or boots, see for example <u>European international standard EN ISO 20345: 2012</u> or 20346:2014;	Clarification
<i>Protective suit</i> <i>Habits de protection</i> <i>Schutzanzug:</i> <i>Защитный костюм</i>	<i>Protective suit</i> 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 European standard EN 340:2003; <u>In case of dangers caused by electrostatic charging: European standard EN 1149-5: 2008</u>	Clarification
<i>Protection wall, gas and liquid tight</i> <i>Mur de protection, étanches aux gaz et aux liquides</i> <i>Schutzwand, gas- und flüssigkeitsdicht</i> <i>Стена защиты, герметичная</i>	<i>Protection wall, gas and liquid tight</i> means a gas and liquid tight wall on deck at the height of the boundary plane of the cargo area <u>preventing gases and liquids to enter areas outside the cargo area.</u>	New zone concept New definition
<i>Receptacle for residual products</i> <i>Grands recipients pour</i>	<i>Receptacle for residual products</i> means an tank intermediate bulk container (IBC) or tank-container or portable tank intended to collect residual cargo, washing water, cargo residues or slops which are suitable for pumping. <u>The maximum permissible capacity of an intermediate bulk container is 3 m³.</u>	Adapted to max. volume of IBC

en, fr, de, ru	Paragraphs	Reason / Explanation
vrac Restebehälter: Емкость для остаточных продуктов	<u>that of a tank-container or portable tank is 12 m³;</u>	
Receptacle for slops Citernes à résidus Slopbehälter. Сосуд для отстоев	<u>Receptacle for slops means a fire resistant steel recipient capable of being closed with lids intended to collect slops which are unsuitable for pumping. In case drums are used they have to comply with code 1A2, ADR). The maximum permissible capacity is 450 l; They shall be marked and easy to handle.</u>	Clarification
Safety valve Soupape de sécurité Druckentlastungsvorrichtung Предохранительный клапан	<u>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, Safety valve of pressure cargo tanks, Pressure relief device and Vacuum valve);</u>	Clarification
Safety valve of pressure cargo tank Soupape de dégagement des citernes à cargaison à pression Sicherheitsventil der Drucktanks: предохранительный клапан Танков высокого давления	<u>Safety valve of pressure cargo tanks means a pressure relief valve which is activated automatically by pressure the purpose of which is to protect the cargo tank against unacceptable excess internal pressure;</u>	Clarification New definition
Sampling opening Dispositif de prise d'échantillons ouvert Probeentnahmeöffnung: Отверстие для взятия проб	<u>Sampling opening means a closable opening of the cargo tanks with a diameter of not more than 0.30 m. 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 3.2.3.2, it shall be fitted with a flame arrester plate stack capable of withstanding steady burning and so designed that the opening period will be as short as possible and that the flame arrester plate stack cannot remain open without external intervention. The flame arrester plate stack shall be of a type approved by the competent authority for this purpose. The flame arrester plate stack shall be tested according to the European standard EN ISO 16852:2010 and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EC³², or ECE Trade 391³³ or at least equivalent).</u>	Clarification




³² Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

³³ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

<i>en, fr, de, ru</i>	<i>Paragraphs</i>	<i>Reason / Explanation</i>
<i>Types of protection</i> <i>Types de protection</i> <i>Zündschutzarten</i> <i>Типы защиты:</i>	<i>Types of protection: <u>electrical equipment</u> (see IEC 60079-0:2011 <u>or at least equivalent</u>)</i> EEx (d): flameproof enclosure (IEC 60079-1:2007 <u>or at least equivalent</u>); EEx (e): increased safety (IEC 60079-7:2006 <u>or at least equivalent</u>); EEx (ia) and EEx (ib): intrinsic safety (IEC 60079-11:2011 <u>or at least equivalent</u>); EEx (m): encapsulation (IEC 60079-18:2009 <u>or at least equivalent</u>); EEx (p): pressurized apparatus (IEC 60079-2:2007 <u>or at least equivalent</u>); EEx (q): powder filling (IEC 60079-5:2007 <u>or at least equivalent</u>); <i>Non-electrical equipment</i> (see IEC EN 13463-1:2005 <u>or at least equivalent</u>) EEx (fr): flow restricting enclosure (EN 13463-2:2004 <u>or at least equivalent</u>) EEx (d): flameproof enclosure (EN 13463-3:2005 <u>or at least equivalent</u>) EEx (c): constructional safety (EN 13463-5:2011 <u>or at least equivalent</u>) EEx (b): control of ignition source (EN 13463-6:2005) <u>or at least equivalent</u> EEx (k): liquid immersion: (EN 13463-8:2003 <u>or at least equivalent</u>)	New zone concept
<i>Ullage opening</i> <i>Orifice de jaugeage</i> <i>Peilöffnung:</i> <i>Отверстие для замеров</i>	<i>Ullage opening</i> means a closable opening of the cargo vessel or the residual cargo tanks with a diameter of maximum 0.1 m. The ullage opening is to be designed in such a way that it is possible to determine the degree of filling by the use of gauging rods.	New definition
<i>Vacuum valve</i> <i>Souape de souspression</i> <i>Unterdruckventil:</i> <i>вакуумный клапан</i>	<i>Vacuum valve</i> means a spring loaded safety valve device which is activated automatically by pressure the purpose of which is to protect the cargo tank against unacceptable negative internal pressure. <u>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 in 3.2.3.2 it has to be deflagration safe against atmospheric explosions of the most critical substance in the list of substances. The deflagration safety shall be tested according to European standard EN ISO 16852:2010; and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EU³⁴, or ECE Trade 391³⁵ or at least equivalent).</u>	Clarification
<i>Zoning</i> <i>Classification des zones</i>	<i>Zoning</i> This zoning applies for tank vessels whose list of substances on the vessel according to 1.16.1.2.5	New zone concept

³⁴ Journal of the European Communities No. L 23 of 26 February 2014, S. 309.

³⁵ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

en, fr, de, ru	Paragraphs	Reason / Explanation
Zoneneinteilung Классификация зон	<p>contains substances for which explosion protection is required in column (17) of Table C of 3.2.3.2 (see drawing)</p> <p>Zone 0: comprises:</p> <ul style="list-style-type: none"> -  <u>all cargo tanks, tank-containers or portable tanks, pipings containing cargoes or cargo vapours including their equipment as well as pumps and compressors.</u> <p>Zone 1: comprises:</p> <ul style="list-style-type: none"> -  <u>compartments within the part of the cargo area below deck being not part of zone 0.</u> - <u>Compartments on deck within the cargo area.</u> - <u>The deck from one side of the vessel to the other within the cargo area up to the cofferdam bulkheads.</u> <p><u>Up to a distance of at least 1.6 m to the “boundary plane of the cargo area” the height above deck is 2.5 m, however at least 1.5 m above the highest piping carrying cargoes or cargo vapours. Adjacent (fore and aft) till the outermost cargo tank shots, the height is 0,25 m above deck. If there is a pump room installed inside the cofferdam the adjacent height (fore and aft) is 1.0 m above deck (see drawing).</u></p> <p><u>Adjacent (fore and aft) till the outer cargo tank bulkhead the height is 0.25 m.</u></p> <p><u>In case there are service spaces within the cofferdam or the vessel is build having hold end bulkheads the adjacent height (fore and aft) till the boundary plane of the cargo area is 1.0 m</u></p> <p><u>Whereas every opening in zone 0 except the high velocity vent valve has to be surrounded cylindrically by at least 2.5 m zone 1</u></p> <ul style="list-style-type: none"> - <u>An area surrounding cylindrically the high velocity vent valve/safety valve of cargo tanks of type G vessels with a radius of 3.0 m up to a height of 4.0 m above the opening of the high velocity vent valve/safety valve of cargo tanks of type G.</u> - <u>A spherical segment surrounding the ventilation openings of the service spaces located within the cargo area which are actively ventilated, comprising a radius of 1.0 m centred over the opening.</u> <p>Zone 2: comprises:</p> <ul style="list-style-type: none"> -  <u>An area on deck of 1.0 m in height and length following zone 1.</u> - <u>On the fore deck and the aft deck an area of the entire width of the vessel adjacent to boundary plane of the cargo area, with a complete length of 7.5 m. Between the lateral side of the vessel and the protection wall this area equals the length and height of the dimensions of the lateral side of the protection wall. Apart from that, the height is 0.5 m.</u> <p><u>This part is not part of zone 2 in case the protection wall extends from one side of the vessel to the other and there are no openings.</u></p>	

<i>en, fr, de, ru</i>	<i>Paragraphs</i>	<i>Reason / Explanation</i>
	<ul style="list-style-type: none"> - <u>An area following zone 1 around the high velocity vent valve/safety valve of pressure cargo tanks having an expansion of 3.0 m.</u> - <u>A spherical segment following zone 1 which surrounds the ventilation openings of the service spaces located within the cargo area which are actively ventilated, comprising a radius of 1.0m centred over the opening.</u> - <u>The interior of closed compartments extending into zone 2 and being constructed in such a way that the penetration of gases from zone 2 is avoided, will not be part of the explosion hazardous area.</u> 	

1.4 Safety obligations of the participants

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
1.4.2.2	<i>Carrier</i>	
1.4.2.2 (f)	(Reserved) <u>within the explosion hazardous areas only electrical and non-electrical equipment is used which at least fulfil the requirements for being used within the respective zone.</u>	
1.4.3.3	<i>Filler</i>	
1.4.3.3 (s)	He shall ascertain that the loading flows conform to the loading instructions referred to in 9.3.2.25.8 or 9.3.3.25.8 and that the pressure at the crossing-point of the gas discharge pipe or the compensation pipe is not greater than the opening pressure of the <u>pressure relief device/ high velocity vent valve.</u>	New zone concept
1.4.3.7.1	(j) Ascertain that the unloading flows conform to the loading instructions referred to in 9.3.2.25.8 or 9.3.3.25.8 and that the pressure at the connecting point of the gas discharge pipe or the gas return pipe does not exceed the opening pressure of the <u>pressure relief device/high velocity vent valve;</u>	

1.6 Transitional Measures

<i>1.6.7.2.1.1 Table of general transitional provisions: Dry cargo</i>			<i>Reason / Explanation</i>
Paragraphs	Subject	Time limit and comments	
7.1.2.19.1	<u>Vessels used for propulsion</u>	<u>N.R.M. from 1 January 2017;</u>	
	<u>Adoption of the new requirements</u>	<u>Renewal of the certificate of approval after 31 December 2034</u>	

		<u>Until then, the requirements of 7.2.2.19.1 which applied until 31 December 2016 apply on board vessels in service,</u>
<u>7.1.3.51.4</u>	<u>Disconnection of electrical installations and equipment in the protected areas</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2024</u>
<u>7.1.3.52.1</u>	<u>Non-electrical electrical installations and equipment</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2024</u>
<u>7.1.3.52.2</u>	<u>Equipment generating surface temperatures above 200°C</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2024</u>
<u>7.1.4.13</u>	<u>Requirements</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2020</u>
<u>7.1.4.41</u>	<u>Prohibition of smoking</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2018</u>
<u>7.1.4.53</u>	<u>Lighting in explosion hazardous area zone 2</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2020</u>
<u>8.1.3.1</u>	<u>Documents which have to be available on board</u>	<u>N.R.M. from 1 January 2020;</u> <u>Renewal of the certificate of approval after 31 December 2018</u>
<u>8.6.1.1</u>	<u>Change in certificat of approval</u>	<u>N.R.M. from 1 January 2017;</u>
<u>8.6.1.2</u>		<u>Renewal of the certificate of approval after 31 December 2016</u>
<u>9.1.0.12.3</u>	<u>Ventilation: accomodation, wheelhouse and service spaces</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2034</u>
<u>9.1.0.12.4</u>	<u>Ventilation openings</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2034</u>
<u>9.1.0.51</u>	<u>Surface temperatures</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2024</u>
<u>9.1.0.52.1</u>	<u>Electrical installations, equipment and material for installations outside</u>	<u>N.R.M. from 1 January 2017;</u>

<i>1.6.7.2.1.1 Table of general transitional provisions: Dry cargo</i>		<i>Reason / Explanation</i>
	<u>the protected area</u>	<u>Renewal of the certificate of approval after 31 December 2034</u> <u>Until then, the requirements of 9.1.0.52.1 which applied until 31 December 2016 apply on board vessels in service</u>
9.1.0.52.2	<u>Marking in red on electrical installations and equipment</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2024</u>
9.1.0.52.4	<u>Breakdown of the power supply of safety and control installations</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2024</u>
9.1.0.53.7	<u>Non-electrical installations and equipment within the protected area</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2024</u>
9.1.0.53.4	<u>Movable electrical cables with the explosion hazardous area</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2018</u>
<i>1.6.7.2.2.2 Table of general transitional provisions: Tank vessels</i>		
Paragraphs	Subject	Time limit and comments
1.2.1	<u>Cargo area</u> <u>Dimensions on deck</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2034</u> <u>Until then, the following requirements apply on board vessels in service:</u> <u>The dimension corresponds to a frustum with</u> <u>Base: from board to board and from outer cofferdam bulkhead to outer cofferdam bulkhead</u> <u>Inclination or the narrow side: 45°</u> <u>Inclination or the long side: 90°</u> <u>Height: 3.0 m</u>
1.2.1	<u>Cargo area</u> <u>Above deck zone 1 if explosion</u>	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2034</u>

1.6.7.2.2.2 Table of general transitional provisions: Tank vessels

	<u>protection is necessary</u>	<u>Until then, the following requirements apply on board vessels in service:</u>
		<u>Dimension of zone 1 corresponds to the cargo area on deck</u>
1.2.1	<u>Flame arrestors</u>	<u>N.R.M. from 1 January 2017;</u>
	<u>Approval: testing according to ISO 16852/ conformity assessment</u>	<u>Renewal of the certificate of approval after 31 December 2034 for type N vessels, whose keels were laid before 1 January 1977</u>
1.2.1	<u>Gas detection system</u>	<u>N.R.M. from 1 January 2017;</u>
	<u>Approval: testing according to IEC 60079-29-1 and EN50271</u>	<u>Renewal of the certificate of approval after 31 December 2024</u>
1.2.1	<u>Portable gas detector</u>	<u>N.R.M. from 1 January 2017;</u>
	<u>Approval: testing according to IEC 60079-29-1 and EN50271</u>	<u>Renewal of the certificate of approval after 31 December 2018</u>
1.2.1	<u>Oxygen measuring system</u>	<u>N.R.M. from 1 January 2017;</u>
	<u>Approval: testing according to 50104</u>	<u>Renewal of the certificate of approval after 31 December 2018</u>
1.2.1	<u>Zoning</u>	<u>N.R.M. from 1 January 2017;</u>
	<u>Zone 1</u>	<u>Renewal of the certificate of approval after 31 December 2034</u>
	<u>Dimension</u>	<u>Until then, the following requirements apply on board vessels in service:</u>
		<u>The dimension corresponds to a frustum with</u>
		<u>Base: from board to board and from outer cofferdam bulkhead to outer cofferdam bulkhead</u>
		<u>Inclination or the narrow side: 45°</u>
		<u>Inclination or the long side: 90°</u>
		<u>Height: 3.0 m</u>
	<u>Zone 2</u>	<u>N.R.M. from 1 January 2017;</u>
	<u>Dimension</u>	<u>Renewal of the certificate of approval after 31 December 2034</u>

 1.6.7.2.2.2 Table of general transitional provisions: Tank vessels

<u>7.2.2.6</u>	<u>Gas detection system:</u>	<u>N.R.M. from 1 January 2017;</u>	
	<u>Calibration based on n-Hexane</u>	<u>Renewal of the certificate of approval after 31 December 2018</u>	
<u>7.2.2.19.3</u>	<u>Vessels used for propulsion</u>	<u>N.R.M. from 1 January 2017</u>	
	<u>Adoption of the new requirements</u>	<u>Renewal of the certificate of approval after 31 December 2034</u>	
		<u>Until then, the requirements of 7.2.2.19.3 which applied until 31 December 2016 apply on board vessels in service</u>	
7.2.3.51.3	Live sockets	N.R.M.	Could be deleted because ending 31.12.2016
		Renewal of the certificate of approval after 31 December 2010 for Type G and Type N vessels	
7.2.3.51.4	<u>Disconnection of electrical installations and equipment within the explosion hazardous area</u>	<u>N.R.M. from 1 January 2017;</u>	
		<u>Renewal of the certificate of approval after 31 December 2016</u>	
<u>7.2.3.51.5</u>	<u>Surface temperatures in case temperature class T4, T5 or T6 is required</u>	<u>N.R.M. from 1 January 2017;</u>	
		<u>Renewal of the certificate of approval after 31 December 2018</u>	
8.1.3.2	<u>Documents which have to be available on board</u>	<u>N.R.M. from 1 January 2017;</u>	
		<u>Renewal of the certificate of approval after 31 December 2018</u>	
		<u>Until then, the requirements of this paragraphs which applied until 31 December 2016 apply on board vessels in service</u>	
8.1.7.2	<u>Installations and equipment: Compliance of the documents required 8.1.3.2 with the situation on board</u>	<u>N.R.M. from 1 January 2017;</u>	
		<u>Renewal of the certificate of approval after 31 December 2016</u>	
8.6.1.3,	<u>Modification of the certificate of approval</u>	<u>N.R.M. from 1 January 2017;</u>	
8.6.1.4		<u>Renewal of the certificate of approval after 31 December 20132016</u>	
<u>9.3.1.8.3</u>	<u>Ensure compliance of the oxygen measuring system</u>	<u>N.R.M. from 1 January 2017;</u>	
<u>9.3.2.8.3</u>		<u>Renewal of the certificate of approval after 31 December 2018</u>	
<u>9.3.3.8.3</u>			
<u>9.3.1.8.4</u>	<u>Compliance of the documents in 8.1.3.2</u>	<u>N.R.M. from 1 January 2017;</u>	
<u>9.3.2.8.4</u>		<u>Renewal of the certificate of approval after 31 December 2016</u>	
<u>9.3.3.8.4</u>			

1.6.7.2.2.2 Table of general transitional provisions: Tank vessels

<u>9.3.1.10.1</u>	<u>Penetration of gases and liquids into the wheelhouse</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.10.1</u>		<u>Renewal of the certificate of approval after 31 December 2018</u>
<u>9.3.3.10.1</u>		
9.3.1.10.2	Height of protective coaming	<u>N.R.M. from 1 January 2017;</u>
9.3.2.10.2		<u>Renewal of the certificate of approval after 31 December 2018</u>
9.3.3.10.2		
<u>9.3.2.10.3</u>	<u>Protection wall</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.3.10.3</u>		<u>Renewal of the certificate of approval after 31 December 2024</u>
9.3.1.10. 2 <u>4</u>	Door coamings, etc.	N.R.M.
9.3.2.10. 2 <u>4</u>		Renewal of the certificate of approval after 31 December 2034
9.3.3.10. 2 <u>4</u>		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
<u>9.3.1.12.4</u>	<u>Ventilation of the wheelhouse</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.12.4</u>		<u>Renewal of the certificate of approval after 31 December 2024</u>
<u>9.3.3.12.4</u>		
9.3.1.12.4	<u>Electrical installations used during loading, unloading, degassing and when near to or within a shoreside assigned zone</u>	<u>N.R.M. from 1 January 2017;</u>
9.3.2.12.4		<u>Renewal of the certificate of approval after 31 December 2034</u>
9.3.3.12.4		<u>N.R.M.</u> Renewal of the certificate of approval after 31 December 2034 for the following installations on vessels whose keels were laid before 1 January 1977: – Lighting installations in accommodation, with the exception of switches near the entrances to accommodation; – Radio telephone installations in accommodation and wheelhouses and combustion engine control appliances. Until then, all other electrical installations shall meet the following

 1.6.7.2.2.2 Table of general transitional provisions: Tank vessels

		requirements:
		(a) Generators, engines, etc. IP13 protection mode;
		(b) Control panels, lamps, etc. IP23 protection mode;
		(c) Appliances, etc. IP55 protection mode.
		<u>Until then, the requirements of 9.3.1.52.3, 9.3.2.52.3, 9.3.3.52.3 which applied until 31 December 2016 apply on board vessels in service</u>
<u>9.3.1.12.4(b)</u>	<u>Gas detection system: T90-time</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.12.4(b)</u>		<u>Renewal of the certificate of approval after 31 December 2034</u>
<u>9.3.3.12.4(b)</u>		
<u>9.3.1.12.4</u>	<u>Alarm if not cleared</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.12.4</u>		<u>Renewal of the certificate of approval after 31 December 2024</u>
<u>9.3.1.12.6</u>	<u>Distance of the ventilation openings of</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.12.6</u>	<u>the wheelhouse</u>	<u>Renewal of the certificate of approval after 31 December 2034</u>
<u>9.3.3.12.6</u>		
<u>9.3.1.17.6</u>	<u>Distance ventilation openings</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.17.6</u>	<u>wheelhouse</u>	<u>Renewal of the certificate of approval after 31 December 2034</u>
<u>9.3.3.17.6</u>		
<u>9.3.1.17.6</u>	<u>Oxygen measuring system</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.17.6</u>		<u>Renewal of the certificate of approval after 31 December 2018</u>
<u>9.3.3.17.6</u>		
<u>9.3.1.17.6</u>	<u>Alarm if not cleared</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.17.6</u>		<u>Renewal of the certificate of approval after 31 December 2024</u>
<u>9.3.3.17.6</u>		
<u>9.3.1.21.7</u>	<u>Alarm if not cleared</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.21.7</u>		<u>Renewal of the certificate of approval after 31 December 2024</u>
<u>9.3.3.21.7</u>		

1.6.7.2.2.2 Table of general transitional provisions: Tank vessels

<u>9.3.2.22.4 b)</u> <u>9.3.2.22.4 a)</u>	Pressure setting of pressure relief device	N.R.M. Renewal of the certificate of approval after 31 December 2018
<u>9.3.2.22.4 b)</u> <u>9.3.2.22.4 a)</u>	Position of outlets of valves above the deck	N.R.M. from 1 January 2003 Renewal of the certificate of approval after 31 December 2018
<u>9.3.2.22.4 b)</u> <u>9.3.2.22.4 e)</u>	Position of outlets of valves above the deck	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2018</u>
<u>9.3.2.22.4 b)</u> <u>9.3.2.22.4 f)</u>	Pressure setting of high velocity vent valves	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2018</u>
<u>9.3.2.25.9</u> <u>9.3.2.25.8</u> <u>9.3.3.25.9</u> <u>9.3.2.25.8</u>	Loading and unloading flow	N.R.M. from 1 January 2003 Renewal of the certificate of approval after 31 December 2018
9.3.1.51 9.3.2.51 9.3.3.51	Surface temperature not exceeding 200°C	<u>N.R.M. from 1 January 2017;</u> <u>Renewal of the certificate of approval after 31 December 2024</u> <u>Until then, the following requirements apply on board vessels in service: Surface temperature may not exceed 300°C.</u>
<u>9.3.1.51.2</u> <u>9.3.1.52.3</u>	Visual and audible alarm	N.R.M. Renewal of the certificate of approval after 31 December 2034
<u>9.3.1.52.1</u> <u>9.3.3.52.1</u>	<u>Electrical installations of the "certified safe" type</u>	N.R.M. Renewal of the certificate of approval after 31 December 2034 for the following installations on vessels whose keels were laid before 1 January 1977: - Lighting installations in accommodation, with the exception of switches near the entrances to accommodation; - Radio telephone installations in accommodation and wheelhouses and combustion engine control appliances. Until then, all other electrical installations shall meet the following requirements: (a) Generators, engines, etc. I P13 protection mode;

 1.6.7.2.2.2 Table of general transitional provisions: Tank vessels

		(b) Control panels, lamps, etc. IP23 protection mode;
		(c) Appliances, etc. IP55 protection mode
<u>9.3.1.52.1 (iv)</u>	<u>Radiotelephone installations</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.52.1 (iv)</u>		<u>Renewal of the certificate of approval after 31 December 2024</u>
<u>9.3.3.52.1 (iv)</u>		
<u>9.3.1.52.1 (ii)</u>	<u>Loading instrument</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.52.1 (ii)</u>		<u>Renewal of the certificate of approval after 31 December 2024</u>
<u>9.3.3.52.1 (ii)</u>		
<u>9.3.1.52.4</u>	Disconnection of such installations from a centralized location	N.R.M.
<u>9.3.2.52.4</u>		Renewal of the certificate of approval after 31 December 2034 <u>2024</u>
<u>9.3.3.52.4</u>		
<u>9.3.1.52.2</u>		
<u>9.3.2.52.2</u>		
<u>9.3.3.52.2</u>		
Last sentence		
<u>9.3.2.52.4</u>	Electrical installations and equipment ; marking in red	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.52.2</u>		<u>Renewal of the certificate of approval after 31 December 2034 for</u>
<u>9.3.3.52.4</u>		<u>Type N open vessels.</u>
<u>9.3.3.52.2</u>		
<u>9.3.3.52.6</u>	Permanently fitted sockets	N.R.M.
<u>9.3.3.52.8</u>		Renewal of the certificate of approval after 31 December 2034 for Type N open vessels
<u>9.3.3.52.2</u>	Accumulators located outside the cargo area	N.R.M.
<u>9.3.3.52.9</u>		Renewal of the certificate of approval after 31 December 2034 <u>2024</u> for Type N open vessels
<u>9.3.2.51.3</u>	Temperature class and explosion group	N.R.M. from 1 January 2017;
<u>9.3.2.53.1</u>		Renewal of the certificate of approval after 31 December 2034
<u>9.3.3.51.3</u>		
<u>9.3.3.53.1</u>		
<u>9.3.1.53.1</u>	<u>Requirements for non-electrical installations and equipment</u>	<u>N.R.M. from 1 January 2017;</u>
<u>9.3.2.53.1</u>		<u>Renewal of the certificate of approval after 31 December 2024</u>
<u>9.3.3.53.1</u>		
<u>9.3.1.56.1</u>	Metallic sheaths for all electrical cables	N.R.M.

1.6.7.2.2.2 Table of general transitional provisions: Tank vessels

9.3.3.56.1 <u>9.3.1.53.2</u> <u>9.3.3.53.2</u>	in the cargo area	Renewal of the certificate of approval after 31 December 2034 for vessels whose keels were laid before 1 January 1977
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Paragraphs	Modification	Reason / Explanation
1.6.7.2.2.3.2	(deleted) For the transport of substances, for which in 3.2.3.2 Table C, column (15) contains the temperature class T1 or T2 the surface temperatures of explosion protected installations and equipment may be up to 300°C. This transitional provision applies	until 31 December 2034.
1.6.7.4	Transitional provisions concerning the transport of substances hazardous to the environment or to health	
1.6.7.4.1 <i>Transitional provisions: vessels</i>	Single-hull tank vessels in service on 1 January 2009 with a dead weight on 1 January 2007 of less than 1,000 tonnes may continue to transport the substances they were authorized to carry on 31 December 2008 until 31 December 2018.	
	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.	
	<u>Supply vessels and oil separator vessels in service on 1 January 2017 may continue to transport the substances they were authorized to carry until 31 December 2038 without fulfilling the requirements of 9.3.3.12.4, 9.3.3.12.6, 9.3.3.51 and 9.3.3.52.</u>	

3 List of dangerous goods

3.2.3.1	"Opening pressure of the <u>pressure relief device</u> / high-velocity vent valve in kPa"	Clarification
<i>Explanations concerning Table C: Column (10)</i>	Contains information concerning the opening pressure of the <u>pressure relief device</u> /high velocity vent valve in kPa.	
3.2.3.1	" Anti -Explosion protection required"	Editorial
<i>Explanations concerning Table C: Column (17)</i>	Contains a code referring information concerning the protection against explosions.	
	Yes anti explosion protection required	
	No anti explosion protection not required	
3.2.3.1	This substance is liable to clog the venting piping and its fittings. Careful surveillance should be ensured. If a closed-type tank vessel is required for the carriage of this substance the venting piping shall conform to	Reference adapted
<i>Explanations</i>		

Paragraphs	Modification	Reason / Explanation
concerning Table C: Column (20) "Additional requirements/Remarks" 5.	9.3.2.22.5 (a) (i), (ii), (iv), and 9.3.2.22.5 (b), (c) or (d) or to 9.3.3.22.5 (a) (i), (ii), (iv), and 9.3.3.22.5 (b) (c) or (d). This requirement does not apply when the cargo tanks and the corresponding piping are inerted in accordance with 7.2.4.18 or when protection against explosions is not required in column (17) and when flame-arresters have not been installed.	
3.2.3.1 <i>Explanations concerning Table C: Column (20)</i> "Additional requirements/Remarks" 6.	<p>When external temperatures are below or equal to that indicated in column (20), the substance may only be carried in tank vessels equipped with the possibility of heating the cargo.</p> <p>In addition, in the event of carriage in a closed-type vessel, <u>the pressure relief device / high-velocity vent valve, the vacuum valve, the flame arresters as well as the venting pipe has to be heatable.</u> if the tank vessel:</p> <p>— is fitted out in accordance with 9.3.2.22.5 (a) (i) or (d) or 9.3.3.22.5 (a) (i) or (d), it shall be equipped with pressure/vacuum valves capable of being heated; or</p> <p>— is fitted out in accordance with 9.3.2.22.5 (a) (ii), (v), (b) or (c) or 9.3.3.22.5 (a) (ii), (v), (b) or (c), it shall be equipped with heatable venting piping and heatable pressure/vacuum valves; or</p> <p>— is fitted out in accordance with 9.3.2.22.5 (a) (iii) or (iv) or 9.3.3.22.5 (a) (iii) or (iv), it shall be equipped with heatable venting piping and with heatable pressure/vacuum valves and heatable flame arresters.</p> <p>The temperature of the venting piping, pressure relief device/high velocity valve, vacuum valves, safety valves and flame-arresters shall be kept at least above the melting point of the substance</p>	Reference simplified
3.2.3.1 <i>Explanations concerning Table C: Column (20)</i> "Additional requirements/Remarks" 7.	<p>If a closed-type tank vessel is required to carry this substance or if the substance is carried in a closed-type tank vessel, <u>the pressure relief device/ high-velocity vent valve, the vacuum valve, the flame arresters as well as the venting pipe has to be heatable.</u></p> <p><u>The temperature of the venting piping, pressure relief device/high velocity valve, vacuum valves and flame-arresters shall be kept at least above the melting point of the substance.</u></p> <p>— is fitted out in accordance with 9.3.2.22.5 (a) (i) or (d) or 9.3.3.22.5 (a) (i) or (d), it shall be equipped with heatable pressure/vacuum valves; or</p> <p>— is fitted out in accordance with 9.3.2.22.5 (a) (ii), (v), (b) or (c) or 9.3.3.22.5 (a) (ii), (v), (b) or (c), it shall be equipped with heatable venting piping and heatable pressure/vacuum valves; or</p> <p>— is fitted out in accordance with 9.3.2.22.5 (a) (iii) or (iv) or 9.3.3.22.5 (a) (iii) or (iv), it shall be equipped with heatable venting piping and with heatable pressure/vacuum valves and heatable flame arresters.</p> <p>The temperature of the venting piping, pressure relief device/high velocity valve, vacuum valves, safety valves and flame-arresters shall be kept at least above the melting point of the substance.</p>	Reference simplified Clarification
3.2.3.2 Table C column (10)	Opening pressure of the <u>pressure relief device</u> / high-velocity vent valve in kPa	Clarification

7.1 Dry cargo vessels

Paragraphs	Modification	Reason / Explanation
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, <u>this vessel equals an onshore assigned zone</u> and 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: <u>1.16.1.1, 1.16.1.2, 1.16.1.3, 1.16.1.4, 7.1.2.5, 8.1.3.1, 8.1.4, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 8.1.8, 8.1.9, 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, 8.1.3.1, 9.1.0.51, 9.1.0.52, 9.1.0.52.3, 9.1.0.52.4, 9.1.0.52.5, 9.1.0.56, 9.1.0.71 and 9.1.0.74.</u>	Basic safety concept
7.1.3.51	<u>Electrical installations and equipment</u>	Clarification
7.1.3.51.1	The electrical installations <u>and equipment</u> shall be properly maintained	Clarification
7.1.3.51.4 new	<u>During loading and unloading or during a stay near to or within a shoreside assigned zone electrical installations and equipment not fulfilling the requirements mentioned in 9.1.0.52.1 and 9.1.0.52.1 (marked in red) have to be switched off or the measures mentioned in 9.1.0.12.3 b) have to be taken.</u>	Basic safety concept
7.1.3.51.5 new	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 cables passing through the holds, to movable cables connecting containers <u>stowed according to 1.4.4.4, or to electrical installations and equipment apparatus fulfilling the requirements for being used in zone 1 of a "certified safe type".</u>	Wording according to Directive 2014/34/EU In ADN 2015 7.1.3.51.4
7.1.3.52 new	<u>Non-electrical installations and equipment</u>	Basic safety concept
7.1.3.52.1 new	<u>Non-electrical installation and equipment have to be kept in satisfactory conditions</u>	Like tank vessel
7.1.3.52.2 new	<u>During loading and unloading or during a stay near to or within a shoreside assigned zone, equipment generating surface temperatures higher than 200 °C have to be switched off or the measures referred to in 7.1.4.13 have to be taken.</u>	Like tank vessel
7.1.4.4.4	<i>The electrical equipment fitted to the outside of a closed container may be connected with removable electrical cables in accordance with the provisions of <u>9.1.0.56, 9.1.0.53.5</u> and be put into operation provided that:</i> (a) <i>Such electrical equipment is of a certified safe type; or</i> (b) <i>Such electrical equipment is not of a certified safe type but is separated sufficiently from other containers containing substances of:</i>	Adopted in January 2015

Paragraphs	Modification	Reason / Explanation
	<ul style="list-style-type: none"> Class 2 for which a label No. 2.1 is required in column (5) of Table A of 3.2.3.2; 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. <p><i>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 2.4 m around the electrical equipment and an unlimited vertical extension.</i></p> <p><i>This condition does not apply if containers with electrical equipment which is not of a certified safe type and containers containing the above-mentioned substances are stowed in separate holds.</i></p>	
7.1.4.13	<u>Measures to be taken before and during loading, unloading as well as during a stay near to or within a shoreside assigned zone</u>	Basic safety concept Like tank vessel
<u>7.1.4.13.1 new</u>	<u>Installations and equipment not fulfilling the requirements of 9.1.0.51 and 9.1.0.52.1 (marked in red) have to be switched off</u>	Basic safety concept
<u>7.1.4.13.2 new</u>	<u>7.2.4.13.1 does not apply in the accommodation, wheelhouse and service spaces in case</u> <u>(a) the ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa and</u> <u>(b) the gas detection system is switched on and is measuring continuously</u>	Basic safety concept
<u>7.1.4.13.3 new</u>	Measures to be taken before loading The holds and cargo areas shall be cleaned prior to loading. The holds shall be ventilated	In ADN 2015 7.2.4.13
<u>7.1.4.41</u>	<u>Fire and naked light</u> 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. <u>Smoking, fire and naked light</u> <u>Smoking, fire and naked light on board the vessel is prohibited. The prohibition of smoking also applies to electronic cigarettes and other similar devices. This prohibition shall be displayed on notice boards at appropriate places. The prohibition of smoking does not apply in accommodation or wheelhouses in case the ventilation system is ensuring an overpressure of 0.1 kPa</u>	New wording identical to 7.2.4.41

Paragraphs	Modification	Reason / Explanation
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 the protected area <u>zone 2</u> , they shall <u>fulfil the requirements for being used in zone 2</u> be of "limited explosion risk" type.	Wording according to ATEX Directive
7.1.4.75	Risk of sparking All electrically continuous connections between the vessel and the shore as well as appliances used in the protected area shall be so designed that they do not present a source of ignition.	New Zone concept

7.2 Tank vessels

Paragraphs	Modification	Reason / Explanation
7.2.2.0	Permitted vessels <i>NOTE 1: The relief pressure of the safety valves of the <u>pressure cargo tanks</u> or of high-velocity vent valves shall be indicated in the certificate of approval (see 8.6.1.3).</i>	Clarification
7.2.2.6	Gas detection system The sensors of the gas detection system shall be set at not more than 20% of the lower explosive limit of the substances allowed for carriage in the vessel. The system shall have been approved by the competent authority or a recognized classification society. <u>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 has to be calibrated in addition according to the most critical LEL of the substance in the list of substances.</u>	Now in definition Basic safety concept
7.2.2.19	Pushed convoys and side-by-side formations	
7.2.2.19.3	When a pushed convoy or a side-by-side formation comprises a tank vessel carrying dangerous substances, <u>this vessel equals an onshore assigned zone and</u> vessels used for propulsion shall meet the requirements of the following paragraphs: <u>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, 8.1.8, 8.1.9, 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, 9.3.3.16.1, 9.3.3.16.2, 9.3.3.17.1 bis, 9.3.3.17.4, 9.3.3.31.1 bis, 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, 9.3.3.50.1 e), 9.3.3.51, 9.3.3.52.1 bis, 9.3.3.52.8, 9.3.3.52.3 bis 9.3.3.52.6, 9.3.3.56.5, 9.3.3.71 and 9.3.3.74.</u> <u>Vessels moving only tank vessels whose list of substances on the vessel according to 1.16.1.2.5 contains only</u>	Basic safety concept ECE/TRANS/WP.15/AC.2/2014/45

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
	<p><u>substances for which explosion protection is not required</u> do not have to meet the requirements of paragraphs 9.3.3.10.1, 9.3.3.10.5, 9.3.3.10.2 and 9.3.3.12.6. 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, 9.3.3.10.2 and 9.3.3.12.6; the vessel may only move tank vessels: "whose <u>list of substances on the vessel according to 1.16.1.2.5 contains only substances for which explosion protection is not required.</u>"</p>	Reference
7.2.2.22	<p><i>Cargo tank openings</i></p> <p>When substances for which a type C vessel is required in column (6) of Table C of 3.2.3.2 are carried, the <u>pressure relief device / high-velocity vent valves</u> shall be set so that blowing-off does not normally occur while the vessel is under way.</p>	clarification
7.2.3.6	<p><i>Gas detection system</i></p> <p>The gas detection system shall be maintained and calibrated <u>by instructed personnel</u> in accordance with the instructions of the manufacturer.</p>	
7.2.3.51	<p><i>Electrical and non-electrical installations <u>and equipment</u></i></p>	clarification
7.2.3.51.1	<p>The electrical <i>and non-electrical</i> installations <u>and equipment</u> shall be properly maintained</p>	clarification
7.2.3.51.2	<p>The use of movable electric cables is prohibited in the <u>explosion hazardous areas</u>. This provision does not apply to:</p> <ul style="list-style-type: none"> – intrinsically safe electric circuits; – electric cables for connecting signal lights or gangway lighting, provided the socket is permanently fitted to the vessel close to the signal mast or gangway; – electric cables for connecting containers; – electric cables for electrically operated hatch cover gantries; – electric cables for connecting submerged pumps; – electric cables for connecting hold ventilators. 	Wording according to ATEX Directive
<u>7.2.3.51.4 new</u>	<p><u>During a stay near to or within a shoreside assigned zone, electrical and non-electrical installations and equipment not complying with the requirements as mentioned in 9.3.1.52.1, 9.3.2.52.1, 9.3.3.52.1, or generating surface temperatures higher than mentioned in 9.3.1.51 (a) resp. 9.3.1.51 (b), 9.3.2.51 (a) resp. 9.3.2.51 b), or 9.3.3.51 (a) resp. 9.3.3.51 b) have to be switched off or the measures referred to in 7.2.4.13.2 have to be taken.</u></p> <p><u>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 3.2.3.2, this provision applies also during loading and unloading and when gas-freeing during berthing</u></p>	Basic safety concept

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
<u>7.2.3.51.5 new</u>	<u>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 (15) of Table C of 3.2.3.2, the temperature classes T4, T5 or T6 surface temperatures occurring within the assigned zones have to be below 135°C (T4), 100°C (T5) or 85°C (T6) respectively</u>	Basic safety concept
<u>7.2.3.51.6 new</u>	<u>7.2.3.51.4 and 7.2.3.51.5</u> 1 do not apply in the accommodations, wheelhouse and service spaces in case (a) <u>the ventilation system is adjusted to guarantee an overpressure of at least 0,1 kPa and</u> (b) <u>the gas detection system is switched on automatically.</u>	Basic safety concept
<u>7.2.3.51.7 new</u>	<u>Istallations and equipment which has been switched off during a stay near to or within a shoreside assigned zone, during loading and unloading and when gas-freeing during berthing shall only be switched on after the vessel stays no longer near to or within a shoreside assigned zone or 10% of the LEL of n-Hexane or 10% of the LEL of the cargo is underrun.</u>	Basic safety concept ... proposal IWG 'degassing of cargo tanks'
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 not more than six approved receptacles for residual products and receptacles for slops having a maximum individual capacity of not more than 2 m³. These receptacles for residual products shall meet the requirements of international regulations applicable to the substance concerned. The receptacles for residual products and the receptacles for slops shall be properly secured in the cargo area and comply with the provisions of 9.3.2.26.4.3 or 9.3.3.26.4.3 concerning them; <u>The receptacles for slops shall be marked as such</u> – 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.	Now in definition
7.2.4.15	<i>Measures to be taken after unloading (stripping system)</i>	
7.2.4.15.2	During the filling of the <u>residual tanks</u> and receptacle for residual products, released gases shall be safely evacuated. <u>Residual tanks and receptacles for residual products shall be connected to the venting piping of cargo tanks only for the time necessary to fill them. During filling, means for collecting any leakage shall be placed under the filling connections.</u>	Clarification
7.2.4.15.3	The gas-freeing of cargo tanks and piping for loading and unloading, <u>if necessary</u> , shall be carried out in compliance with the conditions of 7.2.3.7.	Clarification
7.2.4.16	<i>Measures to be taken during loading, carriage, unloading and handling</i>	

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
7.2.4.16.3	The shut-off devices of the loading and unloading piping, <u>if installed</u> , as well as of the pipes, if installed, of the stripping systems shall remain closed except during loading, unloading, stripping, cleaning or gas-freeing operations.	Clarification
7.2.4.16.6	In case of recovery of the gas-air mixture from shore into the vessel, the pressure at the connection point shall not be more than the opening pressure of the <u>pressure relief device/</u> high velocity vent valve.	Clarification
7.2.4.16.7	When a tank vessel conforms to 9.3.2.25.5-4 (de) or 9.3.3.22.5-4 (de), the individual cargo tanks shall be closed off during transport and opened during loading, unloading and gas-freeing.	Reference
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 3.2.3.2. Persons connecting or disconnecting the loading and unloading piping or the venting piping, <u>relieving pressure in cargo tanks</u> , taking samples, carrying out measurements, <u>cleaning or replacing the flame arrester plate stack</u> (see 7.2.4.22) relieving pressure in cargo tanks , shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of 3.2.3.2. They shall also wear protective equipment A if a toximeter (TOX) is prescribed in column (18) of Table C of 3.2.3.2.	Clarification
7.2.4.17	<i>Closing of windows and doors</i>	
7.2.4.17.1	During loading, unloading, gas-freeing operations, or <u>a stay near to or within a shoreside assigned zone</u> 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 overpressure ventilation system referred to in 9.3.1 52-3.12.4 , 9.3.2 52-3.12.4 or 9.3.3 52-3.12.4 ; – air intakes of <u>air conditioning installations</u> if these openings are fitted with a gas detection system referred to in 9.3.1 52-3.12.4 , 9.3.2 52-3.12.4 or 9.3.3 52-3.12.4 These entrances and openings may only be opened when necessary and for a short time, after the master has given his permission. This e 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.	Basic safety concept
7.2.4.22	<i>Opening of openings of cargo tanks</i>	Agreed upon with IWG on degassing of cargo tanks

Paragraphs	Modification	Reason / Explanation
7.2.4.22.1	<p>Opening of cargo tanks apertures shall be permitted only after the tanks have been relieved of pressure.</p> <p>Pressure relief of cargo tanks is permitted only when carried out by means of the device for safe pressure relief prescribed in 9.3.2.22.4 (a) <u>and 9.3.2.22.4 (b)</u> or 9.3.3.22.4 (a) <u>and 9.3.3.22.4 (b)</u>.</p> <p>When in column (17) of Table C of 3.2.3.2 anti-explosion protection is required, the opening of cargo tank covers or of the housing of the flame arrester for the purpose of mounting or removing the flame arrester plate stack in unloaded cargo tanks shall be permitted only if the cargo tanks in question have been gas-freed and the concentration of flammable gases in the tanks is less than 10% of the LEL of the cargo/<u>last cargo for which marking was required.</u></p>	<p>7.2.4.22.6 of ADN 2015</p> <p>Reference adjusted</p> <p>Clarification</p>
7.2.4.22.2	<p>Opening of sampling outlets and ullage openings and opening of the housing of the flame arrester shall not be permitted except for the purpose of <u>taking samples</u> inspecting or cleaning empty cargo tanks.</p> <p>When in column (17) of Table C of Chapter 3.2 anti-explosion protection is required, the opening of cargo tank covers or of the housing of the flame arrester for the purpose of mounting or removing the flame arrester plate stack in unloaded cargo tanks shall be permitted only if the cargo tanks in question have been gas freed and the concentration of flammable gases in the tanks is less than 10% of the lower explosive limit.</p>	Clarification
7.2.4.22.3	<p>Sampling shall be permitted only if a device prescribed in column (13) of Table C of 3.2.3.2 or a device ensuring a higher level of safety is used.</p> <p>Opening of sampling outlets and ullage openings 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 3.2.3.2 shall be permitted only when loading has been interrupted for not less than 10 minutes.</p>	No ullage openings allowed with cargo tanks
7.2.4.22.5	<p><u>Opening of the housing of the flame arrester shall not be permitted except for the purpose of cleaning of the flame arrester stake plate or replacing the flame arrester stake plate by one identical in construction. The opening is permitted only if the concentration of flammable gases in the tanks is less than 10% of the LEL of the cargo / last cargo for which marking was required.</u></p> <p><u>Cleaning and replacing of the flame arrester stake plate shall be carried out by educated and trained personnel.</u></p>	New zone concept
7.2.4.22.6	The duration of opening shall be limited to the time necessary for control, cleaning, replacing the flame arrester, <u>stake plate, gauging</u> or sampling.	7.2.4.22.5 of ADN 2015 ; new zone concept
7.2.4.22.7 new	The provisions of 7.2.4.22.1 to 7.2.4.22.6 above shall not apply to oil separator or supply vessels <u>For the operations according to 7.2.4.22.4 und 7.2.4.22.5 only low-sparking handtools (e.g. chromium vanadium steel screwdrivers and wrenches) are to be used.</u>	Clarification
7.2.4.22.8	<u>The provisions of 7.2.4.22.1 to 7.2.4.22.6 above shall not apply to oil separator or supply vessels.</u>	7.2.4.22.7 of ADN 2015

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
7.2.4.25	<i>Cargo and venting piping</i>	Clarification
7.2.4.25.7 new	<u>For connecting or disconnecting cargo and venting piping only low-sparking handtools (e.g.chromium vanadium steel screwdrivers and wrenches) are to be used.</u>	Clarification
7.2.4.28.2	When water-spraying is required in column (9) of Table C of 3.2.3.2 and the pressure of the gaseous phase in the cargo tanks may reach 80% of the relief pressure of the pressure relief valve / 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.	Clarification
7.2.4.41	<i>Fire or naked light</i> During loading, unloading or gas freeing operations fires and naked lights are prohibited on board the vessel. However, the provisions of 7.2.3.42.3 and 7.2.3.42.4 are applicable. <i>Smoking, fire or naked light</i> <u>Smoking including electronic cigarettes and other similar devices, fire and naked light on board the vessel are prohibited. However, the provisions of 7.2.3.42.3 and 7.2.3.42.4 are applicable. This prohibition shall be displayed on notice boards at appropriate places.</u> <u>The prohibition of smoking does not apply to the accommodation or the wheelhouse provided the ventilation system is regulated to maintain an overpressure of 0.1 kPa.</u>	Identical to 7.2.4.41
7.2.4.51	<i>Electrical installations and equipment</i>	ATEX wording
7.2.4.51.1	During loading, unloading or gas freeing operations, only electrical equipment conforming to the rules for construction in Part 9 or which are installed in spaces complying with the conditions of 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3, may be used. All other electrical equipment marked in red shall be switched off. <i>(Deleted)</i>	Now in 7.2.3.51.4 new and 7.2.3.51.5 new
7.2.4.51.2	Electrical equipment which has been switched off by the device referred to in 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3 shall only be switched on after the gas free condition has been established in these spaces. <i>(Deleted)</i>	Now in 7.2.3.51.7 new
7.2.4.53	<i>Lighting</i> 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 in the cargo area, they shall be of the "certified safe" type. They have to be certified for being used within the respective zone.	New zone concept
7.2.4.74	<i>Prohibition of smoking, fire and naked light</i>	Now combined in

Paragraphs	Modification	Reason / Explanation
	The prohibition of smoking does not apply in accommodation or wheelhouses conforming to the provisions of 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3 <i>(Deleted)</i>	7.2.4.41

8 Provisions for vessel crews, equipment, operation and documentation

Paragraphs	Modification	Reason / Explanation
8.1.2.1	<u>(j) the documents mentioned in 8.1.3.1</u>	Basic safety concept New zone concept
8.1.3	<i>Documents <u>concerning explosion safety which have to be available on bord</u></i>	Basic safety concept New zone concept
8.1.3.1 new	<i><u>Dry cargo vessels</u></i> <u>(a) a list or a drawing indicating the electrical installations and equipment of "limited explosion risk" type and the installations and equipment complying with 9.1.0.51 (a)</u> <u>(b) a list or a drawing of the equipment which is not allowed to be used during loading and unloading or during a stay near to or within a shoreside assigned zone. These have to be marked in red.</u> <u>(c) a drawing showing the borders of the zones indicating the electrical and non-electrical equipment installed.</u> <u>(d) a list of the equipment referred to under (c) with the following information:</u> <u>- Equipment, location, marking (Explosion protection level according to 60079-0, Equipment category according to Directive 2014/34 EU or at least equivalent protection level including explosion group and temperature class, type of protection, test body) in case of electrical equipment to be used in zone 1 (alternative a copy of the test certificate e.g. certificate of conformity)</u> <u>- Equipment, location, marking (Explosion protection level according to 60079-0, Equipment category according to Directive 2014/34 EU or at least equivalent protection level including explosion group and temperature class, type of protection, identification number) in case of electrical equipment to be used in zone 2 as well as in case of non-electrical equipment to be used in zone 1 and zone 2 (alternative a copy of the test certificate e.g. certificate of conformity)</u> The documents listed above shall bear the stamp of the competent authority issuing the certificate of approval.	New zone concept
8.1.3.2 new	<i><u>Tank vessels</u></i> <u>(a) a list or a drawing indicating the "limited explosion risk" electrical installations and equipment and the</u>	New zone concept

Paragraphs	Modification	Reason / Explanation
	<p><u>installations and equipment complying with 9.3.x.51 (a)</u> (b) <u>a list or a drawing of the equipment which during loading and unloading or during a stay near to or within a shoreside assigned zone. These have to be marked in red</u> (c) <u>a drawing showing the boundaries of the zones and the location of the explosion protected equipment and the autonomous protective systems installed in the respective zone;</u> (d) <u>a list of the equipment referred to under (a) with the following information:</u></p> <p><u>- Equipment, location, marking (Explosion protection level according to 60079-0, Equipment category according to Directive 2014/34 EU or at least equivalent protection level including explosion group and temperature class, type of protection, test body) in case of electrical equipment to be used in zone 1 (alternative a copy of the test certificate e.g. certificate of conformity)</u></p> <p><u>- Equipment, location, marking (Explosion protection level according to 60079-0, Equipment category according to Directive 2014/34 EU or at least equivalent protection level including explosion group and temperature class, type of protection, identification number) in case of electrical equipment to be used in zone 2 as well as in case of non-electrical equipment to be used in zone 1 and zone 2 (alternative a copy of the test certificate e.g. certificate of conformity)</u></p> <p>(e) <u>a list of or general plan indicating the equipment installed outside the explosion hazardous area which are allowed to be operated during loading, unloading or degassing during berthing as well as during a stay near to or within a shoreside assigned zone.</u> The documents listed above shall bear the stamp of the competent authority issuing the certificate of approval.</p>	
8.1.5.2	<p>(Reserved)</p> <p><u>Only low-sparking handtools (e.g.chromium vanadium steel screwdrivers and wrenches) are permitted for operations within the explosion hazardous areas as well as during a stay near to or within a shoreside assigned zone</u></p>	Clarification
8.1.6.3	<p>The special equipment referred to in 8.1.5.1, and <u>the gas detection system as well as the oxygen measuring system</u> shall be checked and inspected in accordance with the instructions of the manufacturer by the manufacturer concerned or by persons authorized for this purpose by the competent authority. A certificate concerning this inspection shall be carried on board.</p>	Clarification
8.1.7	<p><u>Installations, equipment and autonomous protective systems</u></p>	New zone concept
8.1.7.1	<p><u>Electrical installations and equipment</u></p> <p>The insulation resistance of the electrical installations <u>and equipment as well as their earthing and the certified safe type electrical equipment and the conformity of the documents required in 9.3.1.50.1, 9.3.2.50.1 or 9.3.3.50.1 with the circumstances on board</u> 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. An appropriate inspection certificate shall be kept on board.</p>	Clarification
8.1.7.2 new	<p><u>Installations and equipment intended to be used in explosion hazardous areas, "limited explosion risk" type equipment installations and equipment complying with 9.3.1.51, 9.3.2.51 or 9.3.3.51 and autonomous</u></p>	Basic safety concept New zone

Paragraphs	Modification	Reason / Explanation
	<p><u>protective systems</u></p> <p><u>Such installations, equipment and autonomous protective systems as well as the compliance with the documents mentioned in 8.1.3.2 in correlation to the situation on board 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. An appropriate inspection certificate shall be kept on board. The manufacturer's instruction on flame arrestors or safety valves may ask for a shorter inspection period.</u></p>	concept
8.3.2	<p>Portable lamps</p> <p>On board dry cargo vessels, the only portable lamps permitted in the protected explosion hazardous area and on deck are lamps having their own source of power. On board tank vessels, the only portable lamps permitted in the cargo area and on the deck outside the cargo area are lamps having their own source of power. They have at least to comply with the necessary requirements valid for the respective zone.</p>	Basic safety concept
8.3.4	<p>Prohibition on smoking, fire and naked light</p> <p>Smoking on board the vessel is prohibited. The prohibition of smoking also applies to electronic cigarettes and other similar devices. This prohibition shall be displayed on notice boards at appropriate places.</p> <p>This prohibition does not apply to the accommodation or the wheel house provided their windows, doors, skylights and hatches are closed.</p> <p><u>Smoking including electronic cigarettes and other similar devices, fire and naked light on board the vessel are prohibited. However, the provisions of 7.2.3.42.3 and 7.2.3.42.4 are applicable. This prohibition shall be displayed on notice boards at appropriate places.</u></p> <p><u>The prohibition of smoking does not apply to the accommodation or the wheelhouse provided the ventilation system is regulated to maintain an overpressure of 0.1 kPa.</u></p>	Equal to 7.1.4.41/7.2.4.41
8.3.5	<p>Danger caused by <u>Maintenance work on board</u></p> <p>No repair or maintenance work requiring the use of an open flame or electric current or liable to cause sparks may be carried out</p> <ul style="list-style-type: none"> - on board dry cargo vessels in the protected area or on the deck less than 3m forward or aft of that area as well as; - on board tank vessels. <p>This requirement does not apply:</p> <ul style="list-style-type: none"> - <u>in the service spaces outside the protected area or the cargo area, provided the doors and openings are closed for the duration of the work and the vessel is not loading, unloading or degassing when the vessel does not stay near to or within a shoreside assigned zone and either</u> (a) <u>dry cargo vessels are furnished with an authorization from the competent authority or a certificate attesting to the totally gas-free condition of the protected area vessel exists</u> 	New zone concept
		Agreed upon with IWG 'degassing of cargo tanks'

Paragraphs	Modification	Reason / Explanation
	<p>or</p> <p>with tank vessels;</p> <p>(b) after having carried dangerous goods including the three previous cargoes for which explosion protection according to column (17) of Table C of 3.2.3.2. was required, but the concentration of flammable gases in the cargo tanks is below 10% of the LEL of the respective cargo,</p> <p>(c) after having carried dangerous goods including the three last cargoes requiring marking for which explosion protection is not required in column (17) of Table C of 3.2.3.2.</p>	
8.6.1.1 and 8.6.1.2	<p>Competent authority:</p> <p>Space reserved for the emblem and name of the State</p> <p>ADN certificate of approval No.:</p> <p>1. Name of vessel.....</p> <p>2. Official number</p> <p>3. Type of vessel</p> <p><u>Vessel</u> conforms to the rules of construction 9.1.0.12, 9.1.0.51, 9.1.0.52 <u>yes/no</u>¹⁾</p> <p><u>Vessel</u> conforms to the rules of construction 9.1.0.53 <u>yes/no</u>¹⁾</p>	Basic safety concept
8.6.1.1 and 8.6.1.2	<p>5. <u>Equipment to be used within the</u></p> <p>- <u>temperature class</u></p> <p>- <u>explosion group</u></p> <p>The following numbers to be changed</p>	Clarification
8.6.1.3 and 8.6.1.4	7. opening pressure of the <u>pressure relief device</u> / high-velocity vent valve in kPa	Clarification
8.6.1.3 and 8.6.1.4	<p>8. Additional equipment:</p> <p><input type="checkbox"/> Sampling device</p> <p>connection for a sampling device..... <u>yes/no</u>¹²</p> <p>sampling opening <u>yes/no</u>¹²</p> <p><input type="checkbox"/> Water-spray system <u>yes/no</u>¹²</p> <p>Internal pressure alarm 40 kPa <u>yes/ no</u>¹²</p> <p><input type="checkbox"/> Cargo heating system:</p>	

Paragraphs	Modification	Reason / Explanation
	possibility of cargo heating from shore yes/ no ¹²	
	cargo heating installation on board yes/ no ¹²	
	<input type="checkbox"/> Cargo refrigeration system yes/ no ¹²	
	<input type="checkbox"/> Inerting facilities yes/ no ¹²	
	<input type="checkbox"/> Cargo pump-room below deck yes/no ¹	
	<input type="checkbox"/> Ventilation system ensuring an overpressure yes/no ¹	
	<input checked="" type="checkbox"/> Venting piping according to	No longer necessary
	<input type="checkbox"/> piping and installation heated yes/ no ¹²	
	<input type="checkbox"/> Conforms to the rules of construction resulting from the remark(s) of column (20) of Table C of 3.2.3.2 ¹²	
8.6.1.3	<u>9. Electrical and non-electrical installations and equipment</u>	New zone concept
and	<ul style="list-style-type: none"> • Temperature class: 	
8.6.1.4	<ul style="list-style-type: none"> • Explosion group: 	
	<u>12. Additional observations: Conforms to the rules of construction 9.3.x.12, 9.3.x.51, 9.3.x.52</u> yes/ no ¹² :...	Basic safety concept
8.6.3	To be filled in only in the case of loading or unloading of substances for the carriage of which a vessel of the closed	Clarification
ADN	type or a vessel of the open type with flame arrester is required.	
Checklist	Are the cargo tank hatches and cargo tank inspection, gauging and sampling openings closed or protected by <u>suitable</u>	
18	flame arresters in good condition ?	
8.6.3	Is it ensured that the shore installation is such that the pressure at the connecting point cannot exceed the opening	Clarification
ADN	pressure of the <u>pressure relief device</u> / high-velocity vent valves (pressure at connecting point __ kPa)?	
Checklist		
12.2		
<hr/>		
9.1 Dry cargo vessels		
<hr/>		
Paragraphs	Modification	Reason / Explanation
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 ventilator fan shall	

Paragraphs	Modification	Reason / Explanation
	<p>be designed so that no sparks may be emitted on contact of the impeller blades with the housing and no static electricity may be generated. The extraction ducts shall be positioned at the extreme ends of the 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.</p> <p>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.</p>	Now in 9.1.0.12.5
9.1.0.12.3	<p>Ventilation shall be provided for the accommodation, <u>wheelhouse</u> and for service spaces.</p> <p><u>If in the rooms during loading and unloading or during a stay near to or within a shoreside assigned zone higher temperatures as mentioned in 9.1.0.51 occur, this equipment has</u></p> <ol style="list-style-type: none"> a) <u>to be switched off, except</u> b) <u>if these spaces are equipped with</u> <ol style="list-style-type: none"> 1. <u>a ventilation system ensuring an overpressure of 0.1 kPa (0.001 bar). The air intakes of the ventilation system shall be located as far away as possible, however, not less than 6.00 m from the cargo area and not less than 2.00 m above the deck;</u> 2. <u>a gas detection system with sensors:</u> <ul style="list-style-type: none"> - <u>at the suction inlets of the ventilation system;</u> - <u>directly at the top edge of the sill of the entrance doors of the accommodation and service spaces;</u> <p><u>This gas detection system has to fulfil the following requirements:</u></p> <ul style="list-style-type: none"> -<u>The t90-time has to be lower or equal to 4 s</u> -<u>The measurements have to be continuous.</u> <p><u>When the gas concentration reaches 20% of the LEL, the ventilators are switched off. In such a case and when the overpressure is not maintained or in the event of failure of the gas detection system, the equipment and installations not fully complying with the requirements mentioned in 9.1.0.51 und 9.1.0.52.1 have to be switched off.</u></p> <p><u>These operations shall be performed immediately and automatically and activate the emergency lighting in the accommodation, the wheelhouse and the service spaces, which shall comply at least with the requirements mentioned in 9.1.0.52.1. The switching-off shall be indicated in the accommodation and wheelhouse by visual and audible signals.</u></p> <ol style="list-style-type: none"> 3. <u>The ventilation system, the gas detection system and the alarm of the switch-off device have to fully comply with the requirements mentioned in 9.1.0.52.1;</u> 4. <u>The automatic switching-off device is set so that no automatic switch off may occur while the vessel is under way.</u> 5. <u>The failure of the gas detection system of the accommodation shall be indicated by visual and audible signals in the accommodation, wheelhouse and on deck.</u> <u>The failure of the gas detection system of the wheelhouse and service spaces shall be indicated by visual and audible signals in the wheelhouse and on deck when not cleared</u> 	Basic safety concept

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
9.1.0.12.4 new	<p><u>Notice boards shall be fitted at the ventilation inlets indicating the conditions when they shall be closed. All ventilation inlets of accom-modation and service spaces leading outside shall be located not less than 2.00 m from the protected area.</u></p> <p><u>Any ventilation inlets shall be fitted with devices 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.</u></p>	Similar to tank vessel
9.1.0.12.5 new	<u>The ventilator fan shall be designed so that no sparks may be emitted on contact of the impeller blades with the housing and no static electricity may be generated.</u>	Basic safety concept
9.1.0.51 new	<p><u>Surface temperatures of installations and equipment</u></p> <p>a) <u>surface temperatures shall not exceed 200°C</u></p> <p>b) <u>This provision does not apply if the following requirements are fulfilled:</u></p> <ul style="list-style-type: none"> - <u>equipment and installations, which generate surface temperatures higher than 200 °C (marked in red) have to be switched off during loading and unloading or during a stay near to or within a shore-side assigned zone</u> <u>or</u> - <u>accommodation, wheelhouse and service spaces where surface temperatures higher than 200 °C occur are equipped with a ventilation system according to 9.1.0.12.4</u> <p><u>Within the protected area 9.1.0.53.1 applies.</u></p>	Basic safety concept

Paragraphs	Modification	Reason / Explanation
9.1.0.52	<i>Type and location of electrical <u>installation and equipment</u></i>	
9.1.0.52.1	<p>It shall be possible to isolate the electrical equipment in the protected area by means of centrally located switches except where:</p> <p><input type="checkbox"/> in the holds it is of a certified safe type corresponding at least to temperature class T4 and explosion group II B; and</p> <p><input type="checkbox"/> in the protected area on the deck it is of the limited explosion risk type.</p> <p>The corresponding electrical circuits shall have control lamps to indicate whether or not the circuits are live.</p> <p>The switches shall be protected against unintended unauthorized operation. The sockets used in this area shall be so designed as to prevent connections being made 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.</p> <p><u>Electrical installation and equipment outside the protected area shall be at least of the "limited explosion risk" type.</u></p> <p><u>This provision does not apply to:</u></p> <p><u>(i) lighting installations in the accommodation, except for switches near entrances to accommodation;</u></p> <p><u>(ii) mobile phones as well as fixed telephone installations and loading instruments in the accommodation or the wheelhouse</u></p> <p><u>(iii); electrical installations which during loading and unloading or during a stay near to or within a shoreside assigned zone are</u></p> <ul style="list-style-type: none"> - <u>switched off or</u> - <u>installed in spaces which are equipped with a ventilation system according to 9.1.0.12.3</u> <p><u>(iv) radiotelephone installations and inland AIS (automatic identification systems) stations in the accommodation and in the wheelhouse if no part of an aerial for electronic apparatus is situated above the cargo area and if no part of a VHF antenna for AIS stations is situated within 2 m from the cargo area.</u></p>	Basic safety concept
9.1.0.52.2	<p>Electric motors for hold ventilators which are arranged in the air flow shall be of the certified safe type.</p> <p><u>Electrical installations and equipment not complying with the requirements according to 9.1.0.52.1 as well as its switches have to be marked in red. The disconnection of such equipment shall be operated from a centralised location on board.</u></p>	Basic safety concept
9.1.0.52.3	Accumulators shall be located outside the protected area.	In ADN 2015 9.1.0.56.4
9.1.0.52.4 new	<u>The failure of the power supply for the safety and control equipment shall be immediately indicated by visual and audible signals at the locations where the alarms are usually actuated.</u>	Similar to tank vessel
9.1.0.52.5 new	<u>Switches, sockets and electrical cables on deck shall be protected against mechanical damage.</u>	In ADN 2015 9.1.0.56.1

Paragraphs	Modification	Reason / Explanation
9.1.0.52.6 new	<u>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.</u>	In ADN 2015 9.1.0.52.3
9.1.0.52.7	Electric motors for hold ventilators which are arranged in the air flow shall be <u>at least valid to be used in zone 1 temperature class T4 and explosion group IIB</u> of the certified safe type.	In ADN 2015 9.1.0.52.2 Similar to tank vessel
9.1.0.53 new	<u>Type and location of the electrical and non-electrical equipment to be used within the protected area</u>	Similar to tank vessel
9.1.0.53.1 new	It shall be possible to isolate the electrical <u>installations and</u> 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 valid to be used in zone 1 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 so designed as to prevent connections being made except when they are not live. Submerged pumps installed or used in the holds shall be of the certified safe type at least <u>valid to be used in zone 1</u> for temperature class T4 and explosion group II B.	
9.1.0.53.2 new	The sockets used in this area <u>the protected area</u> shall be so designed as to prevent connections being made except when they are not live	
9.1.0.5253.3 new	<u>Electrical cables within the protected area have to be reinforced or protected by a metallic shield or mounted using cable conduit, except optical fibers</u>	Comparable to tank vessels
9.1.0.53.4 new	Movable <u>electrical</u> cables are prohibited in the protected area, except for intrinsically safe electric circuits or for the supply of signal lights and gangway lighting, for containers, for submerged pumps, hold ventilators and for electrically operated cover gantries.	In ADN 2015 9.1.0.56.2
9.1.0.53.5 new	For movable <u>electrical</u> cables permitted in accordance with 9.1.0. 53.4 above, only rubber-sheathed <u>electrical</u> cables of type H07 RN-F in accordance with standard IEC-60 245-4:2011 or cables of at least equivalent design having conductors with a cross-section of not less than 1.5 mm ² , shall be used. These cables shall be as short as possible and installed so that damage is not likely to occur.	In ADN 2015 9.1.0.56.3 Similar to tank vessel
9.1.0.53.6	<u>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</u>	Basic safety

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
new	permanently fitted to the vessel in the vicinity of the hatches	concept
9.1.0.53.7 new	<u>The electrical and non-electrical installations and equipment to be used within the protected area loading, unloading, or a stay near to or within a shoreside assigned zone have to valid at least for the use within the respective zone. It has to correspond at least to temperature class T4 and explosion group II B.</u>	
9.1.0.53-54	(Reserved)	
9.1.0.56	<i>Electric cables</i>	Now in 9.1.0.51 and 9.1.0.52
9.1.0.56.1	Cables and sockets in the protected area shall be protected against mechanical damage.	
9.1.0.56.2	Movable cables are prohibited in the protected area, except for intrinsically safe electric circuits or for the supply of signal lights and gangway lighting, for containers, for submerged pumps, hold ventilators and for electrically operated cover gantries.	
9.1.0.56.3	For movable cables permitted in accordance with 9.1.0.56.2 above, only rubber sheathed cables of type H07 RN F in accordance with standard IEC 60 245 4:1994 or cables of at least equivalent design having conductors with a cross-section of not less than 1.5 mm², shall be used. These cables shall be as short as possible and installed so that damage is not likely to occur.	
9.1.0.57	(Reserved)	
9.1.0.69		

9.3. x Tank vessels

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
9.3.1.8	Classification	
9.3.3.8		
9.3.3.8		
9.3.1.8.2	The cargo pump-rooms shall be inspected by a recognised classification society whenever the certificate of approval has to be renewed as well as during the third year of validity of the certificate of approval. The inspection shall	
9.3.2.8.2	comprise at least:	
9.3.3.8.2	<ul style="list-style-type: none"> – an inspection of the whole system for its condition, for corrosion, leakage or conversion works which have not been approved; – a checking of the condition proper functioning of the gas detection system in the cargo pump rooms, if installed. 	Clarification also in 9.3.x.8.3
	Inspection certificates signed by the recognised classification society with respect to the inspection of the cargo	

Paragraphs	Modification	Reason / Explanation
	pump-rooms shall be kept on board. The inspection certificates shall at least include particulars of the above inspection and the results obtained as well as the date of the inspection.	
9.3.1.8.3 9.3.2.8.3 9.3.3.8.3	The condition <u>proper functioning</u> of the gas detection system referred to in 9.3.2.52.3 9.3.x.12.4 und 9.3.x.17.6 as well as the <u>oxygen measuring system according to 9.3.x.17.6</u> shall be checked by a recognised classification society whenever the certificate of approval has to be renewed and during the third year of validity of the certificate of approval. A certificate signed by the recognised classification society shall be kept on board.	Clarification Reference adjusted
9.3.1.8.4 new 9.3.2.8.4 new	<u>The compliance of the documents referred to in 8.1.3.2 with the reality on board shall be checked by a recognised classification society whenever the certificate of approval has to be renewed and during the third year of validity of the certificate of approval. A certificate signed by the recognised classification society shall be kept on board.</u>	New zone concept
9.3.3.8.4	<u>The compliance of the documents referred to in 8.1.3.2 with the reality on board shall be checked by a recognised classification society whenever the certificate of approval has to be renewed and during the third year of validity of the certificate of approval. A certificate signed by the recognised classification society shall be kept on board.</u> 9.3.3.8.2 and 9.3.3.8.3, checking of the condition of the gas detection system, do not apply to open type N.	superfluous
9.3.1.10 9.3.2.10 9.3.3.10	<u>Protection against the penetration of <i>dangerous gases and the spreading of dangerous liquids</i></u>	Clarification
9.3.1.10.1 9.3.2.10.1 9.3.3.10.1	The vessel shall be designed so as to prevent <u>dangerous gases and liquids</u> from penetrating into the accommodation, <u>wheelhouse</u> and the service spaces. None of the windows of this rooms is capable of being opened <u>except its intended use is as an emergency exit and it is marked as such.</u>	Clarification 2. sentence in ADN 2015 9.3.1.52.3
9.3.1.10.2 9.3.2.10.2 9.3.3.10.2	Outside the cargo area, the lower edges of door openings in the sidewalls of superstructures and the coamings of access hatches to under deck spaces shall have a height of not less than 0.50 m above the deck. This requirement need not be complied with if the wall of the superstructures facing the cargo area extends from one side of the ship to the other and has doors the sills of which have a height of not less than 0.50 m. The height of this wall shall not be less than 2.00 m. In this case, the lower edges of door openings in the sidewalls of superstructures and the coamings of access hatches behind this wall shall have a height of not less than 0.10 m. The sills of engine room doors and the coamings of its access hatches shall, however, always have a height of not less than 0.50 m. <u>Liquid tight protective coamings have to be mounted on deck at the height of the outer cargo tank bulkhead but maximum at a distance of 0,6 m to the outer cofferdam bulkhead or hold end bulkheads. The protective coaming has either to extend from one side of the vessel to the other or to be fixed between the longitudinal spill coamings. The height has to be at least 0,075 m.</u>	New zone concept
9.2.1.10.3 new	<u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2, areas on deck outside the explosion hazardous area where non explosion protected equipment is used during loading and unloading, have to be protected by a gas and liquid tight protection wall to avoid gases and liquid to enter. It has either to extend from one side of the vessel to the other</u>	New zone concept

Paragraphs	Modification	Reason / Explanation
	<u>or surround the areas to protect in an U-shaped form. The wall has to cover the whole width of the area to protect and at least 1,0 m in the direction opposite to the cargo area. The height has to be of at least 1,0 m above the deck of the cargo area (see drawing). The protection wall may coincide with the wall of the accommodation facing the cargo area, if this wall of the accommodation falls into line with the boundary plane of the cargo area and the dimensions of the protection wall are met. The protection wall is not necessary in case the distance between the areas and the depressions to protect and the compressor on deck and the nearest safety valve of pressure cargo tanks is at least 12 m</u>	9.3.1.10.3 Now in 9.3.1.10.4
9.3.2.10.3 new 9.3.3.10.3 new	<u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2, areas on deck outside the explosion hazardous area where non explosion protected equipment is used during loading and unloading, have to be protected by a gas and liquid tight protection wall to avoid gases and liquid to enter. It has either to extend from one side of the vessel to the other or surround the areas to protect in an U-shaped form. The wall has to cover the whole width of the area to protect and at least 1,0 m in the direction opposite to the cargo area. The height has to be of at least 1,0 m above the deck of the cargo area (see drawing). The protection wall may coincide with the wall of the accommodation facing the cargo area, if this wall of the accommodation falls into line with the boundary plane of the cargo area and the dimensions of the protection wall are met. The protection wall is not necessary in case the distance between the areas and the depressions to protect and the the compressor on deck and the nearest high-velocity vent valve is at least 12 m</u>	New zone concept 9.3.2.10.3 9.3.3.10.3 now in 9.3.2.10.4 9.3.3.10.4
9.3.1.10.4 new 9.3.2.10.4 new 9.3.3.10.4 new	<u>On deck</u> the lower edges of door-openings in the sidewalls of superstructures and the coamings of access hatches <u>and ventilation openings</u> to under-deck spaces 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 and double bottom spaces	
9.3.1.10.5 new 9.3.2.10.5 new 9.3.3.10.5 new	On deck the lower edges of door-openings in the sidewalls of superstructures and the coamings of access hatches to under-deck spaces shall have a height of not less than 0.50 m above the deck	Clarification In ADN 2015 9.3.1.10.2+ .3 9.3.2.10.2 + 3 9.3.3.10.2 + 3
9.3.1.10. 6 new 9.3.2.10. 6 new 9.3.3.10.6 new	The bulwarks, foot-rails, etc. shall be provided with sufficiently large openings which are located directly above the deck.	In ADN 2015 9.3.1.10.4 9.3.2.10.4 9.3.3.10.4
9.3.1.11 9.3.2.11	<i>Hold spaces and cargo tanks</i>	

Paragraphs	Modification	Reason / Explanation
9.3.3.11	(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.	
9.3.2.11.2	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 9.3.2.11.7 below. The cargo tanks shall not extend beyond the deck.	
	Refrigerated cargo tank fastenings shall meet the requirements of a recognised classification society.	Clarification
	(b) The cargo tanks independent of the vessel's hull shall be fixed so that they cannot float. <u>Refrigerated cargo tank fastenings shall meet the requirements of a recognised classification society.</u>	
	(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 0.1 m, designed to house the loading and unloading pump, is permitted if it fulfils the following conditions:	
	<ul style="list-style-type: none"> - The recess shall not be greater than 1 m in depth. - The recess shall be located not less than 6 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. 	
	(f) When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2 and the recess is deeper than 0.5 m, it shall be provided with a permanent gas detection system which automatically indicates the presence of explosive gases by means of direct measuring sensors and actuates a visual and audible alarm when the gas concentration has reached 20% of the lower explosion limit LEL of the cargo. The sensors of this system shall be placed at suitable positions at the bottom of the recess. 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 signaled in the wheelhouse and on deck by means of visual and audible alarms.	
	- It shall be possible to drain the recess using a system installed on deck in the cargo area and independent of any	

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
	<p>other system.</p> <ul style="list-style-type: none"> - 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 <u>and on deck</u> when liquid accumulates at the bottom. - When the recess is located above the cofferdam, the engine room bulkhead shall have an ‘A-60’ fire protection insulation according to 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. <p>(f) <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2 and the recess is deeper than 0.5 m, it shall be provided with a permanent gas detection system which automatically indicates the presence of explosive gases by means of direct-measuring sensors and actuates a visual and audible alarm when the gas concentration has reached 20% of the lower explosion limit LEL of the cargo. The sensors of this system shall be placed at suitable positions at the bottom of the recess. Measurement shall be continuous.</u></p> <ul style="list-style-type: none"> - <u>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.</u> <p><u>Failure of the gas detection system shall be immediately signaled in the wheelhouse and on deck by means of visual and audible alarms.</u></p>	Clarification
9.3.1.12	<i>Ventilation</i>	
9.3.2.12		
9.3.3.12		
9.3.1.12.3	a) Any service spaces located in the cargo area below deck shall be provided with a system of forced ventilation with sufficient power for ensuring at least 20 changes of air per hour based on the volume of the space. The ventilation exhaust ducts shall be located up to 50 mm above the bottom of the service space.	
9.3.2.12.3	<p>b) <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2 the fresh air inlets shall be located in the upper part; they shall be not less than 2.00 m above the deck, not less than 2.00 m from the openings of the cargo tanks and not less than 6.00 m from the outlets of safety valves.</u></p> <p>The extension pipes which may be necessary may be of the hinged type.</p>	Clarification
9.3.3.12.3	<p>a) Any service spaces located in the cargo area below deck shall be provided with a system of forced ventilation with sufficient power for ensuring at least 20 changes of air per hour based on the volume of the space. The ventilation exhaust ducts shall be located up to 50 mm above the bottom of the service space.</p> <p>b) <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2 the fresh air inlets shall be located in the upper part; they shall be not less than 2.00 m above the deck, not less than 2.00 m from the openings of the cargo tanks and not less</u></p>	Clarification

Paragraphs	Modification	Reason / Explanation
	<p>than 6.00 m from the outlets of safety valves. The extension pipes which may be necessary may be of the hinged type.</p> <p>c) On board open type N vessels other suitable installations without ventilator fans shall be sufficient.</p>	
9.3.1.12.4	Ventilation of accommodation, <u>wheelhouse</u> and service spaces shall be possible	
9.3.2.12.4	<u>When in this spaces during loading and unloading as well as during a stay near to or within a shoreside assigned zone</u>	
9.3.3.12.4	<u>installations and equipment not fulfilling the requirements referred to in 9.3.x.51 a) resp. 9.3.x.51 b) or 9.3.x.52.1 resp. 9.3.x.53.1</u>	
	<p>a) It shall be possible to switch off <u>this installation and equipment</u>., except</p> <p>b) This rooms are equipped with</p> <p>1. a ventilation system ensuring an overpressure of 0.1 kPa (0.001 bar). The air intakes of the ventilation system shall be located as far away as possible, however, not less than 6.00 m from the cargo area and not less than 2.00 m above the deck</p> <p>2. Gas detection system with sensors – at the suction inlets of the ventilation system; – directly at the top edge of the sill of the entrance doors</p> <p>This gas detection system has to fulfill the following requirements:</p> <ul style="list-style-type: none"> - The t90-time is equal to or lower than 4 s - The gas concentration measurement is continuous <p>3. The ventilators are switched off in case the gas concentration reaches 20% of the lower explosion limit LEL. In such a case and when the overpressure is not maintained or in the event of failure of the gas detection system, the electrical installations <u>and equipment</u> which do not comply with the requirements mentioned in <u>9.3.x.52.1 resp. 9.3.x.53.1</u> shall be switched off.</p> <p>4. The ventilation system, the gas detection system and the alarm of the switch-off device fully comply with the requirements of <u>9.3.x.52.1 resp. 9.3.x.53.1</u></p> <p>5. The automatic switch-off device is set so that no automatic switching-off may occur while the vessel is under way.</p> <p>6. <u>The failure of the gas detection system of the accommodation shall be indicated by visual and audible signals in the accommodation, wheelhouse and on deck</u></p>	<p>Basic safety concept</p> <p>In ADN 2015 9.3.x.52.3</p>
9.3.2.12.5	Ventilators used in the cargo explosion hazardous area shall be designed so that no sparks may be emitted on contact of the impeller blades with the housing and no static electricity may be generated.	Clarification
9.3.1.12.6	Notice boards shall be fitted at the ventilation inlets indicating the conditions under which they shall be closed. Any	
9.3.2.12.6	ventilation inlets of accommodation, <u>wheelhouse</u> and service spaces <u>outside the cargo area</u> leading outside shall be	
9.3.3.12.6	fitted with <u>fixed devices according to 9.3.x.40.2.2 c. which can be closed rapidly. It shall be clear whether they are open or closed.</u>	
	Such ventilation inlets shall be located not less than 2.00 m from the cargo area.	Clarification

Paragraphs	Modification	Reason / Explanation
	<p>concentration has reached 20% of the lower explosive-explosion limit of n-Hexane or of the cargo .. The sensors of this <u>gas detection</u> system shall be placed at suitable positions at the bottom and directly below the deck. Measurement shall be continuous.</p>	Clarification
	<p>The audible and visual alarms are installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system is shut down. Failure of the gas detection system shall be immediately signaled in the wheelhouse and on deck by means of audible and visual alarms; <u>The alarm has to be lead to the accommodation automatically if not cleared.</u></p>	
	<p>– the ventilation system prescribed in 9.3.1.12.3-4 has a capacity of not less than 30 changes of air per hour based on the total volume of the service space.</p>	
<p>9.3.2.17.6 9.3.3.17.6</p>	<p>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:</p>	Basic safety concept
	<p>– the pump room is separated from the engine room or from service spaces outside the cargo area by a cofferdam or a bulkhead with an "A-60" fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3, or by a service space or a hold space;</p>	
	<p>– the "A-60" bulkhead required above does not include penetrations referred to in 9.3.2.17.5 (a);</p>	
	<p>– ventilation exhaust outlets are located not less than 6.00 m from entrances and openings of the accommodation, <u>wheelhouse</u> and service spaces outside the cargo area;</p>	Clarification
	<p>– the access hatches and ventilation inlets can be closed from the outside;</p>	
	<p>– all piping for loading and unloading as well as those of stripping systems are 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 necessary control of the liquid flow rate shall be effected from the deck;</p>	
	<p>– 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;</p>	
	<p><u>-the cargo pump room is provided with a permanent oxygen detection system which automatically indicates the amount of oxygen by means of direct-measuring sensors and which actuates a visual and audible alarm when the oxygen concentration has reached 19,5 Vol%. The sensors of this system shall be placed at suitable positions at the bottom and directly below the deck. Measurement shall be continuous. The audible and visual alarms are installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system is shut down.</u></p>	
	<p><u>Failure of the oxygen detection system shall be immediately signalled in the wheelhouse and on deck by means of audible and visual alarms. The alarm has to be lead to the accommodation automatically if not cleared</u></p>	
	<p>– the ventilation system prescribed in 9.3.2.12.3 has a capacity of not less than 30 changes of air per hour based on the total volume of the service space.</p>	

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
	<p>– <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2, the cargo pump-room is provided in addition with a permanent gas-detection system which automatically indicates the presence of flammable gases or lack of oxygen by means of direct-measuring sensors and which actuates a visual and audible alarm when the gas concentration has reached 20% of the lower explosive explosion limit of n-Hexane or of the cargo . 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.</u></p> <p>The audible and visual alarms are installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system is shut down. Failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by means of audible and visual alarms the loading and unloading system is shut down. <u>The alarm has to be lead to the accommodation automatically if not cleared.</u></p> <p>– the ventilation system prescribed in 9.3.1.12.3-4 has a capacity of not less than 30 changes of air per hour based on the total volume of the service space.</p>	Clarification
9.3.3.17.8	9.3.3.17.5 (g), 9.3.3.17.6 and 9.3.3.17.7 do not apply to open type N.	Reference adjusted
	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.	
9.3.3.20.5	9.3.3.20.4 above does not apply to open type N.	superfluous
	9.3.3.20.2 above does not apply to oil separator and supply vessels.	
9.3.2.21	<i>Safety and control installations</i>	
9.3.3.21		
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 3.2.3.2 a heating installation is required, or if a maximum temperature is indicated in column (20) of that list;	
	(g) a <u>closable</u> 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 3.2.3.2.	clarification
9.3.3.21.1	Cargo tanks shall be provided with the following equipment:	

Paragraphs	Modification	Reason / Explanation
	<p>(a) a mark inside the tank indicating the liquid level of 97%;</p> <p>(b) a level gauge;</p> <p>(c) a level alarm device which is activated at the latest when a degree of filling of 90% is reached;</p> <p>(d) a high level sensor for actuating the facility against overflowing at the latest when a degree of filling of 97.5% is reached;</p> <p>(e) an instrument for measuring the pressure of the vapour phase inside the cargo tank;</p> <p>(f) an instrument for measuring the temperature of the cargo, if in column (9) of Table C of 3.2.3.2 a heating installation is required, or if a maximum temperature is indicated in column (20) of that list;</p> <p>(g) a <u>closable</u> 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 3.2.3.2.</p>	clarification
9.3.2.21.7	<p>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 <u>and on deck. The alarm has to be lead to the accommodation automatically if not cleared. When the wheelhouse is unoccupied, the alarm shall also be perceptible in a location occupied by a crew member.</u></p> <p>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, initiate immediately an electrical contact which shall put into effect measures to interrupt the loading or unloading operation. If the vessel's own discharge pump is used, it shall be switched off automatically.</p> <p>The instrument for measuring the overpressure or vacuum shall activate the alarm at latest when</p> <p>(a) <u>the overpressure reaches 1.15 times the opening pressure of the pressure relief device / high velocity vent valve, or</u></p> <p>(b) <u>the lower limit of the construction vacuum pressure is reached</u> but not exceeding a <u>vacuum of 5 kPa (0.05 bar).</u></p> <p>The maximum allowable temperature is indicated in column (20) of Table C of 3.2.3.2. The sensors for the alarms mentioned in this paragraph may be connected to the alarm device of the sensor.</p> <p>When it is prescribed in column (20) of Table C of 3.2.3.2, the instrument for measuring the overpressure of the gaseous phase shall activate a visible and audible alarm in the wheelhouse when the overpressure exceeds 40 kPa (0.4 bar) during the voyage. <u>When the wheelhouse is unoccupied, the alarm shall also be perceptible in a location occupied by a crew member. The alarm has to be lead to the accommodation automatically if not cleared.</u></p>	clarification
9.3.3.21.7	<p>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 <u>and on deck. The alarm has to be lead to the accommodation automatically if not cleared. When the wheelhouse is unoccupied, the alarm shall also be perceptible in a location occupied by a crew member.</u></p> <p>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, initiate immediately an electrical contact which shall put</p>	clarification

Paragraphs	Modification	Reason / Explanation
	<p>into effect measures to interrupt the loading or unloading operation. If the vessel's own discharge pump is used, it shall be switched off automatically.</p> <p>The instrument for measuring the overpressure or vacuum shall activate the alarm at latest when</p> <p>(a) <u>the overpressure reaches 1.15 times the opening pressure of the pressure relief device / high velocity vent valve, or</u></p> <p>(b) <u>the lower limit of the construction vacuum pressure but not exceeding a vacuum of 5 kPa (0.05 bar).</u></p> <p>The maximum allowable temperature is indicated in column (20) of Table C of 3.2.3.2. The sensors for the alarms mentioned in this paragraph may be connected to the alarm device of the sensor.</p> <p>When it is prescribed in column (20) of Table C of 3.2.3.2, the instrument for measuring the overpressure of the gaseous phase shall activate a visible and audible alarm in the wheelhouse when the overpressure exceeds 40 kPa (0.4 bar) during the voyage. When the wheelhouse is unoccupied, the alarm shall also be perceptible in a location occupied by a crew member. The alarm has to be lead to the accommodation automatically if not cleared. It shall be possible to read the gauges in direct proximity to the control for the water spray system.</p>	
<p>9.3.2.22 9.3.2.22</p>	<p><i>Cargo tank openings</i></p>	
<p>9.3.2.22.4</p>	<p>(a) Each cargo tank or group of cargo tanks connected to a common venting piping shall be fitted with:</p> <ul style="list-style-type: none"> – safety devices for preventing unacceptable overpressures or vacuums.. – a device for the safe depressurization of the tanks which clearly indicates whether it is open or shut... – a connection for the safe return ashore of gases expelled during loading; <p>The opening pressure of the high-velocity vent valve and the opening pressure of the vacuum valve shall be indelibly indicated on the valves;</p> <p>The setting of the pressure relief device 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.</p> <p><u>The gases shall be discharged upwards</u></p> <p>The outlets of the pressure relief device 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 accommodation, <u>wheelhouse</u> and from the service spaces outside the cargo area. Within a radius of 1.00 m round the outlet of the pressure relief device, there is no equipment allowed, and no work is being carried out and signs indicate the area.</p> <p>b) <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2,</u></p> <ul style="list-style-type: none"> - the venting piping at the connection to the cargo tank has to be equipped with a flame arrester capable of withstanding a deflagration <u>detonation</u> and - the vacuum valve as well as the device for the safe depressurization is deflagration safe. <u>The deflagration safety can</u> 	<p>Clarification</p> <p>New zone concept</p>

Paragraphs	Modification	Reason / Explanation
	<p><u>be assured by the use of a flame arrester capable of withstanding a deflagration.</u></p> <p>c) <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2, or there is a T mentioned in column 3b the pressure relief device shall be a high velocity vent valve-</u></p> <p>d) <u>The safety devices mentioned in a) and b) have to be chosen according to the explosion group of the substances listed in the list of substances on the vessel (see 3.2 table C, column 15).</u></p> <p><u>In case it is necessary that the pressure relief device / high-velocity vent valve, the vacuum valve, the flame arresters as well as the venting pipe has to be heatable for carriage in closed vessels the mentioned safety devices have to be suited for the respective temperature and pressure.</u></p> <p>e) <u>If shut-off devices will be mounted between the venting piping and the cargo tank these devices have to mounted between the cargo tank and the flame arrester and each cargo tank has to be equipped with pressure relieve valves.</u></p> <p>f) <u>The outlets of 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 accommodations, wheelhouse and from the service spaces outside the cargo area. This height may be reduced when within a radius of 1.00 m round the outlet of the high-velocity vent valve, there is no equipment, no work is being carried out and signs indicate the area. The setting of the high-velocity vent 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.</u></p> <p>g) <u>The setting of the high-velocity vent 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.</u></p>	
9.3.3.22.4	<p>Each cargo tank or group of cargo tanks connected to a common venting piping shall be fitted with safety devices for preventing unacceptable overpressures or vacuums.</p> <p>These safety devices shall be as follows:</p> <p>for the open N type:</p> <ul style="list-style-type: none"> – safety devices designed to prevent any accumulation of water and its penetration into the cargo tanks; <p>for the open N type with flame-arresters:</p> <ul style="list-style-type: none"> – safety equipment fitted with flame-arresters capable of withstanding steady burning and designed to prevent any accumulation of water and its penetration into the cargo tank; <p><u>The opening pressure of the pressure relief device and the opening pressure of the vacuum valve shall be permanently marked on the valves.</u></p> <p>for the closed N type:</p> <ul style="list-style-type: none"> a) – <u>safety devices for preventing unacceptable overpressure or vacuum.</u> – <u>a device for the safe depressurization of the tanks which clearly indicates whether it is open or shut.</u> – <u>a connection for the safe return ashore of gases expelled during loading;</u> 	

Paragraphs	Modification	Reason / Explanation
	<p><u>The opening pressure of the pressure relief device and the opening pressure of the vacuum valve shall be permanently marked on the valves.</u></p> <p><u>b) when the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2</u></p> <ul style="list-style-type: none"> - <u>the venting piping at the connection to the cargo tank has to be equipped with a flame arrester capable of withstanding a deflagration detonation</u> - <u>the vacuum valve as well as the device for the safe depressurization is deflagration safe. <u>The deflagration safety can be assured by the use of a flame arrester capable of withstanding a deflagration, and</u></u> - <u>the pressure relief device shall be a high velocity vent valve.</u> <p>The gases shall be discharged upwards.</p> <p>The outlets of 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 accommodation and from the service spaces outside the cargo area. This height may be reduced when within a radius of 1.00 m round the outlet of the high-velocity vent valve, there is no equipment, no work is being carried out and signs indicate the area. The setting of the high-velocity vent 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.</p> <p><u>c) the safety devices mentioned in b) have to be chosen according to the explosion group of the substances listed in the list of substances on the vessel (see 3.2.3.2 table C, column 15) The safety devices shall be suited for the intended temperature and pressure range.</u></p>	<p>Similar to Type C vessels</p>
<p>9.3.2.22.5 9.3.3.22.5</p>	<p><u>Venting piping</u></p> <p>a) <u>When two or more cargo tanks are connected by a joint venting piping, it is sufficient that the equipment according to 9.3.x.22.4 is installed on the joint venting piping (see also 7.2.4.16.7)</u></p> <p>b) <u>When each cargo tank is connected to an own venting piping, each cargo tank or the associated venting piping has to be equipped according to 9.3.x.22.4</u></p> <p>(a) <u>Insofar as anti-explosion protection is prescribed in column (17) of Table C of Chapter 3.2, venting piping connecting two or more cargo tanks shall be fitted, at the connection to each cargo tank, with a flame arrester with a fixed or spring loaded plate stack, capable of withstanding detonation. This equipment may consist of:</u></p> <ul style="list-style-type: none"> (i) <u>a flame arrester fitted with a fixed plate stack, where each cargo tank is fitted with a vacuum valve capable of withstanding a deflagration and a high velocity vent valve capable of withstanding steady burning;</u> (ii) <u>a flame arrester fitted with a spring loaded plate stack, where each cargo tank is fitted with a vacuum valve capable of withstanding a deflagration;</u> (iii) <u>a flame arrester with a fixed or spring loaded plate stack;</u> (iv) <u>a flame arrester with a fixed plate stack, where the pressure measurement device is fitted with an alarm system in</u> 	<p>Clarification</p> <p>9.3.2.22.5 d) in ADN 2015 moved to 7.2.4.16.7</p>

Paragraphs	Modification	Reason / Explanation
	<p>accordance with 9.3.3.21.7;</p> <p>(v) a flame arrester with a spring loaded plate stack, where the pressure measurement device is fitted with an alarm system in accordance with 9.3.3.21.7.</p> <p>Only substances which do not mix and which do not react dangerously with each other may be carried simultaneously in cargo tanks connected to a common venting piping;</p> <p>or</p> <p>(b) Insofar as anti-explosion protection is prescribed in column (17) of Table C of Chapter 3.2, venting piping connecting two or more cargo tanks shall be fitted, at the connection to each cargo tank, with a pressure/vacuum valve incorporating a flame arrester capable of withstanding a detonation/deflagration so that any gas released is removed by the venting piping.</p> <p>Only substances which do not mix and which do not react dangerously with each other may be carried simultaneously in cargo tanks connected to a common venting piping;</p> <p>or</p> <p>(c) Insofar as anti-explosion protection is prescribed in column (17) of Table C of Chapter 3.2, an independent venting piping for each cargo tank, fitted with a vacuum valve incorporating a flame arrester capable of withstanding a deflagration and a high velocity vent valve incorporating a flame arrester capable of withstanding steady burning. Several different substances may be carried simultaneously;</p> <p>or</p> <p>(d) Insofar as anti-explosion protection is prescribed in column (17) of Table C of Chapter 3.2, venting piping connecting two or more cargo tanks shall be fitted, at the connection to each cargo tank, with a shut-off device capable of withstanding adetonation, where each cargo tank is fitted with a vacuum valve capable of withstanding a deflagration and a high velocity vent valve capable of withstanding steady burning.</p> <p>Only substances which do not mix and which do not react dangerously with each other may be carried simultaneously in cargo tanks connected to a common venting piping.</p>	
9.3.1.25	Pumps and piping	
9.3.2.25		
9.3.3.25		
9.3.1.25.3	The distance referred to in 9.3.3.25.1 (c) and 9.3.3.25.2 (c) may be reduced to 3.00 m if a transverse bulkhead complying with 9.3.3.10.2 is situated at the end of the cargo area. The openings shall be provided with doors.	New zone concept
9.3.2.25.3	The following notice shall be displayed on the doors:	
9.3.3.25.3	Do not open during loading and unloading without	

Paragraphs	Modification	Reason / Explanation
	<p>the permission of the master.</p> <p>Close immediately.</p> <p><i>(Deleted)</i></p>	
9.3.2.25.9	The permissible loading and unloading flows shall be calculated.	Clarification
9.3.3.25.9	<p>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.</p> <p>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:</p> <p>over-pressure: 115% of the opening pressure of the <u>pressure relief device</u>/ high-velocity vent valve;</p>	
9.3.2.26	<i>Tanks and receptacles for residual products and receptacles for slops</i>	
9.3.3.26		
9.3.2.26.1	If vessels are provided with a tank or a receptacle for residual products or a receptacle for slops, it shall comply with the provisions of <u>9.3.x.26.2</u> and 9.3.x.26.3. Receptacles for residual products and receptacles for slops shall be located only in the cargo area. During the filling of the receptacles for residual products, means for collecting any leakage shall be placed under the filling connections.	Clarification
9.3.3.26.1		In ADN 2015 9.3.2.26.4 9.3.3.26.4
9.3.2.26.2	<p>Receptacles for slops shall be fire resistant and shall be capable of being closed with lids (drums with removable heads, code 1A2, ADR). The receptacles for slops shall be marked and be easy to handle.</p> <p>Tanks for residual product shall be equipped with</p> <ul style="list-style-type: none"> - a level indicator - connections with shut-off devices, for pipes and hose assemblies - pressure-relief <u>device</u> and vacuum relief valves. The setting of the pressure relief device shall be such that during the transport operation they do not blow off. This condition is met when the opening pressure of the valve meets the conditions set out in column (10) of Table C of 3.2.3.2. <p><u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2, the vacuum valve has to be deflagration safe. The deflagration safety may also be ensured by a flame arrester</u></p> <p><u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2, or there is a T mentioned in column 3b the pressure relief device shall be a high velocity vent valve-</u></p>	9.3.2.26.2 in ADN 2015 now in definitions Clarification New zone concept

Paragraphs	Modification	Reason / Explanation
9.3.3.26.2	<p>The high velocity vent valve shall be so regulated as not to open during carriage. This condition is met when the opening pressure of the valve meets the conditions set out in column (10) of Table C of 3.2.3.2;</p> <p><u>The high velocity vent valve and the deflagration safe vacuum valve have to be chosen according to the explosion group of the substances listed in the list of substances on the vessel (see 3.2.3.2 table C, column 15)</u></p> <p>The maximum capacity of a tank for residual products is 30 m3.</p> <p>Receptacles for slops shall be fire resistant and shall be capable of being closed with lids (drums with removable heads, code 1A2, ADR). The receptacles for slops shall be marked and easy to handle.</p> <p>The tank for residual products shall be equipped with:</p> <ul style="list-style-type: none"> – in the case of an open system: <ul style="list-style-type: none"> – a device for ensuring pressure equilibrium; – an ullage opening; – connections, with stop valves, for pipes and hose assemblies – in the case of a protected system: <ul style="list-style-type: none"> – a device for ensuring pressure equilibrium, fitted with a flame-arrester capable of withstanding steady burning; – an ullage opening; – connections, with stop valves, for pipes and hose assemblies; – in the case of a closed system: <ul style="list-style-type: none"> a) - a level indicator <ul style="list-style-type: none"> - connections with shut-off devices, for pipes and hose assemblies - pressure-relief <u>device</u> and vacuum relief valves. <p>The setting of the pressure relief device shall be such that during the transport operation they do not blow off. This condition is met when the opening pressure of the valve meets the conditions set out in column (10) of Table C of 3.2.3.2.</p> <p>b) <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which explosion protection is required in column (17) of Table C of 3.2.3.2, the pressure relief device shall be a high velocity vent valve and the vacuum valve has to be deflagration safe. The deflagration safety may also be ensured by a flame arrester</u></p> <p><u>The high velocity vent valve and the deflagration safe vacuum valve have to be chosen according to the explosion group of the substances listed in the list of substances on the vessel (see 3.2.3.2 table C, column 15)</u></p>	<p>9.3.3.26.2 of ADN 2015 moved to 9.3.3.26.4</p> <p>Similar to Type C vessels</p>

Paragraphs	Modification	Reason / Explanation
	The maximum capacity of a tank for residual products is 30 m ³	
9.3.2.26.3	The maximum capacity of a tank for residual products is 30 m³.	Now in definition
9.3.3.26.3	Receptacles for residual products shall be equipped with	In ADN 2015
	- a possibility of indicating the degree of filling;	9.3.2.26.4
	- connections with shut-off devices, for pipes and hose assemblies	moved to 7.2.4.16.2
	- a connection enabling gases released during filling to be evacuated safely	moved to 9.3.x.26.1
	Receptacles for residual products shall be connected to the venting piping of cargo tanks only for the time necessary to fill them in accordance with 7.2.4.15.2.	
	Receptacles for residual products and receptacles for slops placed on the deck shall be located at a minimum distance from the hull equal to one quarter of the vessel's breadth.	
9.3.2.26.4	The tank for residual products shall be equipped with:	Now in
9.3.3.26.4	— in the case of an open system:	9.3.2.26.1, 9.3.3.26.1, 9.3.2.26.2, 9.3.3.26.2.
	— a device for ensuring pressure equilibrium;	9.3.2.26.3, 9.3.3.26.3
	— an ullage opening;	
	— connections, with stop valves, for pipes and hose assemblies;	
	— in the case of a protected system:	
	— a device for ensuring pressure equilibrium, fitted with a flame arrester capable of withstanding steady burning;	
	— an ullage opening;	
	— connections, with stop valves, for pipes and hose assemblies;	
	— in the case of a closed system:	
	— a vacuum valve and a high velocity vent valve.	
	The high velocity vent valve shall be so regulated that it does not open during carriage. 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. When anti explosion protection is required in column (17) of Table C of Chapter 3.2, the vacuum valve shall be capable of withstanding deflagrations and the high velocity vent valve steady burning;	
	— a device for measuring the degree of filling;	
	— connections, with stop valves, for pipes and hose assemblies.	
	Receptacles for residual products shall be equipped with:	

Paragraphs	Modification	Reason / Explanation
	<p>— a connection enabling gases released during filling to be evacuated safely;</p> <p>— a possibility of indicating the degree of filling;</p> <p>— connections with shut-off devices, for pipes and hose assemblies.</p>	
	<p>Receptacles for residual products shall be connected to the venting piping of cargo tanks only for the time necessary to fill them in accordance with 7.2.4.15.2.</p>	
	<p>Receptacles for residual products and receptacles for slops placed on the deck shall be located at a minimum distance from the hull equal to one quarter of the vessel's breadth.</p>	
	<i>(Deleted)</i>	
9.3.2.28	<p>Water-spray system</p> <p>When water-spraying is required in column (9) of Table C of 3.2.3.2, a water-spray system shall be installed in the cargo area on deck to enable gas emissions from loading to be precipitated and to cool the tops of cargo tanks by spraying water over the whole surface to avoid safely the activation of the <u>pressure relief device</u> / high-velocity vent valve at 50 kPa (0.5 bar).</p> <p>The spray nozzles shall be so installed that the entire cargo deck area is covered and the gases released are precipitated safely.</p> <p>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.</p>	Clarification
9.3.3.28	<p>Water-spray system</p> <p>When water-spraying is required in column (9) of Table C of 3.2.3.2, 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 <u>pressure relief device</u> / high-velocity vent valve at 10 kPa or as regulated.</p> <p>The spray nozzles shall be so installed that the entire cargo deck area is covered and the gases released are precipitated safely.</p> <p>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.</p>	Clarification
9.3.1.31.3	<p>Sparking shall not be possible within the cargo area</p>	New zone
9.3.2.31.3	<i>(Deleted)</i>	concept
9.3.3.31.3	<i>(Deleted)</i>	
9.3.1.31.4	<p>The surface temperature of the outer parts of engines used during loading or unloading operations, as well as that of</p>	Superfluous
9.3.2.31.4	<p>their air inlets and exhaust ducts shall not exceed the allowable temperature according to the temperature class of the</p>	

Paragraphs	Modification	Reason / Explanation
9.3.3.31.4	substances carried. This provision does not apply to engines installed in service spaces provided the provisions of 9.3.1.52.3 are fully complied with. (Deleted)	
9.3.1.50 9.3.2.50 9.3.3.50	Documents which have to be available on board (Deleted)	Now in 8.1.3.2
9.3.1.51 new 9.3.2.51 new 9.3.3.51 new	Replace by Surface temperatures of installations and equipment a) surface temperatures shall not exceed 200°C b) <u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which in column (15) of Table C of 3.2.3.2, T4, T5 or T6 is indicated the allowed respective surface temperatures have to be not more than 135°C (T4), 100°C (T5) 85°C (T6)</u> c) a) and b) does not apply if the following requirements are fulfilled: - <u>Equipment and installations, which generate surface temperatures higher than mentioned in a) and b) have to be marked in red and switched off operated during loading, unloading or gas-freeing during berthing as well as during a stay near to or within a shoreside assigned zone.</u> <u>or</u> - <u>Accommodation, wheelhouse and service spaces where surface temperatures higher than mentioned in a) or b) occur are equipped with a ventilation system according to 9.3.x.12.4</u>	Basic safety concept
9.3.1.52 9.3.2.52 9.3.3.52	<u>Type and location of electrical installations and equipment</u>	Basic safety concept
9.3.1.52.1 new	Electrical installations and equipment used during loading, unloading and gas freeing during berthing and which are located outside the cargo area (comparable to zone 2) shall be at least of the "limited explosion risk" type.	Basic safety concept
9.3.2.52.1 new 9.3.3.52.1 new	This provision does not apply to: (i) lighting installations in the accommodation, except for switches near entrances to accommodation; (ii) mobile <u>phones</u> and fixed telephone installations and <u>loading instruments</u> in the accommodation or the wheelhouse; (iii) electrical installations or equipment which <u>during a stay near to or within a shoreside assigned zone</u> - <u>a) are switched off or</u> - <u>b) are installed in spaces which are equipped with a ventilation system according to 9.3.x.12.4</u> (iv) Inland AIS (automatic identification systems) stations <u>and radiotelephone installations</u> in the accommodation and in the wheelhouse if no part of an aerial for electronic apparatus is situated above the cargo area and if no part of a VHF antenna for AIS stations is situated within 2 m from the cargo area.	Content of 9.3.x.52.1 in ADN 2015 now in 9.3.x.53.1

<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
9.3.1.52.2 9.3.2.52.2 9.3.3.52.2 In ADN 2015 9.3.1.51.1 9.3.2.51.1 9.3.3.51.1	Only hermetically sealed echo sounding devices the cables of which are led through thick-walled steel tubes with gastight connections up to the main deck;	9.3.x.52.2 of ADN 2015 moved to 9.3.x.52.9
9.3.1.52.3 9.3.2.52.3 9.3.3.52.3 In ADN 2015 9.3.1.51.2 9.3.2.51.2 9.3.3.51.2	The electrical <u>installations</u> and equipment which does not meet the requirements set out in 9.3.2.52.1 (IV b) together with its switches shall be marked in red. The disconnection of such equipment shall be operated from a centralised location on board.	9.3.1x.52.3, of ADN 2015 moved to 9.3.x.12.4 Reference adjusted
9.3.1.52.4 9.3.2.52.4 9.3.3.52.4 In ADN 2015 9.3.1.51.2 9.3.2.51.2 9.3.3.51.2	Every insulated distribution network shall be fitted with an automatic device with a visual and audible alarm for checking the insulation level.	9.3.1x.52.4, of ADN 2015 now in 9.3.x.52.1
9.3.1.52.5 9.3.2.52.5 9.3.3.52.5 In ADN 2015 9.3.1.56.5 9.3.2.56.5, 9.3.2.56.5	Only distribution systems without return connection to the hull are permitted: This provision does not apply to: - active cathodic corrosion protection; - local installations outside the cargo area (e.g. connections of starters of diesel engines); - the device for checking the insulation level referred to in 9.3.x.51.3 below.	Reference adjusted 9.3.x.52.4 of ADN 2015 moved to 9.3.x.52.2
9.3.1.52.6 9.3.2.52.6 9.3.3.52.6 In ADN 2015 9.3.1.52.7 9.3.2.52.7	An electric generator which is permanently driven by an engine and which does not meet the requirements of 9.3.1.52.3 above, shall be fitted with a switch capable of shutting down the excitation of the generator. A notice board with the operating instructions shall be displayed near the switch. For movable <u>electrical</u> cables intended for signal lights and gangway lighting, only sheathed cables of type H 07 RN-F in accordance with standard IEC 60 245-4:2011 or <u>electrical</u> cables of at least equivalent design having conductors with a cross-section of not less than 1.5 mm ² shall be used.	Basic safety concept 9.3.x.52.6 of ADN 2015 moved to

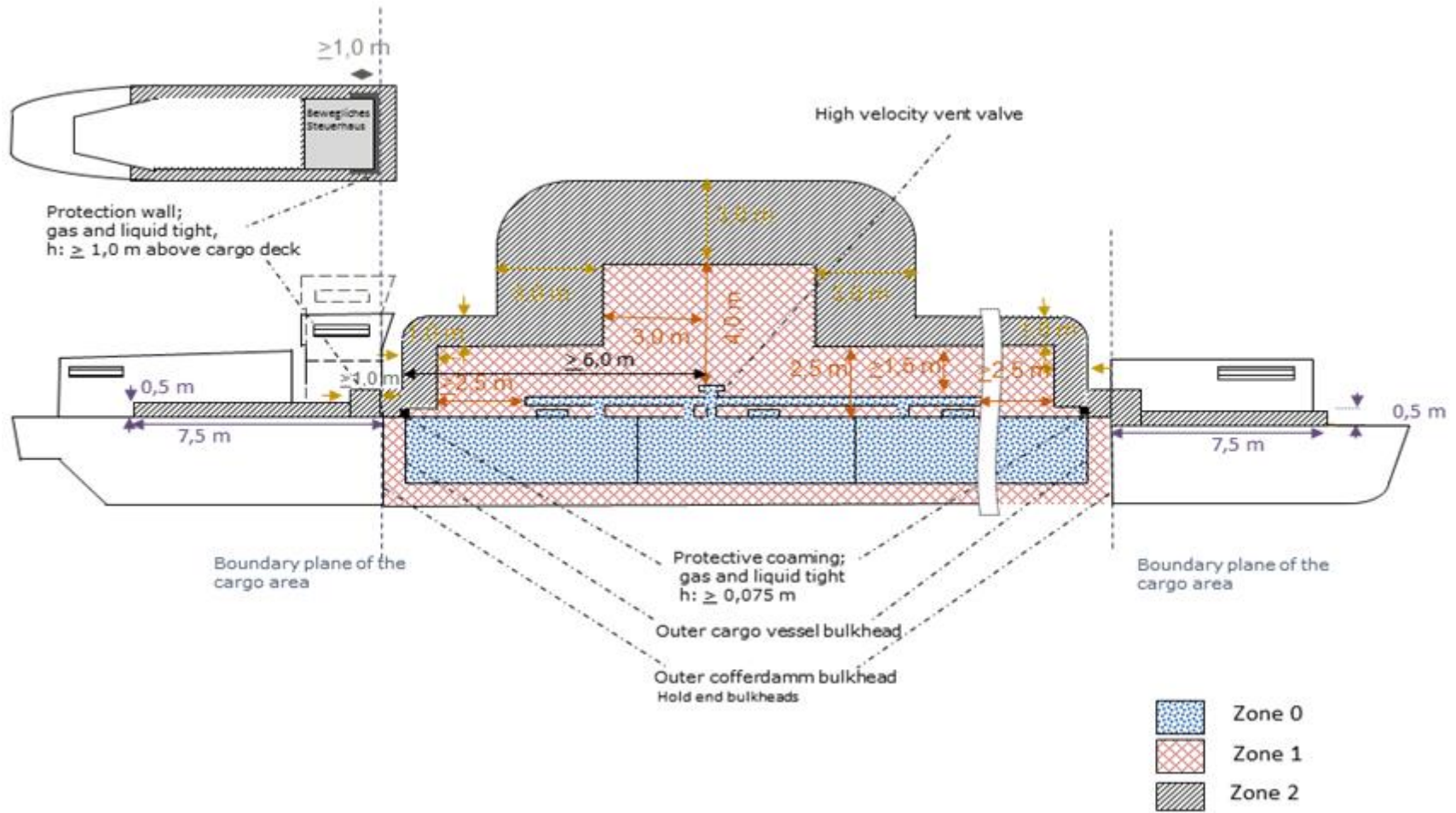
<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
9.3.2.52.7	These <u>electrical</u> cables shall be as short as possible and installed so that damage is not likely to occur.	9.3.x.52.9
9.3.1.52.7 9.3.2.52.7 9.3.3.52.7	The failure of the power supply for the safety and control equipment shall be immediately indicated by visual and audible signals at the locations where the alarms are usually actuated.	
9.3.1.52.8 new 9.3.2.52.8 new 9.3.3.52.8 new	<u>Switches</u> , cables and sockets <u>on deck</u> shall be protected against mechanical damage.	Clarification
In ADN 2015 9.3.1.52.6 9.3.2.52.6 9.3.3.52.6		
9.3.1.52.9 new 9.3.2.52.9 new 9.3.3.52.9 new	Sockets for the connection of signal lights and gangway lighting shall be permanently fitted to the vessel close to the signal mast or the gangway. Connecting and disconnecting shall not be possible except when the sockets are not live.	
In ADN 2015 9.3.1.52.2 9.3.2.52.2 9.3.3.52.2		
9.3.1.52.10 new 9.3.2.52.10 new 9.3.3.52.10 new	Accumulators shall be located outside the cargo area.	
In ADN 2015 9.3.1.52.2 9.3.2.52.2 9.3.3.52.2		
9.3.1.53 9.3.2.53 9.3.3.53	<u>Text in 9.3.x.53, 9.3.x.53.1, 9.3.x.53.3, 9.2.x.53.3 to be replaced by</u> <u>Type and location of electrical and non-electrical installations and equipment intended to be used in explosion</u>	New zone concept

Paragraphs	Modification	Reason / Explanation
	<u>hazardous areas</u>	
9.3.1.53.1	<u>Electrical and non-electrical installations and equipment intended to be used in explosion hazardous areas according to the definition in 1.2.1 shall fulfill at least the requirements for being used in the respective zone.</u>	New zone concept
9.3.2.53.1	<u>They have to be chosen according to the explosion group and temperature class of the substances listed in the list of substances on the vessel (see 3.2.3.2 table C, column 15 and 16)</u>	Basic safety concept
9.3.3.53.1	<u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which in column (15) of Table C of 3.2.3.2, T4, T5 or T6 is indicated the allowed respective surface temperatures have to be not more than 135°C (T4), 100°C (T5), 85°C (T6)</u>	In ADN 2015
	<u>When the list of substances on the vessel according to 1.16.1.2.5 will contain substances for which in column (15) of Table C of 3.2.3.2, T1 and T2 is indicated the allowed respective surface temperatures within the assigned zones shall not exceed 200°C.</u>	9.3.x.51.3
	<u>In case zoning is not necessary 9.3.x.51 and 9.3.x.52 apply.</u>	
9.3.1.53.2	<u>Electrical cables within the cargo area have to be reinforced or protected by a metallic shield or mounted using cable conduit, except optical fibers</u>	Clarification
9.3.2.53.2	Electrical cables for echo sounding devices and the active cathodic protection of the shell plating in protective steel tubes such as those provided for echo sounding devices.	In ADN 2015
9.3.3.53.2		9.3.x.56.1
9.3.1.53.3	Movable <u>electrical</u> cables are prohibited in the cargo area, except for intrinsically safe electric circuits or for the supply of signal lights and gangway lighting.	In ADN 2015
9.3.2.53.3		9.3.x.56.3
9.3.3.53.3	Movable <u>electrical</u> cables are prohibited in the cargo area, except for intrinsically safe electric circuits, for the supply of signal lights and gangway lighting and submerged pumps on board oil separator vessels..	
9.3.1.53.4	<u>Electrical</u> cables of intrinsically safe circuits shall only be used for such circuits and shall be separated from other cables not intended for being used in such circuits (e.g. they shall not be installed together in the same string of cables and they shall not be fixed by the same cable clamps).	In ADN 2015
9.3.2.53.4		9.3.x.56.4
9.3.3.53.4		
9.3.1.54	<u>Earthing</u>	In ADN 2015
9.3.2.54		9.3.2.53
9.3.3.54		
9.3.2.5 5	<i>(Reserved)</i>	
9.3.2.5 <u>9</u>		
9.3.2.56	No longer necessary	
9.3.3.56		
9.3.1.56		
9.3.2.56.1	moved to 9.3.2.53.2	
9.3.3.56.1		

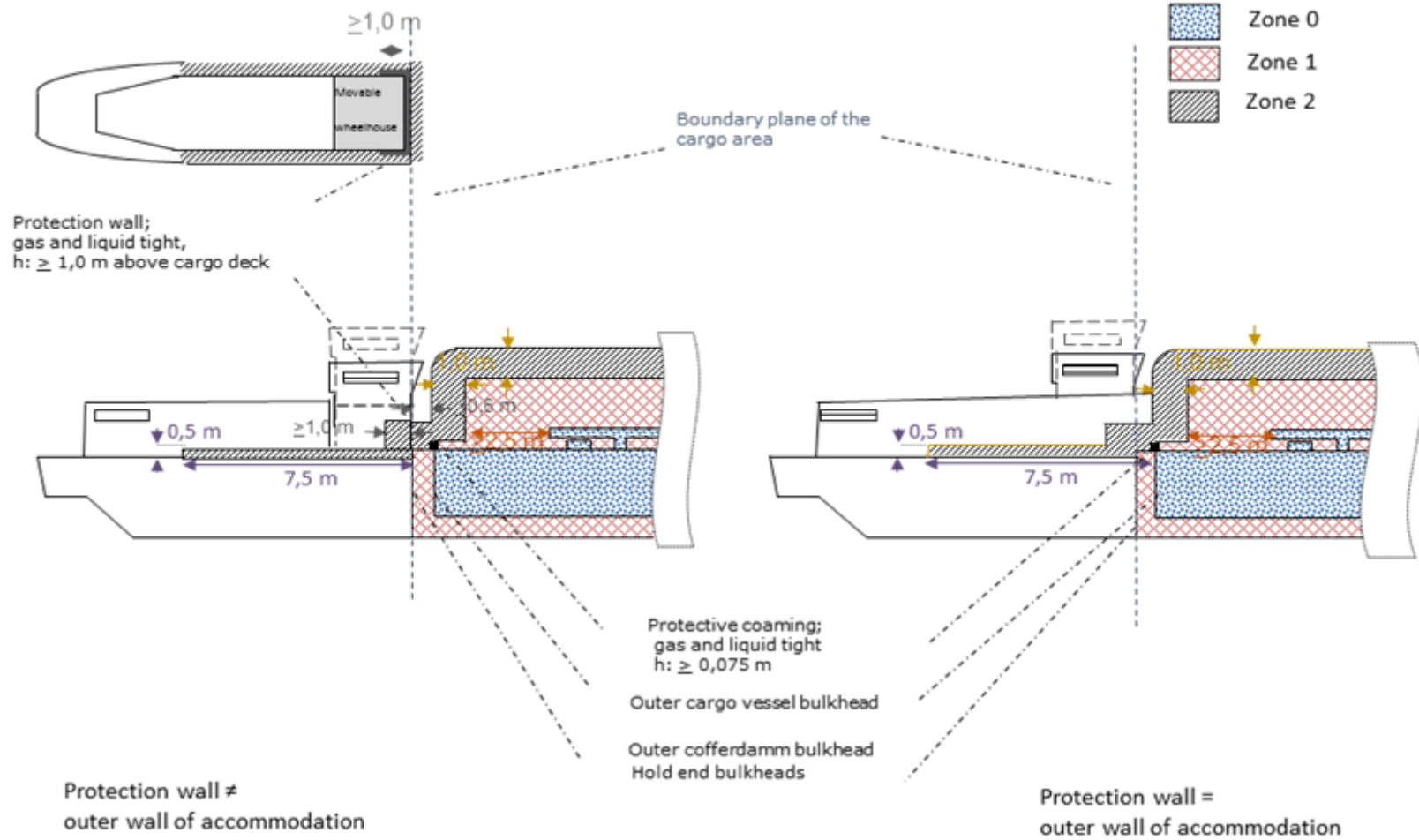
<i>Paragraphs</i>	<i>Modification</i>	<i>Reason / Explanation</i>
9.3.1.56.1 of ADN 2015	moved to 9.3.3.53.2 moved to 9.3.1.53.2	
9.3.2.56.2	moved to 9.3.2.52.6 and 9.3.2.53.4	
9.3.3.56.2	moved to 9.3.3.52.6 and 9.3.3.53.4	
9.3.1.56.2 of ADN 2015	moved to 9.3.1.52.6 and 9.3.1.53.4	
9.3.2.56.3	moved to 9.3.2.53.3	
9.3.3.56.3	moved to 9.3.3.53.3	
9.3.1.56.3 of ADN 2015	moved to 9.3.1.53.3	
9.3.2.56.4	moved to 9.3.2. 53.5	
9.3.3.56.4	moved to 9.3.3. 53.5	
9.3.1.56.4 of ADN 2015	moved to 9.3.1. 53.5	
9.3.2.56.5	moved to 9.3.2.52.4	
9.3.3.56.5	moved to 9.3.3.52.4	
9.3.1.56.5 of ADN 2015	moved to 9.3.1.52.4	
9.3.2.56.6	No longer necessary;	
9.3.3.56.6	Covered by 9.3.x.53.1	
9.3.1.56.6		

Annex 2

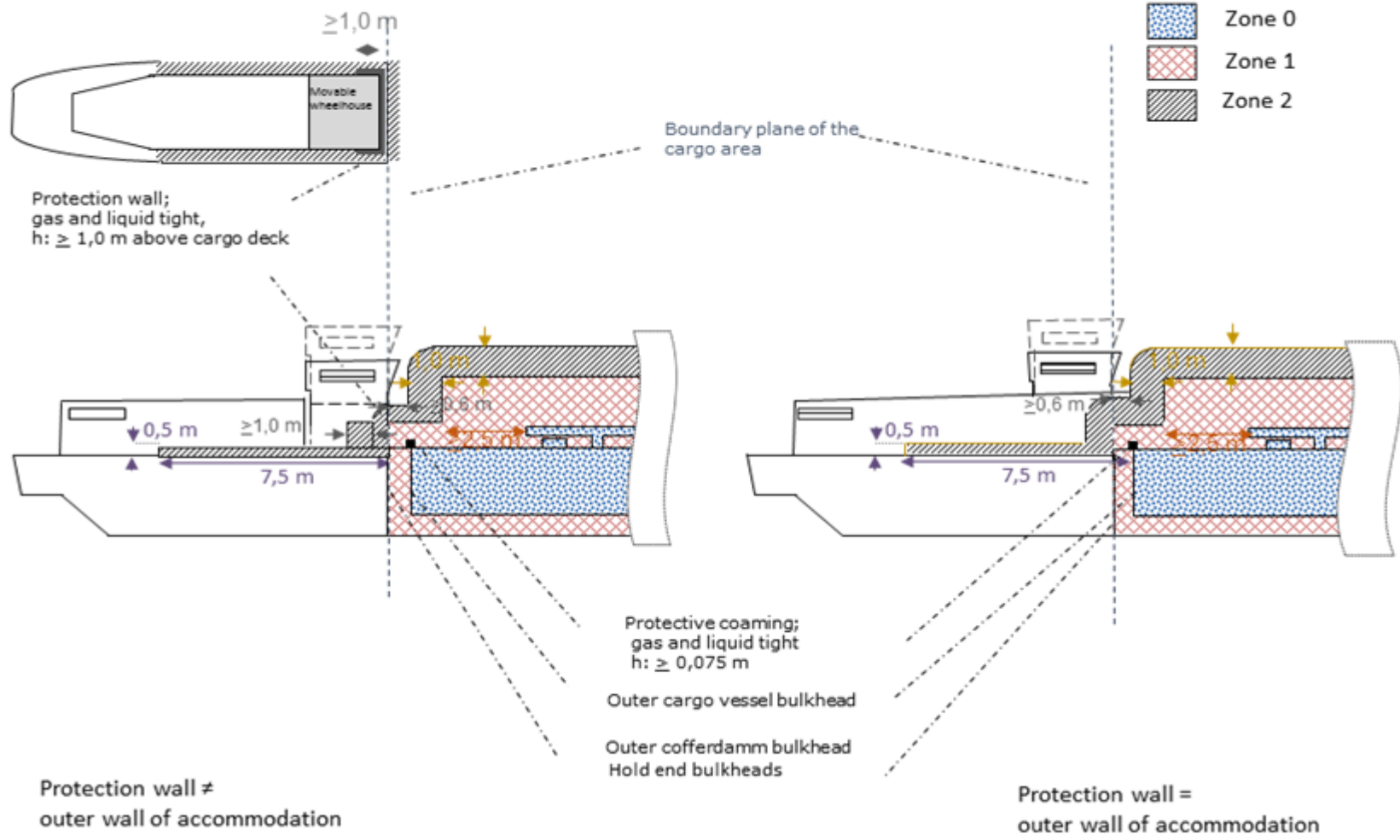
Zoning



No service spaces within cofferdam



Service spaces within cofferdam



Annex 3

Proposed changes to ADN not covered in Annex 1

1. Replace "Anti-explosion protection" by "explosion protection" in the following cases:

3.2.3.2 Table C column 17 header

3.2.3.1 Explanations concerning Table C, Column (17)

3.2.3.3 Flowchart, schemes and criteria for determining applicable special requirements (columns (6) to (20) of Table C), Column (15), Column (16), Column (17), Column (18)

3.2.3.3 Flowchart, schemes and criteria for determining applicable special requirements (columns (6) to (20) of Table C), G. Column (15), H. Column (16), I. Column (17), I. Column (17)

12.3 in the ADN Checklist, 9.3.2.22.4, 9.3.2.22.5, 9.3.2.26.4, 9.3.3.22.5, 9.3.3.26.4

2. Modify 7.2.4.16.1 to read as follows:

"7.2.4.16.1 The loading/unloading rate and the maximum operational pressure of the cargo pumps shall be determined in agreement with the personnel of the shore installation."
