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REPORTS OF INFORMAL WORKING GROUPS */

Report of the informal working group on the revision of Chapter 6.2

Transmitted by the European Industrial Gases Association (EIGA)

Introduction

1. The following is the outcome of the deliberations of the informal working group acting on the instructions in TRANS/WP.15/AC.1/96, paragraphs 39 to 41, TRANS/WP.15/AC.1/98, paragraphs 63 to 66, TRANS/WP.15/AC.1/100, paragraphs 99 to 101, TRANS/WP.15/AC.1/102, paragraphs 56 to 58, TRANS/WP.15/AC.1/104, paragraphs 61 to 67.

Report from the Working Group

2. The working group met on 12-13 October, 8-9 November and 20 to 22 November 2006 and representatives of Belgium, Finland, France, Germany, the Netherlands, Switzerland, the United Kingdom, the European Commission, the European Cylinder Makers Association (ECMA), the European Liquefied Petroleum Gas Association (AEGPL), the Independent Controllers Association (ACI), the European Industrial Gases Association (EIGA), the International Union of Private Wagons (UIP) and the International Tank Containers Organisation (ITCO) participated.

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3. As part of transferring the elements of Directive 99/36/EC (TPED) to ADR/RID, provisions were drafted for competent authorities, inspection bodies, their international co-operation, mutual recognition of inspection certificates and marking of the equipment.

A draft proposal had been prepared for the basis of discussion. The Joint Meeting in March 2006 had advised to locate this part of the Working Group's proposal under Chapter 1.8 of ADR/RID. A first draft of section 1.8.x was submitted to the Joint Meeting in September 2006 as informal document INF.28. The Working Group had also asked the opinion of the secretariats of the Joint Meeting on the additional tasks that the new provisions might bring about, if adopted. Comments were provided by the UNECE secretariat.

4. In a thorough discussion it became clear that the members of the Working Group could not agree on the principles of mutual recognition of inspection bodies and of the free use of certified receptacles in the territories of all those Contracting Parties that would be eligible for the mutual recognition scheme. In particular, there were doubts that within the legal framework of the RID and ADR the international co-operation procedures could provide the necessary confidence and safeguards.

5. Since the principles above were essential for most of the other provisions of the draft section 1.8.x, it was decided to leave out provisions for competent authorities, their international co-operation and marking as well. The only points that remained were provisions for the requirements for inspection bodies and for their approval, which basically were already available for UN pressure receptacles under section 6.2.5. The procedures for conformity assessment were seen as being administrative and therefore logically belonging more appropriately to section 1 alongside the requirements for competent authorities than to section 6 which is about technical requirements.

6. Rules for mutual recognition of inspection bodies and certificates and related issues in the European Union were left to be regulated under European Union law. However, there is a need for a clear understanding of the meaning of the word 'use' in ADR/RID. A proposal will be submitted to the Joint Meeting.

7. Since in practice there is already mutual recognition for Chapter 6.7 tanks there is no need to introduce new requirements.

8. This proposal does not update the references in Chapter 1.6 and the secretariat, are invited to take care of the consequential changes.

Proposals

9. The proposals in Annex 1 add two definitions in Chapter 1.2 and give the full text of the new sections of Chapter 1.8. A reworked Chapter 6.2 is given in Annex 2. New provisions for the conformity assessment of tanks in 6.8.4 are specified in Annex 3. Annex 4 lists provisions of RID/ADR 2007 which have been deleted and the justification for their deletion.

Annex 1Proposals for Part 1**Chapter 1.2**

It is proposed to add the following definitions in Chapter 1.2:

“*Conformity Assessment*’ means the process of verifying the conformity of a product according to the provisions of sections 1.8.6 and 1.8.7 related to the type approval, the supervision of manufacture and the initial inspection and testing;”.

“*Applicant*’ means, in the case of conformity assessment, the manufacturer or its authorised representative in a Contracting Party. In the case of periodic testing and exceptional checks;”.

“*applicant*’ means the testing facility, the operator or their authorised representative in a contracting party;”.

Chapter 1.8

It is proposed to add the following sections 1.8.6 and 1.8.7 in Chapter 1.8:

1.8.6 Administrative controls for application of the conformity assessments, periodic inspections, and exceptional checks described in 1.8.7

- 1.8.6.1 The competent authority may approve inspection bodies for conformity assessments, periodic inspections and exceptional checks as specified in section 1.8.7.
- 1.8.6.2 The competent authority shall ensure the monitoring of the inspection bodies and shall revoke or restrict the approval given, if it verifies that an approved body is no longer in compliance with the approval and the requirements of 1.8.6.4 or does not follow the procedures specified in the provisions of RID/ADR. The competent authority shall inform immediately the secretariats of the OTIF and the United Nations Economic Commission for Europe thereof. The secretariats shall act in accordance with 1.8.4.
- 1.8.6.3 If the approval is revoked or restricted or when the inspection body has ceased activity, the competent authority shall take the appropriate steps to ensure that the files are either processed by another inspection body or kept available.
- 1.8.6.4 The inspection body shall:
- (a) have a staff with an organisational structure, capable, trained, competent and skilled, to satisfactorily perform its technical functions;

- (b) have access to suitable and adequate facilities and equipment;
- (c) operate in an impartial manner and be free from any influence which could prevent it from doing so;
- (d) ensure commercial confidentiality of the commercial and proprietary activities of the manufacturer and other bodies;
- (e) maintain clear demarcation between actual inspection body functions and unrelated functions;
- (f) documented quality system;
- (g) ensure that the tests and inspections specified in the relevant standard and in the RID/ADR are performed; and
- (h) maintain an effective and appropriate report and record system in accordance with 1.8.7.

The inspection body shall additionally be accredited according to the standard EN-ISO/IEC 17020:2004, as specified in 6.2.3.6 and TA4 and TT9 of 6.8.4.

An inspection body starting a new activity may be approved temporarily. Before temporary designation, the competent authority shall ensure that the inspection body meets the requirements of the standard EN-ISO/IEC 17020:2004. The inspection body shall be accredited in its first year of activity to be able to continue the new activity.

1.8.7 Procedures for conformity assessment and periodic inspection

NOTE: In this section, “relevant body” means the bodies assigned in 6.2.3.6 when certifying pressure receptacles and in special provisions TA4 and TT9 in 6.8.4.

1.8.7.1 General provisions

1.8.7.1.1 The following procedures shall be applied according to the table in 6.2.3.6 when receptacles and according to TA4 and TT9 in 6.8.4 when certifying tanks, battery-vehicles/wagons and MEGCs.

1.8.7.1.2 Each application for

- (a) the type approval in accordance with 1.8.7.2 or;
- (b) the supervision of manufacture in accordance with 1.8.7.3 and the initial inspection and test in accordance with 1.8.7.4; or

- (c) the periodic inspection and exceptional checks in accordance with 1.8.7.5 shall be lodged by the applicant with a single competent authority, its delegate or an approved inspection body of his choice.

1.8.7.1.3 The application shall include:

- (a) the name and address of the applicant;
- (b) for conformity assessment where the applicant is not the manufacturer, the name and address of the manufacturer;
- (c) a written declaration that the same application has not been lodged with any other competent authority, its delegate or inspection body;
- (d) the relevant technical documentation specified in point 1.8.7.7;
- (e) a statement allowing the competent authority, its delegate or inspection body access for inspection purposes to the locations of manufacture, inspection, testing and storage and provide it with all necessary information.

1.8.7.1.4 Where the applicant can demonstrate to the satisfaction of the competent authority or its delegated inspection body conformity with 1.8.7.6 the applicant may establish an in-house inspection service which may perform part or all of the inspection and test when specified in 6.2.3.6.

1.8.7.2 Type approval

1.8.7.2.1 The applicant shall:

- (a) In the case of receptacles, place at the disposal of the relevant body representative samples of the production envisaged. The relevant body may request further samples if required by the test programme;
- (b) In the case of tanks, battery vehicles/wagons or MEGCs, give access to the prototype for type testing.

1.8.7.2.2 The relevant body shall:

- (a) examine the technical documentation specified in 1.8.7.7.1 to verify that the design is in accordance with the relevant provisions of the RID/ADR, and the prototype or the prototype lot has been manufactured in conformity with the technical documentation and is representative of the design;

- (b) perform the examinations and witness the tests specified in RID/ADR, to determine that the provisions have been applied and fulfilled, and the procedures adopted by the manufacturer meet the requirements;
- (c) check the certificate(s) issued by the materials manufacturer(s) against the relevant provisions of RID/ADR;
- (d) as applicable, approve the procedures for the permanent joining of parts or check that they have been previously approved, and verify that the staff undertaking the permanent joining parts and the non-destructive tests are qualified or approved;
- (e) agree with the applicant the location and testing facilities where the examinations and necessary tests are to be carried out.

The relevant body shall issue a type-examination report to the applicant.

1.8.7.2.3 Where the type satisfies all applicable provisions, the competent authority, its delegate or the inspection body, shall issue a type approval certificate.

This certificate shall contain:

- (a) the name and address of the issuer;
- (b) the name and address of the manufacturer;
- (c) a reference to the version of the RID/ADR and standards used for the type examination;
- (d) any requirements resulting from the examination;
- (e) the necessary data for identification of the type and variation, as defined by the relevant standard; and
- (f) the reference to the type examination report(s).

A list of the relevant parts of the technical documentation shall be annexed to the certificate (see 1.8.7.7.1).

1.8.7.3 *Supervision of manufacture*

1.8.7.3.1 The manufacturing process shall be subject to a survey by the relevant body to ensure the product is produced in conformity with the provisions of the type approval.

1.8.7.3.2 The applicant shall take all the necessary measures to ensure that the manufacturing process complies with the applicable provisions of RID/ADR and of the type approval certificate and its annexes.

1.8.7.3.3 The relevant body shall:

- (a) verify the conformity with the technical documentation specified in 1.8.7.7.2;
- (b) verify that the manufacturing process produces products in conformity with the requirements and the documentation which apply to it;
- (c) verify the traceability of materials and check the material certificate(s) against the specifications;
- (d) as applicable, verify that the personnel undertaking the permanent joining of parts and the non-destructive tests are qualified or approved;
- (e) agree with the applicant on the location where the examinations and necessary tests are to be carried out; and
- (f) record the results of its survey.

1.8.7.4 Initial inspection and tests

1.8.7.4.1 The applicant shall:

- (a) affix the marks specified in the RID/ADR; and
- (b) supply to the relevant body the technical documentation specified in 1.8.7.7.

1.8.7.4.2 The relevant body shall:

- (a) perform the necessary examinations and tests in order to verify that the product is manufactured in accordance with the type approval and the relevant provisions;
- (b) check the certificates supplied by the manufacturers of service equipment against the service equipment;
- (c) issue an initial inspection and test report to the applicant relating to the detailed tests and verifications carried out and the verified technical documentation; and
- (d) draw up a written certificate of conformity of the manufacture and affix its registered mark when the manufacture satisfies the provisions.

The certificate and report may cover a number of items of the same type (group certificate or report).

1.8.7.4.3 The certificate shall contain as a minimum:

- (a) the name and address of the relevant body;
- (b) the name and address of the manufacturer and the name and address of the applicant, if not the manufacturer;
- (c) a reference to the version of the RID/ADR and standards used for the initial inspections and tests;
- (d) the results of the inspections and tests;
- (e) the data for identification of the inspected product(s), at least the serial number or for non refillable cylinders the batch number; and
- (f) the type approval number.

1.8.7.5 *Periodic inspection and exceptional checks*

The relevant body shall:

- (a) perform the identification and verify the conformity with the documentation;
- (b) carry out the inspections and witness the tests in order to check that the requirements are met;
- (c) issue reports of the results of the inspections and tests, which may cover a number of items; and
- (d) ensure that the required marks are applied.

1.8.7.6 *Surveillance of the applicant's in-house inspection service*

1.8.7.6.1 The applicant shall

- (a) implement an in-house inspection service with a quality system for inspections and tests documented in section 1.8.7.7.5 and be subject to surveillance;
- (b) fulfil the obligations arising out of the quality system as approved and to ensure that it remains satisfactory and efficient;

- (c) appoint trained and competent personnel for the in-house inspection service; and
- (d) affix the registered mark of the inspection body where appropriate.

1.8.7.6.2 The inspection body shall carry out an initial audit. If satisfactory the inspection body shall issue an authorisation for a period not exceeding three years. The following provisions shall be met:

- (a) This audit shall confirm that the inspections and tests performed on the product are in compliance with the requirements of RID/ADR;
- (b) The inspection body may authorise the in-house inspection service of the applicant to affix the registered mark of the inspection body to each approved product;
- (c) The authorisation may be renewed after a satisfactory audit in the last year prior to the expiry. The new period of validity shall begin with the date of expiry of the authorisation; and
- (d) the auditors of the inspection body shall be competent to carry out the assessment of conformity of the product covered by the quality system.

1.8.7.6.3 The inspection body shall carry out periodic audits within the duration of the authorisation to make sure that the applicant maintains and applies the quality system. The following provisions shall be met:

- (a) A minimum of two audits shall be carried out in a 12 month period;
- (b) The inspection body may require additional visits, training, technical changes, modifications of the quality system, restrict or prohibit the inspections and tests to be done by the applicant;
- (c) The inspection body shall assess any changes in the system and decide whether the modified quality system will still satisfy the requirements of the initial audit or whether a full reassessment is required;
- (d) The auditors of the inspection body shall be competent to carry out the assessment of conformity of the product covered by the quality system; and
- (e) The inspection body shall provide the applicant with a visit or audit report and, if a test has taken place, with a test report.

1.8.7.6.4 In cases of non conformity with the relevant requirements the inspection body shall ensure that corrective measures are taken. If corrective measures are not taken in due time, the inspection body shall suspend or withdraw the permission

for the in-house inspection service to carry out its activities. The notice of suspension or withdrawal shall be transmitted to the competent authority. A report shall be provided to the applicant giving detailed reasons for the decisions taken by the inspection body.

1.8.7.7 Documents

The technical documentation shall enable an assessment to be made of conformity with the relevant requirements.

1.8.7.7.1 Documents for type approval

The applicant shall provide as appropriate:

- (a) The list of standards used for the design and manufacture;
- (b) A description of the type including all variations;
- (c) The instructions according to the relevant column of table A of Chapter 3.2 or a list of dangerous goods to be transported for dedicated products;
- (d) A general assembly drawing or drawings;
- (e) The detailed drawings including the dimensions used for the calculations, of the product, the service equipment, the structural equipments , the marking and/or the labelling necessary to verify the conformity;
- (f) The calculation notes, results and conclusions;
- (g) The list of the service equipment and description of the functioning of the equipment, including logic diagrams of functioning between service equipments, description of the flow diagram and logical commands and diagrams of the service equipment when applicable within a use manual;
- (h) The list of material requested in the standard for manufacture used for every part, sub-part, lining, service and structural equipment and the corresponding material specifications or the corresponding declaration of conformity to RID./ADR and other applicable regulations;
- (i) The approved qualification of permanent joining process;
- (j) The description of the heat treatment process(es); and
- (k) The procedures, descriptions and records of all relevant tests listed in the standards or RID/ADR for the type approval and for the manufacture.

1.8.7.7.2 Documents for the supervision of manufacture

The applicant shall make available as appropriate:

- (a) The documents listed in 1.8.7.7.1;
- (b) The manufacturing procedures including test procedures;
- (c) The manufacturing records;
- (d) The approved qualifications of permanent joining operators;
- (e) The approved qualifications of the non destructive test operators;
- (f) The reports of the destructive and non destructive tests;
- (g) The heat treatment records; and
- (e) The calibration records.

1.8.7.7.3 Documents for initial inspection and tests

The applicant shall make available as appropriate:

- (a) The documents listed in 1.8.7.7.1 and 1.8.7.7.2;
- (b) The material certificates of the product and any sub-parts;
- (c) The declarations of conformity and material certificates of the service equipment; and
- (d) A declaration of conformity including the description of the product and all the variations adopted from the type approval.

1.8.7.7.4 Documents for periodic inspections and exceptional checks

The applicant shall make available as appropriate:

- (a) For receptacles, the documents specifying special requirements when the manufacturing and periodic inspections and tests standards so require;
- (b) For tanks;
 - (i) the tank report; and
 - (ii) one or more of the documents mentioned in 1.8.7.7.1 to 1.8.7.7.3.

1.8.7.7.5 Documents for the assessment of in-house inspection service

The applicant for in-house inspection service shall make available the quality system documentation as appropriate:

- (a) The organisational structure and responsibilities;
- (b) The relevant inspection and test, quality control, quality assurance and process operation instructions, and systematic actions that will be used;
- (c) The quality records, such as inspection reports, test data, calibration data and certificates;
- (d) The management reviews to ensure the effective operation of the quality system arising from the audits in accordance with 1.8.7.6;
- (e) The process describing how customer and regulation requirements are met;
- (f) The process for control of documents and their revision;
- (g) The procedures for dealing with non-conforming products; and
- (h) Training programmes and qualification procedures for relevant personnel.

1.8.7.8 Products manufactured, approved, inspected and tested according to standards

The requirements of 1.8.7.7 are considered to have been complied with if the following standards, as relevant, are applied:

Applicable subsection and paragraph	References	Title of the document
1.8.7.7.1 to 1.8.7.7.4	EN 12972 : 2001	Tank for the transport of dangerous goods/inspections and tests.

Annex 2

Proposal for a revised Chapter 6.2

Introduction

The following is a revised version of TRANS/WP.15/AC.1/2005/47. The comments from the working group are shown in boxes at the relevant points, but one issue requires further explanation.

Paragraph 6.2.1.3.4, suggested amendment to P200 (2) concerning pressure relief devices. The bracketed UN text presents the following problems:

- Which is the country of use, the country where the pressure receptacle is filled or where emptied?
- If individual countries specify that pressure relief devices shall or shall not be used, it will prevent transport of the pressure receptacles in countries which apply differing rules.

The working group proposes that the existing RID/ADR situation is preserved by deleting the text in square brackets.

Explanations

In sections 6.2.1 and 6.2.2, the text is from the 14th revised edition of the UN Recommendations on the Transport of Dangerous Goods as modified by ST/SG/AC.10/C.3/2006/101 and departures from the text of the UN are shown underlined. In sections 6.2.3 to 6.2.5 the text is from RID/ADR 2007, again with underlining showing the changes. Annex 4 shows text discarded from RID/ADR with reasons for its discontinuance. There are no changes in the 12 pages of UN text from paragraph 6.2.2.1 to 6.2.2.6.6, but it is shown for completeness.

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- 6.2.6 General requirements for aerosol dispensers and small receptacles containing gas (gas cartridges)

CHAPTER 6.2

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PRESSURE RECEPTACLES, AEROSOL DISPENSERS AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES)

6.2.1 General requirements

NOTE: ~~For aerosol dispensers and small receptacles containing gas (gas cartridges) are subject only to the requirements of 6.2.6 see 6.2.4.~~

6.2.1.1 Design and construction

6.2.1.1.1 Pressure receptacles and their closures shall be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during normal conditions of transport carriage and use.

6.2.1.1.2 ~~In recognition of scientific and technological advances, and recognizing that pressure receptacles other than those that are marked with a UN certification marking may be used on a national or regional basis, pressure receptacles conforming to requirements other than those specified in these Regulations may be used if approved by the competent authorities in the countries of transport and use. (*Reserved*)~~

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| <ol style="list-style-type: none">1. The Note is amended to clarify that aerosol dispensers and gas cartridges are uniquely not subject to the sections preceding 6.2.6.2. Carriage replaces transport as is customary in RID/ADR and RID/ADR already specifies that use should be considered in the design.3. 6.2.1.1.2 is deleted since this point is covered in the existing ADR 6.2.3 and is more appropriately placed in the new 6.2.5 |
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6.2.1.1.3 In no case shall the minimum wall thickness be less than that specified in the design and construction technical standards.

6.2.1.1.4 For welded pressure receptacles, only metals of weldable quality shall be used.

6.2.1.1.5 The test pressure of for cylinders, tubes, pressure drums and bundles of cylinders shall be in accordance with packing instruction P200. The test pressure for closed cryogenic receptacles shall be in accordance with packing instruction P203.

6.2.1.1.6 Pressure receptacles assembled in bundles shall be structurally supported and held together as a unit. Pressure receptacles shall be secured in a manner that prevents movement in relation to the structural assembly and movement that would result in the concentration of harmful local stresses. Manifold assemblies (e.g. manifold, valves, and pressure gauges) shall be designed and constructed such that they are

protected from impact damage and forces normally encountered in transport. Manifolds shall have at least the same test pressure as the cylinders. For toxic liquefied gases, each pressure receptacle shall have an isolation valve to ensure that each pressure receptacle can be filled separately and that no interchange of pressure receptacle contents can occur during transport carriage.

NOTE: Toxic liquefied gases have the classification codes 2T, 2TF, 2TC, 2TO, 2TFC or 2TOC

- 6.2.1.1.7 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.
- 6.2.1.1.8 Additional requirements for the construction of closed cryogenic receptacles for refrigerated liquefied gases
- 6.2.1.1.8.1 The mechanical properties of the metal used shall be established for each pressure receptacle, including the impact strength and the bending coefficient.

NOTE: With regard to the impact strength, 6.8.5.3 gives details of test requirements which may be used.

- 6.2.1.1.8.2 The pressure receptacles shall be thermally insulated. The thermal insulation shall be protected against impact by means of a jacket. If the space between the pressure receptacle and the jacket is evacuated of air (vacuum-insulation), the jacket shall be designed to withstand without permanent deformation an external pressure of at least 100 kPa (1 bar) calculated in accordance with a recognised technical code or a calculated critical collapsing pressure of not less than 200 kPa (2 bar) gauge pressure. If the jacket is so closed as to be gas-tight (e.g. in the case of vacuum-insulation), a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the pressure receptacle or its fittings. The device shall prevent moisture from penetrating into the insulation.
- 6.2.1.1.8.3 Closed cryogenic receptacles intended for the transport carriage of refrigerated liquefied gases having a boiling point below $-182\text{ }^{\circ}\text{C}$ at atmospheric pressure shall not include materials which may react with oxygen or oxygen enriched atmospheres in a dangerous manner, when located in parts of the thermal insulation where there is a risk of contact with oxygen or with oxygen enriched liquid.
- 6.2.1.1.8.4 Closed cryogenic receptacles shall be designed and constructed with suitable lifting and securing arrangements.
- 6.2.1.1.9 *Additional requirements for the construction of pressure receptacles for acetylene*

Pressure receptacles for UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free, shall be filled with a porous material, uniformly distributed, of a type

that conforms to the requirements and testing specified by the competent authority and which:

- (a) is compatible with the pressure receptacle and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001; and
- (b) is capable of preventing the spread of decomposition of the acetylene in the material.

In the case of UN 1001, the solvent shall be compatible with the pressure receptacles.

6.2.1.2 *Materials*

6.2.1.2.1 Construction materials of pressure receptacles and their closures which are in direct contact with dangerous goods shall not be affected or weakened by the dangerous goods intended and shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods.

6.2.1.2.2 Pressure receptacles and their closures shall be made of the materials specified in the design and construction technical standards and the applicable packing instruction for the substances intended for ~~transport~~carriage in the pressure receptacle. The materials shall be resistant to brittle fracture and to stress corrosion cracking as indicated in the design and construction technical standards.

6.2.1.3 *Service equipment*

6.2.1.3.1 Valves, piping and other fittings subjected to pressure, excluding pressure relief devices, shall be designed and constructed so that the burst pressure is at least 1.5 times the test pressure of the pressure receptacle.

6.2.1.3.2 Service equipment shall be configured or designed to prevent damage that could result in the release of the pressure receptacle contents during normal conditions of handling and ~~transport~~carriage. Manifold piping leading to shut-off valves shall be sufficiently flexible to protect the valves and the piping from shearing or releasing the pressure receptacle contents. The filling and discharge valves and any protective caps shall be capable of being secured against unintended opening. Valves shall be protected as specified in 4.1.6.1.8.

Additional amendments to RID/ADR 4.1.6.8 to align with the UN Model Regulations

- (i) Delete '(d) Valves are placed in a protective frame;' and renumber (e) and (f) accordingly. This text, which appears in RID/ADR only, allows a technical solution believed not to be in use any more. The use of a 'frame' protecting a valve would come within the meaning of a guard or shroud and as such shall be subject to

the drop test specified in EN 962 or ISO 11117.

- (ii) Add a new sentence to the new (e); 'For UN pressure receptacles the packaging as prepared for carriage shall be capable of meeting the drop test specified in 6.1.5.3 at the packing group I performance level.'

Explanatory note: The use of PG I packagings was discussed at previous Joint Meetings when UN pressure receptacle text was adopted and it was agreed that such a robust packaging has not been found necessary in European land transport.

- 6.2.1.3.3 Pressure receptacles which are not capable of being handled manually or rolled, shall be fitted with devices (skids, rings, straps) ensuring that they can be safely handled by mechanical means and so arranged as not to impair the strength of, nor cause undue stresses in, the pressure receptacle.
- 6.2.1.3.4 Individual pressure receptacles shall be equipped with pressure relief devices as specified in P200 (1 2) or 6.2.1.3.6.4 and 6.2.1.3.6.5. Pressure-relief devices shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure. When fitted, pressure relief devices on manifolded horizontal pressure receptacles filled with flammable gas shall be arranged to discharge freely to the open air in such a manner as to prevent any impingement of escaping gas upon the pressure receptacle itself under normal conditions of ~~transport~~ carriage.

An additional amendment to RID/ADR P200 (2) is needed to align it with the UN Model Regulations.

Add the following text to P200 (2):

The following requirements shall be applied to UN pressure receptacles: Pressure relief devices shall be fitted on pressure receptacles used for the transport of UN No. 1013 carbon dioxide and UN No. 1070 nitrous oxide. [Other pressure receptacles shall be fitted with a pressure relief device if specified by the competent authority of the country of use. The type of pressure relief device, the set to discharge pressure and relief capacity of pressure relief devices, if required, shall be specified by the competent authority of the country of use;]

The working group recommends deviating from the UN Model Regulations by excluding the text between square brackets; the reasons are explained in the report of the working group paragraph 1.

NOTE: The format of UN Numbers has been changed from UN format (UN 1013) to the current RID/ADR format (UN No. 1013). The working group recommends that the RID/ADR should align with the UN format.

6.2.1.3.5 Pressure receptacles whose filling is measured by volume shall be provided with a level indicator.

6.2.1.3.6 *Additional requirements for closed cryogenic receptacles*

6.2.1.3.6.1 Each filling and discharge opening in a closed cryogenic receptacle used for the ~~transport~~-carriage of flammable refrigerated liquefied gases shall be fitted with at least two mutually independent shut-off devices in series, the first being a stop-valve, the second being a cap or equivalent device.

6.2.1.3.6.2 For sections of piping which can be closed at both ends and where liquid product can be trapped, a method of automatic pressure-relief shall be provided to prevent excess pressure build-up within the piping.

6.2.1.3.6.3 Each connection on a closed cryogenic receptacle shall be clearly marked to indicate its function (e.g. vapour or liquid phase).

6.2.1.3.6.4 Pressure-relief devices

6.2.1.3.6.4.1

Every closed cryogenic receptacle shall be provided with at least one pressure-relief device. The pressure-relief device shall be of the type that will resist dynamic forces including surge.

6.2.1.3.6.4.2

Closed cryogenic receptacles may, in addition, have a frangible disc in parallel with the spring loaded device(s) in order to meet the requirements of 6.2.1.3.6.5.

6.2.1.3.6.4.3

Connections to pressure-relief devices shall be of sufficient size to enable the required discharge to pass unrestricted to the pressure-relief device.

6.2.1.3.6.4.4

All pressure-relief device inlets shall under maximum filling conditions be situated in the vapour space of the closed cryogenic receptacle and the devices shall be so arranged as to ensure that the escaping vapour is discharged unrestrictedly.

6.2.1.3.6.5 Capacity and setting of pressure-relief devices

NOTE: *In relation to pressure-relief devices of closed cryogenic receptacles, maximum allowable working pressure (MAWP) means the maximum effective gauge pressure permissible at the top of a loaded closed cryogenic receptacle in its operating position including the highest effective pressure during filling and discharge.*

1. Maximum allowable working pressure is written in full for user-friendliness.
2. A consequential amendment is required in ADR/RID 1.2.1 for the reference in the **NOTE 2** in the definition of *maximum working pressure* as follows.

NOTE 2: *For closed cryogenic receptacles, see NOTE to ~~6.2.1.3.3.5~~ 6.2.1.3.6.5.*

6.2.1.3.6.5.1

The pressure-relief device shall open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110% of the MAWP. It shall, after discharge, close at a pressure not lower than 10% below the pressure at which discharge starts and shall remain closed at all lower pressures.

6.2.1.3.6.5.2

Frangible discs shall be set to rupture at a nominal pressure which is the lower of either the test pressure or 150% of the MAWP.

6.2.1.3.6.5.3

In the case of the loss of vacuum in a vacuum-insulated closed cryogenic receptacle the combined capacity of all pressure-relief devices installed shall be sufficient so that the pressure (including accumulation) inside the closed cryogenic receptacle does not exceed 120% of the MAWP.

6.2.1.3.6.5.4

The required capacity of the pressure-relief devices shall be calculated in accordance with an established technical code recognized by the competent authority¹.

6.2.1.4 *Initial inspection and test*

- 6.2.1.4.1 New pressure receptacles, other than closed cryogenic receptacles, shall be subjected to testing and inspection during and after manufacture in accordance with the applicable design standards including the following:

On an adequate sample of pressure receptacles:

¹ See for example CGA Publications S-1.2-2003 "Pressure Relief Device Standards-Part 2-Cargo and Portable Tanks for Compressed Gases" and S-1.1-2003 "Pressure Relief Device Standards-Part 1-Cylinders for Compressed Gases".

- (a) Testing of the mechanical characteristics of the material of construction;
- (b) Verification of the minimum wall thickness;
- (c) Verification of the homogeneity of the material for each manufacturing batch;
- (d) Inspection of the external and internal conditions of the pressure receptacles;
- (e) Inspection of the neck threads;
- (f) Verification of the conformance with the design standard;

For all pressure receptacles:

- (g) A hydraulic pressure test. Pressure receptacles shall withstand the test pressure without expansion greater than that allowed in the design specification;

NOTE: With the agreement of the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.

- (h) Inspection and assessment of manufacturing defects and either repairing them or rendering the pressure receptacles unserviceable. In the case of welded pressure receptacles, particular attention shall be paid to the quality of the welds;
- (i) An inspection of the markings on the pressure receptacles;
- (j) In addition, pressure receptacles intended for the ~~transport~~ carriage of UN No. 1001 acetylene, dissolved, and UN No. 3374 acetylene, solvent free, shall be inspected to ensure proper installation and condition of the porous material and, if applicable, the quantity of solvent.

6.2.1.4.2 On an adequate sample of closed cryogenic receptacles, the inspections and tests specified in 6.2.1.4.1 (a), (b), (d) and (f) shall be performed. In addition, welds shall be inspected by radiographic, ultrasonic or another suitable non-destructive test method on a sample of closed cryogenic receptacles according to the applicable design and construction standard. This weld inspection does not apply to the jacket.

Additionally, all closed cryogenic receptacles shall undergo the initial inspections and tests specified in 6.2.1.4.1 (g), (h) and (i), as well as a leakproofness test and a test of the satisfactory operation of the service equipment after assembly.

6.2.1.5 *Periodic inspection and test*

6.2.1.5.1 Refillable pressure receptacles, other than cryogenic receptacles, shall be subjected to periodic inspections and tests by a body authorized by the competent authority, in accordance with the following:

- (a) Check of the external conditions of the pressure receptacle and verification of the equipment and the external markings;
- (b) Check of the internal conditions of the pressure receptacle (e.g. internal inspection, verification of minimum wall thickness);
- (c) Checking of the threads if there is evidence of corrosion or if the fittings are removed;
- (d) A hydraulic pressure test and, if necessary, verification of the characteristics of the material by suitable tests.

NOTE 1: *With the agreement of the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.*

NOTE 2: *With the agreement of the competent authority, the hydraulic pressure test of cylinders or tubes may be replaced by an equivalent method based on acoustic emission testing, ultrasonic examination or a combination of acoustic emission testing and ultrasonic examination.*

NOTE 3: *For periodicities see P200.*

NOTE 3 is added for user-friendliness.

A consequential amendment is required in 4.1.4.1 P200 (8), 4.1.6.4 and 4.1.6.10; change the reference from 6.2.1.6 to 6.2.1.5.

6.2.1.5.2 For pressure receptacles intended for the ~~transport-carriage~~ of UN No. 1001 acetylene, dissolved and UN No. 3374 acetylene, solvent free, only the external condition (corrosion, deformation) and the condition of the porous material (loosening, settlement) shall be required to be examined.

6.2.1.6 *Approval of pressure receptacles*

6.2.1.6.1 The conformity of pressure receptacles shall be assessed at time of manufacture as required by the competent authority. Pressure receptacles shall be inspected, tested and approved by an inspection body. The technical documentation shall include full specifications on design and construction, and full documentation on the manufacturing and testing.

6.2.1.6.2 Quality assurance systems shall conform to the requirements of the competent authority.

6.2.1.7 *Requirements for manufacturers*

6.2.1.7.1 The manufacturer shall be technically able and shall possess all resources required for the satisfactory manufacture of pressure receptacles; this relates in particular to qualified personnel:

- (a) to supervise the entire manufacturing process;
- (b) to carry out joining of materials; and
- (c) to carry out the relevant tests.

6.2.1.7.2 The proficiency test of a manufacturer shall in all instances be carried out by an inspection body approved by the competent authority of the country of approval.

6.2.1.8 *Requirements for inspection bodies*

6.2.1.8.1 Inspection bodies shall be independent from manufacturing enterprises and competent to perform the tests, inspections and approvals required.

6.2.2 *Requirements for UN pressure receptacles*

In addition to the general requirements of section 6.2.1, UN pressure receptacles shall comply with the requirements of this section, including the standards, as applicable.

NOTE: With the agreement of the competent authority, more recently published versions of the standards, if available, may be used.

6.2.2.1 *Design, construction and initial inspection and test*

6.2.2.1.1 The following standards apply for the design, construction, and initial inspection and test of UN cylinders, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

ISO 9809-1:1999	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 Mpa <i>NOTE: The note concerning the F factor in section 7.3 of this standard shall not be applied for UN cylinders.</i>
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ISO 9809-2:2000	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1100 MPa
ISO 9809-3:2000	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 3: Normalized steel cylinders
ISO 7866:1999	Gas cylinders – Refillable seamless aluminium alloy gas cylinders – Design, construction and testing <i>NOTE: The note concerning the F factor in section 7.2 of this standard shall not be applied for UN cylinders. Aluminium alloy 6351A – T6 or equivalent shall not be authorized.</i>
ISO 11118:1999	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods
ISO11119-1:2002	Gas cylinders of composite construction – Specification and test methods – Part 1: Hoop wrapped composite gas cylinders
ISO11119-2:2002	Gas cylinders of composite construction – Specification and test methods – Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners
ISO11119-3:2002	Gas cylinders of composite construction – Specification and test methods – Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners

NOTE 1: *In the above referenced standards composite cylinders shall be designed for unlimited service life.*

NOTE 2: *After the first 15 years of service, composite cylinders manufactured according to these standards, may be approved for extended service by the competent authority which was responsible for the original approval of the cylinders and which will base its decision on the test information supplied by the manufacturer or owner or user.*

6.2.2.1.2 The following standards apply for the design, construction, and initial inspection and test of UN tubes, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

ISO 11120:1999	Gas cylinders – Refillable seamless steel tubes for compressed gas transport, of water capacity between 150 l and 3000 l – Design, construction and testing <i>NOTE: The note concerning the F factor in section 7.1 of this standard shall not be applied for UN tubes</i>
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- 6.2.2.1.3 The following standards apply for the design, construction and initial inspection and test of UN acetylene cylinders, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

For the cylinder shell:

ISO 9809-1:1999	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa <i>NOTE: The note concerning the F factor in section 7.3 of this standard shall not be applied for UN cylinders.</i>
ISO 9809-3:2000	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 3: Normalized steel cylinders

For the porous material in the cylinder:

ISO 3807-1:2000	Cylinders for acetylene – Basic requirements – Part 1: Cylinders without fusible plugs
ISO 3807-2:2000	Cylinders for acetylene – Basic requirements – Part 2: Cylinders with fusible plugs

- 6.2.2.1.4 The following standards apply for the design, construction, and initial inspection and test of UN cryogenic receptacles, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

ISO 21029-1:2004	Cryogenic vessels – Transportable vacuum insulated vessels of not more than 1000 l volume – Part 1: Design, fabrication, inspection and tests
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6.2.2.2 *Materials*

In addition to the material requirements specified in the pressure receptacle design and construction standards, and any restrictions specified in the applicable packing instruction for the gas(es) to be ~~transported~~carried (e.g. packing instruction P200), the following standards apply to material compatibility:

ISO 11114-1:1997	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic materials
ISO 11114-2:2000	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic materials

6.2.2.3 Service equipment

The following standards apply to closures and their protection:

ISO 11117:1998	Gas cylinders – Valve protection caps and valve guards for industrial and medical gas cylinders – Design, construction and tests
ISO 10297:1999	Gas cylinders – Refillable gas cylinder valves – Specification and type testing

6.2.2.4 Periodic inspection and test

The following standards apply to the periodic inspection and testing of UN cylinders:

ISO 6406:2005	Periodic inspection and testing of seamless steel gas cylinders
ISO 10461:2005	Seamless aluminium – alloy gas cylinders – Periodic inspection and testing
ISO 10462:2005	Cylinders for dissolved acetylene – Periodic inspection and maintenance
ISO 11623:2002	Transportable gas cylinders – Periodic inspection and testing of composite gas cylinders

6.2.2.5 Conformity assessment system and approval for manufacture of pressure receptacles**6.2.2.5.1 Definitions**

For the purposes of this section:

Conformity assessment system means a system for competent authority approval of a manufacturer, by pressure receptacle design type approval, approval of manufacturer's quality system and approval of inspection bodies;

Design type means a pressure receptacle design as specified by a particular pressure receptacle standard;

Verify means confirm by examination or provision of objective evidence that specified requirements have been fulfilled;

6.2.2.5.2 *General requirements*

Competent authority

6.2.2.5.2.1 The competent authority that approves the pressure receptacle shall approve the conformity assessment system for the purpose of ensuring that pressure receptacles conform to the requirements of these Regulations. In instances where the competent authority that approves a pressure receptacle is not the competent authority in the country of manufacture, the marks of the approval country and the country of manufacture shall be indicated in the pressure receptacle marking (see 6.2.2.7 and 6.2.2.8).

The competent authority of the country of approval shall supply, upon request, evidence demonstrating compliance to this conformity assessment system to its counterpart in a country of use.

6.2.2.5.2.2 The competent authority may delegate its functions in this conformity assessment system in whole or in part.

6.2.2.5.2.3 The competent authority shall ensure that a current list of approved inspection bodies and their identity marks and approved manufacturers and their identity marks is available.

Inspection body

6.2.2.5.2.4 The inspection body shall be approved by the competent authority for the inspection of pressure receptacles and shall:

- (a) have a staff with an organisational structure, capable, trained, competent, and skilled, to satisfactorily perform its technical functions;
- (b) have access to suitable and adequate facilities and equipment;
- (c) operate in an impartial manner and be free from any influence which could prevent it from doing so;
- (d) ensure commercial confidentiality of the commercial and proprietary activities of the manufacturer and other bodies;
- (e) maintain clear demarcation between actual inspection body functions and unrelated functions;
- (f) operate a documented quality system;
- (g) ensure that the tests and inspections specified in the relevant pressure receptacle standard and these Regulations are performed; and

- (h) maintain an effective and appropriate report and record system in accordance with 6.2.2.5.6.

6.2.2.5.2.5 The inspection body shall perform design type approval, pressure receptacle production testing and inspection, and certification to verify conformity with the relevant pressure receptacle standard (see 6.2.2.5.4 and 6.2.2.5.5).

Manufacturer

6.2.2.5.2.6 The manufacturer shall:

- (a) operate a documented quality system in accordance with 6.2.2.5.3;
- (b) apply for design type approvals in accordance with 6.2.2.5.4;
- (c) select an inspection body from the list of approved inspection bodies maintained by the competent authority in the country of approval; and
- (d) maintain records in accordance with 6.2.2.5.6.

Testing laboratory

6.2.2.5.2.7 The testing laboratory shall have:

- (a) staff with an organisational structure, sufficient in number, competence, and skill; and
- (b) suitable and adequate facilities and equipment to perform the tests required by the manufacturing standard to the satisfaction of the inspection body.

6.2.2.5.3 *Manufacturer's quality system*

6.2.2.5.3.1 The quality system shall contain all the elements, requirements, and provisions adopted by the manufacturer. It shall be documented in a systematic and orderly manner in the form of written policies, procedures and instructions.

The contents shall in particular include adequate descriptions of:

- (a) the organisational structure and responsibilities of personnel with regard to design and product quality;
- (b) the design control and design verification techniques, processes, and procedures that will be used when designing the pressure receptacles;
- (c) the relevant pressure receptacle manufacturing, quality control, quality assurance and process operation instructions that will be used;

- (d) quality records, such as inspection reports, test data and calibration data;
- (e) management reviews to ensure the effective operation of the quality system arising from the audits in accordance with 6.2.2.5.3.2;
- (f) the process describing how customer requirements are met;
- (g) the process for control of documents and their revision;
- (h) the means for control of non-conforming pressure receptacles, purchased components, in - process and final materials; and
- (i) training programmes and qualification procedures for relevant personnel.

6.2.2.5.3.2 Audit of the quality system

The quality system shall be initially assessed to determine whether it meets the requirements in 6.2.2.5.3.1 to the satisfaction of the competent authority.

The manufacturer shall be notified of the results of the audit. The notification shall contain the conclusions of the audit and any corrective actions required.

Periodic audits shall be carried out, to the satisfaction of the competent authority, to ensure that the manufacturer maintains and applies the quality system. Reports of the periodic audits shall be provided to the manufacturer.

6.2.2.5.3.3 Maintenance of the quality system

The manufacturer shall maintain the quality system as approved in order that it remains adequate and efficient. The manufacturer shall notify the competent authority that approved the quality system, of any intended changes. The proposed changes shall be evaluated in order to determine whether the amended quality system will still satisfy the requirements in 6.2.2.5.3.1.

6.2.2.5.4 *Approval process*

Initial design type approval

6.2.2.5.4.1 The initial design type approval shall consist of approval of the manufacturer's quality system and approval of the pressure receptacle design to be produced. An application for an initial design type approval shall meet the requirements of 6.2.2.5.4.2 to 6.2.2.5.4.6 and 6.2.2.5.4.9.

6.2.2.5.4.2 A manufacturer desiring to produce pressure receptacles in accordance with a pressure receptacle standard and these Regulations shall apply for, obtain, and

retain a design type approval certificate issued by the competent authority in the country of approval for at least one pressure receptacle design type in accordance with the procedure given in 6.2.2.5.4.9. This certificate shall, on request, be submitted to the competent authority of the country of use.

- 6.2.2.5.4.3 An application shall be made for each manufacturing facility and shall include:
- (a) the name and registered address of the manufacturer and in addition, if the application is submitted by an authorised representative, its name and address;
 - (b) the address of the manufacturing facility (if different from the above);
 - (c) the name and title of the person(s) responsible for the quality system;
 - (d) the designation of the pressure receptacle and the relevant pressure receptacle standard;
 - (e) details of any refusal of approval of a similar application by any other competent authority;
 - (f) the identity of the inspection body for design type approval;
 - (g) documentation on the manufacturing facility as specified under 6.2.2.5.3.1; and
 - (h) the technical documentation required for design type approval, which shall enable verification of the conformity of the pressure receptacles with the requirements of the relevant pressure receptacle design standard. The technical documentation shall cover the design and method of manufacture and shall contain, as far as is relevant for assessment, at least the following:
 - (i) pressure receptacle design standard, design and manufacturing drawings, showing components and subassemblies, if any;
 - (ii) descriptions and explanations necessary for the understanding of the drawings and intended use of the pressure receptacles;
 - (iii) a list of the standards necessary to fully define the manufacturing process;
 - (iv) design calculations and material specifications; and
 - (v) design type approval test reports, describing the results of examinations and tests carried out in accordance with 6.2.2.5.4.9.

6.2.2.5.4.4 An initial audit in accordance with 6.2.2.5.3.2 shall be performed to the satisfaction of the competent authority.

6.2.2.5.4.5 If the manufacturer is denied approval, the competent authority shall provide written detailed reasons for such denial.

6.2.2.5.4.6 Following approval, changes to the information submitted under 6.2.2.5.4.3 relating to the initial approval shall be provided to the competent authority.

Subsequent design type approvals

6.2.2.5.4.7 An application for a subsequent design type approval shall encompass the requirements of 6.2.2.5.4.8 and 6.2.2.5.4.9, provided a manufacturer is in the possession of an initial design type approval. In such a case, the manufacturer's quality system according to 6.2.2.5.3 shall have been approved during the initial design type approval and shall be applicable for the new design.

6.2.2.5.4.8 The application shall include:

- (a) the name and address of the manufacturer and in addition, if the application is submitted by an authorised representative, its name and address;
- (b) details of any refusal of approval of a similar application by any other competent authority;
- (c) evidence that initial design type approval has been granted; and
- (d) the technical documentation, as described in 6.2.2.5.4.3 (h).

Procedure for design type approval

6.2.2.5.4.9 The inspection body shall:

- (a) examine the technical documentation to verify that:
 - (i) the design is in accordance with the relevant provisions of the standard, and
 - (ii) the prototype lot has been manufactured in conformity with the technical documentation and is representative of the design;
- (b) verify that the production inspections have been carried out as required in accordance with 6.2.2.5.5;

- (c) select pressure receptacles from a prototype production lot and supervise the tests of these pressure receptacles as required for design type approval;
- (d) perform or have performed the examinations and tests specified in the pressure receptacle standard to determine that:
 - (i) the standard has been applied and fulfilled, and
 - (ii) the procedures adopted by the manufacturer meet the requirements of the standard; and
- (e) ensure that the various type approval examinations and tests are correctly and competently carried out.

After prototype testing has been carried out with satisfactory results and all applicable requirements of 6.2.2.5.4 have been satisfied, a design type approval certificate shall be issued, which shall include the name and address of the manufacturer, results and conclusions of the examination, and the necessary data for identification of the design type.

If the manufacturer is denied a design type approval, the competent authority shall provide written detailed reasons for such denial.

6.2.2.5.4.10 Modifications to approved design types

The manufacturer shall either:

- (a) inform the issuing competent authority of modifications to the approved design type, where such modifications do not constitute a new design, as specified in the pressure receptacle standard; or
- (b) request a subsequent design type approval where such modifications constitute a new design according to the relevant pressure receptacle standard. This additional approval shall be given in the form of an amendment to the original design type approval certificate.

6.2.2.5.4.11 Upon request, the competent authority shall communicate to any other competent authority, information concerning design type approval, modifications of approvals and withdrawn approvals.

6.2.2.5.5 *Production inspection and certification*

General requirements

An inspection body, or its delegate, shall carry out the inspection and certification of each pressure receptacle. The inspection body selected by the manufacturer for

inspection and testing during production may be different from the inspection body used for the design type approval testing.

Where it can be demonstrated to the satisfaction of the inspection body that the manufacturer has trained competent inspectors, independent of the manufacturing operations, inspection may be performed by those inspectors. In such a case, the manufacturer shall maintain training records of the inspectors.

The inspection body shall verify that the inspections by the manufacturer, and tests performed on those pressure receptacles, fully conform to the standard and the requirements of these Regulations. Should non-conformance in conjunction with this inspection and testing be determined, the permission to have inspection performed by the manufacturer's inspectors may be withdrawn.

The manufacturer shall, after approval by the inspection body, make a declaration of conformity with the certified design type. The application of the pressure receptacle certification marking shall be considered a declaration that the pressure receptacle complies with the applicable pressure receptacle standards and the requirements of this conformity assessment system and these Regulations. The inspection body shall affix or delegate the manufacturer to affix the pressure receptacle certification marking and the registered mark of the inspection body to each approved pressure receptacle.

A certificate of compliance, signed by the inspection body and the manufacturer, shall be issued before the pressure receptacles are filled.

6.2.2.5.6 *Records*

Design type approval and certificate of compliance records shall be retained by the manufacturer and the inspection body for not less than 20 years.

6.2.2.6 *Approval system for periodic inspection and test of pressure receptacles*

6.2.2.6.1 *Definition*

For the purposes of this section:

Approval system means a system for competent authority approval of a body performing periodic inspection and test of pressure receptacles (hereinafter referred to as “periodic inspection and test body”), including approval of that body’s quality system.

6.2.2.6.2 *General requirements*

Competent authority

6.2.2.6.2.1 The competent authority shall establish an approval system for the purpose of ensuring that the periodic inspection and test of pressure receptacles conform to the requirements of these Regulations. In instances where the competent authority that approves a body performing periodic inspection and test of a pressure receptacle is not the competent authority of the country approving the manufacture of the pressure receptacle, the marks of the approval country of periodic inspection and test shall be indicated in the pressure receptacle marking (see 6.2.2.7).

The competent authority of the country of approval for the periodic inspection and test shall supply, upon request, evidence demonstrating compliance to this approval system including the records of the periodic inspection and test to its counterpart in a country of use.

The competent authority of the country of approval may terminate the approval certificate referred to in 6.2.2.6.4.1, upon evidence demonstrating non-compliance with the approval system.

6.2.2.6.2.2 The competent authority may delegate its functions in this approval system, in whole or in part.

6.2.2.6.2.3 The competent authority shall ensure that a current list of approved periodic inspection and test bodies and their identity marks is available.

Periodic inspection and test body

6.2.2.6.2.4 The periodic inspection and test body shall be approved by the competent authority and shall:

- (a) have a staff with an organisational structure, capable, trained, competent, and skilled, to satisfactorily perform its technical functions;
- (b) have access to suitable and adequate facilities and equipment;
- (c) operate in an impartial manner and be free from any influence which could prevent it from doing so;
- (d) ensure commercial confidentiality;
- (e) maintain clear demarcation between actual periodic inspection and test body functions and unrelated functions;
- (f) operate a documented quality system accordance with 6.2.2.6.3;

- (g) apply for approval in accordance with 6.2.2.6.4;
- (h) ensure that the periodic inspections and tests are performed in accordance with 6.2.2.6.5; and
- (i) maintain an effective and appropriate report and record system in accordance with 6.2.2.6.6.

6.2.2.6.3 Quality system and audit of the periodic inspection and test body

6.2.2.6.3.1 Quality system

The quality system shall contain all the elements, requirements, and provisions adopted by the periodic inspection and test body. It shall be documented in a systematic and orderly manner in the form of written policies, procedures, and instructions.

The quality system shall include:

- (a) a description of the organisational structure and responsibilities;
- (b) the relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;
- (c) quality records, such as inspection reports, test data, calibration data and certificates;
- (d) management reviews to ensure the effective operation of the quality system arising from the audits performed in accordance with 6.2.2.6.3.2;
- (e) a process for control of documents and their revision;
- (f) a means for control of non-conforming pressure receptacles; and
- (g) training programmes and qualification procedures for relevant personnel.

6.2.2.6.3.2 Audit

The periodic inspection and test body and its quality system shall be audited in order to determine whether it meets the requirements of these Regulations to the satisfaction of the competent authority.

An audit shall be conducted as part of the initial approval process (see 6.2.2.6.4.3). An audit may be required as part of the process to modify an approval (see 6.2.2.6.4.6).

Periodic audits shall be conducted, to the satisfaction of the competent authority, to ensure that the periodic inspection and test body continues to meet the requirements of these Regulations.

The periodic inspection and test body shall be notified of the results of any audit. The notification shall contain the conclusions of the audit and any corrective actions required.

6.2.2.6.3.3 Maintenance of the quality system

The periodic inspection and test body shall maintain the quality system as approved in order that it remains adequate and efficient.

The periodic inspection and test body shall notify the competent authority that approved the quality system, of any intended changes, in accordance with the process for modification of an approval in 6.2.2.6.4.6.

6.2.2.6.4 *Approval process for periodic inspection and test bodies*

Initial approval

6.2.2.6.4.1 A body desiring to perform periodic inspection and test of pressure receptacles in accordance with a pressure receptacle standard and these Regulations shall apply for, obtain, and retain an approval certificate issued by the competent authority.

This written approval shall, on request, be submitted to the competent authority of a country of use.

6.2.2.6.4.2 An application shall be made for each periodic inspection and test body and shall include:

- (a) the name and address of the periodic inspection and test body and, if the application is submitted by an authorised representative, its name and address;
- (b) the address of each facility performing periodic inspection and test;
- (c) the name and title of the person(s) responsible for the quality system;
- (d) the designation of the pressure receptacles, the periodic inspection and test methods, and the relevant pressure receptacle standards met by the quality system;
- (e) documentation on each facility, the equipment, and the quality system as specified under 6.2.2.6.3.1;

- (f) the qualifications and training records of the periodic inspection and test personnel; and
- (g) details of any refusal of approval of a similar application by any other competent authority.

6.2.2.6.4.3 The competent authority shall:

- (a) examine the documentation to verify that the procedures are in accordance with the requirements of the relevant pressure receptacle standards and these Regulations; and
- (b) conduct an audit in accordance with 6.2.2.6.3.2 to verify that the inspections and tests are carried out as required by the relevant pressure receptacle standards and these Regulations, to the satisfaction of the competent authority.

6.2.2.6.4.4 After the audit has been carried out with satisfactory results and all applicable requirements of 6.2.2.6.4 have been satisfied, an approval certificate shall be issued. It shall include the name of the periodic inspection and test body, the registered mark, the address of each facility, and the necessary data for identification of its approved activities (e.g. designation of pressure receptacles, periodic inspection and test method and pressure receptacle standards).

6.2.2.6.4.5 If the periodic inspection and test body is denied approval, the competent authority shall provide written detailed reasons for such denial.

Modifications to periodic inspection and test body approvals

6.2.2.6.4.6 Following approval, the periodic inspection and test body shall notify the issuing competent authority of any modifications to the information submitted under 6.2.2.6.4.2 relating to the initial approval.

The modifications shall be evaluated in order to determine whether the requirements of the relevant pressure receptacle standards and these Regulations will be satisfied. An audit in accordance with 6.2.2.6.3.2 may be required. The competent authority shall accept or reject these modifications in writing, and an amended approval certificate shall be issued as necessary.

6.2.2.6.4.7 Upon request, the competent authority shall communicate to any other competent authority, information concerning initial approvals, modifications of approvals, and withdrawn approvals.

6.2.2.6.5 *Periodic inspection and test and certification*

The application of the periodic inspection and test marking to a pressure receptacle shall be considered a declaration that the pressure receptacle complies with the applicable pressure receptacle standards and the requirements of these Regulations. The periodic inspection and test body shall affix the periodic inspection and test marking, including its registered mark, to each approved pressure receptacle (see 6.2.2.7.6).

A record certifying that a pressure receptacle has passed the periodic inspection and test shall be issued by the periodic inspection and test body, before the pressure receptacle is filled.

6.2.2.6.6 *Records*


The periodic inspection and test body shall retain records of pressure receptacle periodic inspection and tests (both passed and failed) including the location of the test facility, for not less than 15 years.

The owner of the pressure receptacle shall retain an identical record until the next periodic inspection and test unless the pressure receptacle is permanently removed from service.

6.2.2.7 *Marking of refillable UN pressure receptacles*

Refillable UN pressure receptacles shall be marked clearly and legibly with certification, operational and manufacturing marks. These marks shall be permanently affixed (e.g. stamped, engraved, or etched) on the pressure receptacle. The marks shall be on the shoulder, top end or neck of the pressure receptacle or on a permanently affixed component of the pressure receptacle (e.g. welded collar or corrosion resistant plate welded on the outer jacket of a closed cryogenic receptacle). Except for the UN packaging symbol, the minimum size of the marks shall be 5 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 2.5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the UN packaging symbol shall be 10 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 5 mm for pressure receptacles with a diameter less than 140 mm.

6.2.2.7.1 The following certification marks shall be applied:

- (a) The United Nations packaging symbol  ;

This symbol shall only be marked on pressure receptacles which conform to the requirements of these Regulations for UN pressure receptacles.

Note: ST/SG/AC.10/C.3/2006/101 has the following in square brackets. [6.2.2.7.1 (a) Replace the first sentence after the symbol with: "This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant regulations in Chapter 6.1, 6.2, 6.3, 6.5 or 6.6".]

- (b) The technical standard (e.g. ISO 9809-1) used for design, manufacture and testing;
- (c) The character(s) identifying the country of approval as indicated by the distinguishing signs of motor vehicles in international traffic;

The country of approval in 6.2.2.7.1 shall be understood to be the country that approved the body which inspected the individual receptacle at time of manufacture.

- (d) The identity mark or stamp of the inspection body that is registered with the competent authority of the country authorizing the marking;
- (e) The date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/");

6.2.2.7.2 The following operational marks shall be applied:

- (f) The test pressure in bar, preceded by the letters "PH" and followed by the letters "BAR";
- (g) The mass of the empty pressure receptacle including all permanently attached integral parts (e.g. neck ring, foot ring, etc.) in kilograms, followed by the letters "KG". This mass shall not include the mass of valve, valve cap or valve guard, any coating, or porous material for acetylene. The mass shall be expressed to three significant figures rounded up to the last digit. For cylinders of less than 1 kg, the mass shall be expressed to two significant figures rounded up to the last digit. In the case of pressure receptacles for UN No. 1001 acetylene, dissolved and UN No. 3374 acetylene, solvent free, at least one decimal shall be shown after the decimal point and two digits for pressure receptacles of less than 1 kg;
- (h) The minimum guaranteed wall thickness of the pressure receptacle in millimetres followed by the letters "MM". This mark is not required for pressure receptacles with a water capacity less than or equal to 1 litre or for composite cylinders or for closed cryogenic receptacles;
- (i) In the case of pressure receptacles for compressed gases, UN No. 1001 acetylene, dissolved, and UN No. 3374 acetylene, solvent free, the working pressure in bar, preceded by the letters "PW". In the case of closed cryogenic receptacles, the maximum allowable working pressure preceded by the letters "MAWP";

- (j) In the case of pressure receptacles for liquefied gases and refrigerated liquefied gases, the water capacity in litres expressed to three significant digits rounded down to the last digit, followed by the letter "L". If the value of the minimum or nominal water capacity is an integer, the figures after the decimal point may be neglected;
- (k) In the case of pressure receptacles for UN No. 1001 acetylene, dissolved, the total of the mass of the empty receptacle, the fittings and accessories not removed during filling, any coating, the porous material, the solvent and the saturation gas expressed to three significant figures rounded down to the last digit followed by the letters "KG". At least one decimal shall be shown after the decimal point. For pressure receptacles of less than 1 kg, the mass shall be expressed to two significant figures rounded down to the last digit;
- (l) In the case of pressure receptacles for UN No. 3374 acetylene, solvent free, the total of the mass of the empty receptacle, the fittings and accessories not removed during filling any coating, and the porous material expressed to three significant figures rounded down to the last digit followed by the letters "KG". At least one decimal shall be shown after the decimal point. For pressure receptacles of less than 1 kg, the mass shall be expressed to two significant figures rounded down to the last digit;

6.2.2.7.3 The following manufacturing marks shall be applied:

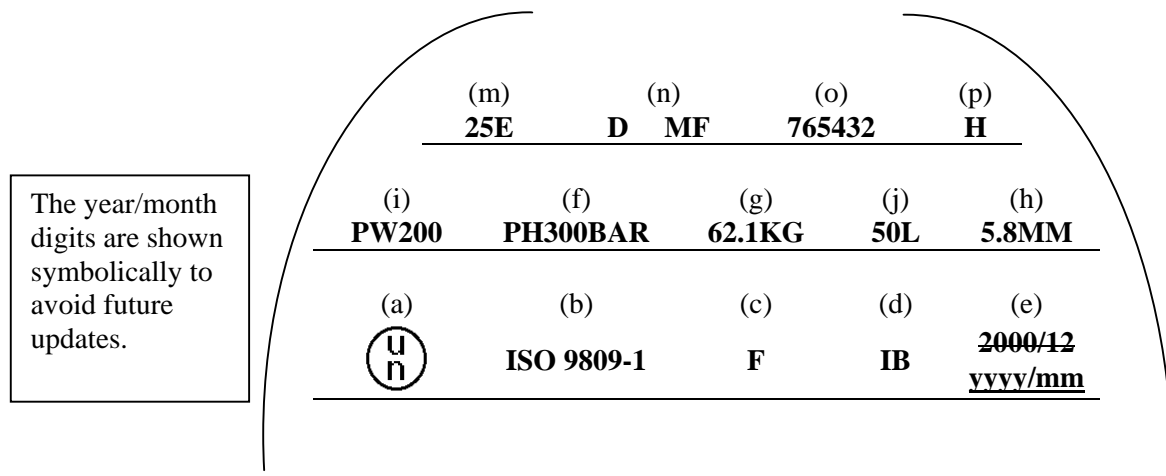
- (m) Identification of the cylinder thread (e.g. 25E). This mark is not required for closed cryogenic receptacles;
- (n) The manufacturer's mark registered by the competent authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark shall be preceded by the character(s) identifying the country of manufacture as indicated by the distinguishing signs of motor vehicles in international traffic. The country mark and the manufacturer's mark shall be separated by a space or slash;
- (o) The serial number assigned by the manufacturer;
- (p) In the case of steel pressure receptacles and composite pressure receptacles with steel liner intended for the ~~transport~~-carriage of gases with a risk of hydrogen embrittlement, the letter "H" showing compatibility of the steel (see ISO 11114-1:1997);

6.2.2.7.4 The above marks shall be placed in three groups:

- Manufacturing marks shall be the top grouping and shall appear consecutively in the sequence given in 6.2.2.7.3.

- The operational marks in 6.2.2.7.2 shall be the middle grouping and the test pressure (f) shall be immediately preceded by the working pressure (i) when the latter is required.
- Certification marks shall be the bottom grouping and shall appear in the sequence given in 6.2.2.7.1.

The following is an example of the markings applied to a cylinder.



6.2.2.7.5 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. In the case of closed cryogenic receptacles, such marks may be on a separate plate attached to the outer jacket. Such marks shall not conflict with required marks.

6.2.2.7.6 In addition to the preceding marks, each refillable pressure receptacle that meets the periodic and test requirements of 6.2.2.4 shall be marked indicating:

- (a) The character(s) identifying the country authorizing the body performing the periodic inspection and test. This marking is not required if this body is approved by the competent authority of the country approving manufacture;
- (b) The registered mark of the body authorised by the competent authority for performing periodic inspection and test;
- (c) The date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. “/”). Four digits may be used to indicate the year.

The above marks shall appear consecutively in the sequence given.

6.2.2.7.7 For acetylene cylinders, with the agreement of the competent authority, the date of the most recent periodic inspection and the stamp of the body performing the periodic inspection and test may be engraved on a ring held on the cylinder by the valve. The ring shall be configured so that it can only be removed by disconnecting the valve from the cylinder.

6.2.2.8 *Marking of non-refillable UN pressure receptacles*

Non-refillable UN pressure receptacles shall be marked clearly and legibly with certification and gas or pressure receptacle specific marks. These marks shall be permanently affixed (e.g. stencilled, stamped, engraved, or etched) on the pressure receptacle. Except when stencilled, the marks shall be on the shoulder, top end or neck of the pressure receptacle or on a permanently affixed component of the pressure receptacle (e.g. welded collar). Except for the UN packaging symbol and the “DO NOT REFILL” mark, the minimum size of the marks shall be 5 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 2.5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the UN packaging symbol shall be 10 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the “DO NOT REFILL” mark shall be 5 mm.

6.2.2.8.1 The marks listed in 6.2.2.7.1 to 6.2.2.7.3 shall be applied with the exception of (g), (h) and (m). The serial number (o) may be replaced by the batch number. In addition, the words “DO NOT REFILL” in letters of at least 5 mm in height are required.

6.2.2.8.2 The requirements of 6.2.2.7.4 shall apply.

NOTE: Non-refillable pressure receptacles may, on account of their size, substitute this marking by a label.

6.2.2.8.3 Other marks are allowed provided they are made in low stress areas other than the side wall and are not of a size and depth that will create harmful stress concentrations. Such marks shall not conflict with required marks.

6.2.2.9 For UN pressure receptacles the requirements of 6.2.2.5 and 6.2.2.6 are considered to have been complied with when these following procedures are applied:

<u>Procedure</u>	<u>Relevant body</u>
<u>Design type approval 1.8.7.1.1</u>	<u>Xa</u>
<u>Supervision of manufacture 1.8.7.1.2</u>	<u>Xa or IS(2)</u>
<u>Initial inspection and tests 1.8.7.1.3</u>	<u>Xa or IS(2)</u>
<u>Periodic inspection 1.8.7.14</u>	<u>Xa or Xb or IS(2)</u>

Xa means the competent authority, its delegate or inspection body conforming to 1.8.6.4 and accredited according to EN ISO/IEC 17020: 2004 type A.

Xb means inspection body conforming to 1.8.6.4 and accredited according to EN ISO/IEC 17020: 2004 type B or type C.

IS(2) means an in-house inspection service of the applicant under the surveillance of an inspection body conforming to 1.8.6.4 and accredited according to EN ISO/IEC 17020: 2004 type A. The in-house inspection service shall be independent from design process, manufacturing operations, repair and maintenance.

6.2.3 General requirements for non-UN pressure receptacles

6.2.3.1 *Design and construction*

6.2.3.1.1 Pressure receptacles and their closures not designed, constructed, inspected, tested and approved according to the requirements of 6.2.2 shall be designed, constructed, inspected, tested and approved in accordance with the general requirements of 6.2.1 as amended by the requirements of this section and those of 6.2.4 or 6.2.5.

6.2.3.1.2 ~~Normally~~Whenever possible the wall thickness shall be determined by calculation, accompanied, if needed, by experimental stress analysis. Otherwise the wall thickness may be determined by experimental means.

Appropriate design calculations for the pressure envelope and supporting components shall be used to ensure the safety of the pressure receptacles concerned.

The minimum wall thickness to withstand pressure shall be calculated in particular with regard to:

- the calculation pressures, which shall not be less than the test pressure;
- the calculation temperatures allowing for appropriate safety margins;
- the maximum stresses and peak stress concentrations where necessary;
- factors inherent to the properties of the material.

The Working Group decided to clarify that calculation is the preferred method.
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- 6.2.3.1.3 For welded pressure receptacles, only metals of weldable quality whose adequate impact strength at an ambient temperature of $-20\text{ }^{\circ}\text{C}$ can be guaranteed shall be used.
- 6.2.3.1.4 For cryogenic receptacles, the impact strength to be established as required by 6.2.1.1.8.1 shall be tested as laid down in 6.8.5.3.
- 6.2.3.1.5 Pressure receptacles for UN No. 1001, acetylene, dissolved, shall be filled entirely with a porous mass, uniformly distributed, of a type approved by the competent authority and which:
- (a) does not attack the pressure receptacles or form harmful or dangerous compounds either with the acetylene or with the solvent;
 - (b) is capable of preventing the spread of decomposition of the acetylene in the porous mass.

The solvent shall not attack the pressure receptacles

The above requirements, excluding those for the solvent, apply equally to pressure receptacles for UN No. 3374 acetylene, solvent free.”

6.2.3.2 *(Reserved)*

6.2.3.3 *Service equipment*

6.2.3.1.1 Service equipment shall comply with 6.2.1.3.

6.2.3.1.2 *Openings*

Pressure drums may be provided with openings for filling and discharge and with other openings intended for level gauges, pressure gauges or relief devices. The number of openings shall be kept to a minimum consistent with safe operations. Pressure drums may also be provided with an inspection opening, which shall be closed by an effective closure.

6.2.3.1.3 *Fittings*

- (a) If cylinders are fitted with a device to prevent rolling, this device shall not be integral with the valve cap;
- (b) Pressure drums which are capable of being rolled shall be equipped with rolling hoops or be otherwise protected against damage due to rolling (e.g. by corrosion resistant metal sprayed on to the pressure receptacle surface);
- (dc) Bundles of cylinders shall be fitted with appropriate devices ensuring that they can be handled and carried safely;

(ed) If level gauges, pressure gauges or relief devices are installed, they shall be protected in the same way as is required for valves in 4.1.6.8;

6.2.3.4 *Initial inspection and test*

6.2.3.4.1 New pressure receptacles shall be subjected to testing and inspection during and after manufacture in accordance with the requirements of 6.2.1.4 except that 6.2.1.4.1 (g) shall be replaced by the following:

(g) A hydraulic pressure test. Pressure receptacles shall withstand the test pressure without undergoing permanent deformation or exhibiting cracks;

6.2.3.4.2 *Specific provisions applying to aluminium alloy pressure receptacles*

(a) In addition to the initial inspection required by ~~6.2.1.5.1~~ 6.2.1.4.1, it is necessary to test for possible intercrystalline corrosion of the inside wall of the pressure receptacles where use is made of an aluminium alloy containing copper, or where use is made of an aluminium alloy containing magnesium and manganese and the manganese content is greater than 3.5% or the manganese content lower than 0.5%;

(b) In the case of an aluminium/copper alloy the test shall be carried out by the manufacturer at the time of approval of a new alloy by the competent authority; it shall thereafter be repeated in the course of production, for each pour of the alloy;

(c) In the case of an aluminium/magnesium alloy the test shall be carried out by the manufacturer at the time of approval of a new alloy and of the manufacturing process by the competent authority. The test shall be repeated whenever a change is made in the composition of the alloy or in the manufacturing process.

6.2.3.5 *Periodic inspection and test*

6.2.3.5.1 Periodic inspection and test shall be in accordance with 6.2.1.5.1

NOTE 3: *With the agreement of the testing and certifying body approved by the competent authority of the country of approval², the hydraulic pressure test of each welded steel cylinder intended for the carriage of gases of UN No. 1965, hydrocarbon gas mixture liquefied, n.o.s., with a capacity below 6,5 l may be replaced by another test ensuring an equivalent level of safety.*

6.2.3.5.2 ~~By derogation from 6.2.1.6.1 (d) e~~ Closed cryogenic receptacles shall be subjected to periodic inspections and tests by a body authorised by the competent authority in accordance with the periodicity defined in P203 to verify external conditions, condition and operation of pressure relief devices and be subjected to a

leakproofness test [at 90% of the maximum working pressure]. The leakproofness test shall be carried out with the gas contained in the pressure receptacle or with an inert gas. Checking shall be performed by means of a pressure gauge or by vacuum measurement. The thermal insulation need not be removed.

The above text is from RID/ADR 6.2.1.6.3 but introduces the periodic inspection body as described in the new (UN) 6.2.1.5 1. The NOTE is from RID/ADR 6.2.1.6.1. A consequential amendment to P203 (9) is necessary; the reference to 6.2.1.6 needs to be changed to 6.2.3.5.2.

The Joint Meeting is invited to consider adopting the text in square brackets specifying the pressure of the leakproofness test. The proposed value of the pressure is in accordance with the requirement of 6.8.3.4.9.

6.2.3.6 *Approval of pressure receptacles*

The procedures for conformity assessment and periodic inspection of section 1.8.7 shall be performed by the relevant body according the following table based on the test pressure and water capacity of the receptacles. The procedures shall be applied by the relevant body selected from one column.

<u>PH.V = Test pressure x water capacity of the pressure receptacles in bar.litres</u>	<u>PH.V <= 300</u>		<u>All PH.V values</u>
<u>Type approval 1.8.7.1.1</u>	<u>Xa</u>	<u>IS(1) or IS(2)</u>	<u>Xa</u>
<u>Supervision of the manufacture 1.8.7.1.2</u>			<u>Xa or IS(2)</u>
<u>Initial inspection and tests 1.8.7.1.3 and 6.2.3.4</u>	<u>IS(1) or IS(2)</u>	<u>Xa</u>	<u>Xa or IS(2)</u>
<u>Periodic inspection 1.8.7.1.4 and 6.2.3.5</u>	<u>Xa or Xb or IS(2)</u>		

The conformity assessment of valves and other accessories having a direct safety function may be carried out separately from the receptacles and the conformity assessment procedure shall be at least as stringent as that undergone by the receptacle to which they are fitted.

Xa means the competent authority, its delegate or inspection body conforming to 1.8.6.4 and accredited according to EN ISO/IEC 17020: 2004 type A.

Xb means inspection body conforming to 1.8.6.4 and accredited according to EN ISO/IEC 17020: 2004 type B or type C.

IS(1) means the manufacturer including its in-house inspection service shall be appropriately ISO 9001:2000 certified. In this case, the surveillance of the in-house inspection service by inspection body is not needed.

IS(2) means an in-house inspection service of the applicant under the surveillance of an inspection body accredited according to EN ISO/IEC 17020: 2004 type A. The in-house inspection service shall be independent from design process, manufacturing operations, repair and maintenance.

~~6.2.3.6.1 — The conformity of pressure receptacles, having a test pressure capacity product of more than 150 MPa.litre (1 500 bar.litre) with the provisions of Class 2, shall be assessed by one of the following methods:~~

~~(a) — Single pressure receptacles shall be examined, tested and approved by a testing and certifying body an inspection body approved by the competent authority of the country of approval², on the basis of the technical documentation and declaration of the manufacturer on compliance with the relevant provisions of Class 2.~~

~~The technical documentation shall include full specifications on design and construction, and full documentation on the manufacturing and testing; or~~

~~(b) — The construction of the pressure receptacles shall be tested and approved by a testing and certifying body an inspection body approved by the competent authority of the country of approval² on the basis of the technical documentation with regard to their compliance with the relevant provisions of Class 2.~~

~~Pressure receptacles shall furthermore be designed, manufactured and tested according to a comprehensive quality assurance programme for design, manufacture, final inspection and testing. The quality assurance programme shall guarantee the conformity of the pressure receptacles with the relevant provisions of Class 2 and shall be approved and supervised by a testing and certifying body an inspection body approved by the competent authority of the country of approval²; or~~

~~(c) — The design type of the pressure receptacles shall be approved by a testing and certifying body an inspection body approved by the competent authority of the country of approval². Any pressure receptacle of this design shall be manufactured and tested according to a quality assurance programme for production, final inspection and testing, which shall be approved and supervised by a testing and certifying body an inspection body approved by the competent authority of the country of approval²; or~~

² ~~If the country of approval is not a contracting party to ADR, the competent authority of a contracting party to ADR.~~

~~(d) — The design type of the pressure receptacles shall be approved by a testing and certifying body an inspection body approved by the competent authority of the country of approval². Any receptacle of this design shall be tested under the supervision of a testing and certifying body an inspection body approved by the competent authority of the country of approval² on the basis of a declaration of the manufacturer on compliance with the approved design and the relevant provisions of Class 2.~~

~~6.2.3.6.2 — The conformity of pressure receptacles having a test pressure capacity product of more than 30 MPa.litre (300 bar.litre) and not more than 150 MPa.litre (1 500 bar.litre) with the provisions of Class 2 shall be assessed by one of the methods described in 6.2.1.4.1 6.2.3.6.1 or by one of the following methods:~~

~~(a) — The pressure receptacles shall be designed, manufactured and tested according to a comprehensive quality assurance programme for their design, manufacture, final inspection and testing, approved and supervised by a testing and certifying body an inspection body approved by the competent authority of the country of approval²; or~~

~~(b) — The design type of the pressure receptacle shall be approved by a testing and certifying body an inspection body approved by the competent authority of the country of approval². The compliance of any pressure receptacle with the approved design shall be declared in writing by the manufacturer on the basis of his quality assurance programme for final inspection and testing of pressure receptacles, approved and supervised by a testing and certifying body an inspection body approved by the competent authority of the country of approval²; or~~

~~(c) — The design type of the pressure receptacle shall be approved by a testing and certifying body an inspection body approved by the competent authority of the country of approval². The compliance of any pressure receptacle with the approved design shall be declared in writing by the manufacturer and all pressure receptacles of this type shall be tested under the supervision of a testing and certifying body an inspection body approved by the competent authority of the country of approval²;~~

~~6.2.3.6.3 — The conformity of pressure receptacles, having a test pressure capacity product of not more than 30 MPa.litre (300 bar.litre) with the provisions for Class 2 shall be assessed by one of the methods described in 6.2.1.4.1 or 6.2.1.4.2 6.2.3.6.1 or 6.2.3.6.2 or by one of the following methods:~~

² ~~If the country of approval is not a contracting party to ADR, the competent authority of a contracting party to ADR.~~

- ~~(a) — The compliance of any pressure receptacle with a design, fully specified in technical documentation, shall be declared in writing by the manufacturer and pressure receptacles of this design shall be tested under the supervision of a testing and certifying body an inspection body approved by the competent authority of the country of approval²; or~~
- ~~(b) — The design type of the pressure receptacles shall be approved by a testing and certifying body an inspection body approved by the competent authority of the country of approval². The compliance of all pressure receptacles with the approved design shall be declared in writing by the manufacturer and all pressure receptacles of this type shall be tested individually.~~

~~6.2.3.6.4 — The requirements of 6.2.1.4.1 6.2.3.6.1 to 6.2.1.4.3 6.2.3.6.3 shall be deemed to be complied with:~~

- ~~(a) — as regards the quality assurance systems mentioned in 6.2.1.4.1 6.2.3.6.1 and 6.2.1.4.2 6.2.3.6.2, if they conform to the relevant European Standard of the EN ISO 9000 series;~~
- ~~(b) — in their entirety, if the relevant conformity assessment procedures of Council Directive 99/36/EC³ have been complied with as follows:~~
 - ~~(i) — for the pressure receptacles listed under 6.2.1.4.1 6.2.3.6.1, the modules G, or H1, or B in combination with D, or B in combination with F;~~
 - ~~(ii) — for the pressure receptacles listed under 6.2.1.4.2 6.2.3.6.2, the modules H, or B in combination with E, or B in combination C1, or B1 in combination with F, or B1 in combination with D;~~
 - ~~(iii) — for the pressure receptacles listed under 6.2.1.4.3 6.2.3.6.3, the modules A1, or D1, or E1.~~

6.2.3.7 *Requirements for manufacturers*

6.2.3.7.1 The relevant requirements of 1.8.7 shall be met.

6.2.3.8 *Requirements for inspection bodies*

6.2.3.8.1 The requirements of 1.8.6 shall be met. Inspection bodies shall be independent from manufacturing enterprises and technologically competent to the degree

³ *Council Directive 99/36/EC concerning transportable pressure equipment (Official Journal of the European Communities, No. L 138 of 1.06.1999).*

~~required. These requirements shall be deemed to be met if the bodies have been approved on the basis of an accreditation procedure in accordance with the relevant European standards of series EN 45000.~~

This text from 6.2.1.4.6 is already covered by 1.8.6.

6.2.3.9 *Marking of refillable pressure receptacles*

- 6.2.3.9.1 Markings shall be in accordance with sub-section 6.2.2.7 with the following variations.
- 6.2.3.9.2 The United Nations packaging symbol specified in 6.2.2.7.1 (a) shall not be applied.
- 6.2.3.9.3 The requirements of 6.2.2.7.1 (j) shall be replaced by the following. The water capacity of the receptacle in litres followed by the letter "L". In the case of pressure receptacles for liquefied gases the water capacity in litres shall be expressed to three significant figures rounded down to the last digit. If the value of the minimum or nominal water capacity is an integer, the figures after the decimal point may be neglected;
- 6.2.3.9.4 The marks specified in 6.2.2.7.2 (g), 6.2.2.7.2 (h) and 6.2.2.7.3 (m) are not required for pressure receptacles for UN No. 1965 hydrocarbon gas mixture, liquefied, n.o.s.
- 6.2.3.9.5 When marking the date required by 6.2.2.7.6 (c), the month need not be indicated for gases for which the interval between periodic inspections is 10 years or more (see 4.1.4.1 packing instructions P200 and P203).
- 6.2.3.9.6 With the agreement of the competent authority, the date of the most recent periodic inspection and the stamp of the ~~expert inspection body~~ may be engraved on a ring of an appropriate material affixed to the cylinder when the valve is installed and which is removable only by disconnecting the valve from the cylinder.

These final four paragraphs are adaptations of text in the 2007 RID/ADR 6.2.1.7.

6.2.3.10 *Marking of non-refillable pressure receptacles*

- 6.2.3.10.1 Markings shall be in accordance with 6.2.2.8, except that the United Nations packaging symbol specified in 6.2.2.7.1 (a) shall not be applied.

6.2.4 Requirements for non-UN pressure receptacles designed, constructed and tested according to standards

The requirements of 6.2.1 and 6.2.3 are considered to have been complied with if the following standards, as relevant, are applied:

NOTE 1: *The standards listed in 6.2.2 may also be used provided the requirements of 6.2.3 are also complied with.*

NOTE 2: *Persons or bodies identified in standards as having responsibilities in accordance with RID/ADR shall meet the requirements of RID/ADR.*

Reference	Title of document	Applicable sub-sections and paragraphs
<i>for materials</i>		
EN 1797:2001	Cryogenic vessels - Gas/material compatibility	6.2.1.2
EN ISO 11114-1: 1997	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic materials.	6.2.1.2
EN ISO 11114-2: 2000	Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic materials.	6.2.1.2
EN ISO 11114-4: 2005 (except method C in 5.3)	Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents – Part 4: Test methods for selecting metallic materials resistant to hydrogen embrittlement.	6.2.1.2
<i>for design and construction</i>		
Annex I, Parts 1 to 3 to 84/525/EEC	Council directive on the approximation of the laws of the Member States relating to seamless steel gas cylinders.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
Annex I, Parts 1 to 3 to 84/526/EEC	Council directive on the approximation of the laws of the Member States relating to seamless, unalloyed aluminium and aluminium alloy gas cylinders.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
Annex I, Parts 1 to 3 to 84/527/EEC	Council directive on the approximation of the laws of the Member States relating to welded unalloyed steel gas cylinders.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 1442:1998 /A2:2005	Transportable refillable welded steel cylinders for liquefied petroleum gas (LPG) – Design and construction.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 1800:1998/AC: 1999	Transportable gas cylinders – Acetylene cylinders – Basic requirements and definitions.	<u>6.2.3.1.5</u>

Reference	Title of document	Applicable sub-sections and paragraphs
EN 1964-1:1999	Transportable gas cylinders – Specifications for the design and construction of refillable transportable seamless steel gas cylinders of capacity from 0.5 litres up to 150 litres – Part 1: Cylinders made of seamless steel with a Rm value of less than 1 100 MPa.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 1975:1999 + A1:2003	Transportable gas cylinders – Specifications for the design and construction of refillable transportable seamless aluminium and aluminium alloy gas cylinders of capacity from 0.5 litres up to 150 litres.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN ISO 11120:1999	Gas cylinders – Refillable seamless steel tubes for compressed gas transport of water capacity between 150 litres and 3 000 litres – Design, construction and testing.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 1964-3: 2000	Transportable gas cylinders – Specifications for the design and construction of refillable transportable seamless steel gas cylinders of capacity from 0.5 litre up to 150 litres – Part 3: Cylinders made of stainless steel.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 12862: 2000	Transportable gas cylinders – Specifications for the design and construction of refillable transportable welded aluminium alloy gas cylinders.	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 1251-2: 2000	Cryogenic vessels- Transportable, vacuum insulated, of not more than 1 000 litres volume – Part 2: Design, fabrication, inspection and testing	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 12257:2002	Transportable gas cylinders – Seamless, hoop wrapped composite cylinders	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 12807:2001 (except Annex A)	Transportable refillable brazed steel cylinders for liquefied petroleum gas (LPG) – Design and construction	6.2.1.1 and 6.2.1.5
EN 1964-2:2001	Transportable gas cylinders – Specification for the design and construction of refillable transportable seamless steel gas cylinders of water capacities from 0.5 litre up to and including 150 litre – Part 2: Cylinders made of seamless steel with a Rm \geq 1100 Mpa	<u>6.2.3.1</u> and <u>6.2.3.4</u>

Reference	Title of document	Applicable sub-sections and paragraphs
EN 13293:2002	Transportable gas cylinders – Specification for the design and construction of refillable transportable seamless normalised carbon manganese steel gas cylinders of water capacity up to 0.5 litre for compressed, liquefied and dissolved gases and up to 1 litre for carbon dioxide	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 13322-1:2003 + A1:2006	Transportable gas cylinders – Refillable welded steel gas cylinders – Design and construction – Part 1: Welded steel	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 13322-2:2003	Transportable gas cylinders – Refillable welded stainless steel gas cylinders – Design and construction – Part 2: Welded stainless steel	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 12245:2002	Transportable gas cylinders – Fully wrapped composite cylinders	<u>6.2.3.1</u> and <u>6.2.3.4</u>
EN 12205:2001	Transportable gas cylinders – Non refillable metallic gas cylinders	<u>6.2.3.1</u> , <u>6.2.3.4</u> and <u>6.2.3.9</u>
EN 13110:2002	Transportable refillable welded aluminium cylinders for liquefied petroleum gas (LPG). Design and construction	<u>6.2.3.1</u> , <u>6.2.3.4</u> and <u>6.2.3.9</u>
EN 14427:2004 + A1:2005	Transportable refillable fully wrapped composite cylinders for liquefied petroleum gases – Design and construction <i>NOTE 1: This standard applies only to cylinders equipped with pressure relief valves.</i> <i>NOTE 2: In 5.2.9.2.1 and 5.2.9.3.1, both cylinders shall be subject to the burst test when they show damage equal to or worse than the rejection criteria.</i>	<u>6.2.3.1</u> , <u>6.2.3.4</u> and <u>6.2.3.9</u>
EN 14208:2004	Transportable gas cylinders – Specification for welded pressure drums up to 1000 litres capacity for the transport of gases – Design and construction	<u>6.2.3.1</u> , <u>6.2.3.4</u> and <u>6.2.3.9</u>
EN 14140:2003	Transportable refillable welded steel cylinders for Liquefied Petroleum Gas (LPG) – Alternative design and construction	<u>6.2.3.1</u> , <u>6.2.3.4</u> and <u>6.2.3.9</u>
EN 13769:2003 /A1:2005	Transportable gas cylinders – Cylinder bundles – Design, manufacture, identification and testing	<u>6.2.3.1</u> , <u>6.2.3.4</u> and <u>6.2.3.9</u>
<i>for closures</i>		
EN ISO 10297:2006	Transportable gas cylinders – Cylinder valves: Specification and type testing	<u>6.2.3.1</u>

Reference	Title of document	Applicable sub-sections and paragraphs
EN 13152:2001	Specifications and testing of LPG – cylinder valves – Self closing	<u>6.2.3.1</u>
EN 13153:2001	Specifications and testing of LPG – cylinder valves – Manually operated	<u>6.2.3.1</u>
<i>for periodic inspection and test</i>		
EN 1251-3: 2000	Cryogenic vessels – Transportable, vacuum insulated, of not more than 1 000 litres volume – Part 3: Operational requirements	<u>6.2.3.5</u>
EN 1968:2002 + A1:2005 (except Annex B)	Transportable gas cylinders – Periodic inspection and testing of seamless steel gas cylinders	<u>6.2.3.5</u>
EN 1802:2002 (except Annex B)	Transportable gas cylinders – Periodic inspection and testing of seamless aluminium alloy gas cylinders	<u>6.2.3.5</u>
EN 12863:2002 + A1:2005	Transportable gas cylinders – Periodic inspection and maintenance of dissolved acetylene cylinders <i>NOTE: In this standard "initial inspection" is to be understood as the "first periodic inspection" after final approval of a new acetylene cylinder.</i>	<u>6.2.3.5</u>
EN 1803:2002 (except Annex B)	Transportable gas cylinders – Periodic inspection and testing of welded steel gas cylinders	<u>6.2.3.5</u>
EN ISO 11623:2002 (except clause 4)	Transportable gas cylinders – Periodic inspection and testing of composite gas cylinders	<u>6.2.3.5</u>
EN 14189:2003	Transportable gas cylinders – Inspection and maintenance of cylinder valves at time of periodic inspection of gas cylinders	<u>6.2.3.5</u>

6.2.5 Requirements for non-UN pressure receptacles not designed, constructed and tested according to standards

Pressure receptacles not designed, constructed and tested according to standards listed in the tables of 6.2.2 or 6.2.5 4 shall be designed, constructed and tested in accordance with the provisions of a technical code providing the same level of safety and recognised by the competent authority.

Where an appropriate standard is referenced in the tables of 6.2.2 or 6.2.5 4 the competent authority shall, within two years, withdraw recognition for the use of any technical code for the same purpose.

This does not remove the competent authority's rights to recognise technical codes to reflect scientific and technical progress or where no standard exists or to deal with specific aspects not addressed in a standard.

The competent authority shall transmit to the secretariat of OTIF / UNECE a list of the technical codes that it recognises. The list should include the following details: name and date of the code, purpose of the code and details of where it may be obtained. The secretariat shall make this information publicly available on its website.

The requirements of 6.2.1, 6.2.3 and the following requirements however-shall be met:

NOTE: For this section, the references to technical standards in 6.2.1 shall be considered as references to technical codes.

The Note is added to cover the references to standards in 6.2.1.1.3, 6.2.1.2.2, 6.2.1.4.1, etc.

6.2.5.1 ***Materials***

The following provisions contain examples of materials that may be used to comply with the requirements for materials in 6.2.1.2:

- (a) carbon steel for compressed, liquefied, refrigerated liquefied gases and dissolved gases as well as for substances not in Class 2 listed in Table 3 of packing instruction P200 in 4.1.4.1;
- (b) alloy steel (special steels), nickel, nickel alloy (such as monel) for compressed, liquefied, refrigerated liquefied gases and dissolved gases as well as for substances not in Class 2 listed in Table 3 of packing instruction P200 in 4.1.4.1;
- (c) copper for:
 - (i) gases of classification codes 1A, 1O, 1F and 1TF, whose filling pressure referred to a temperature of 15 °C does not exceed 2 MPa (20 bar);
 - (ii) gases of classification code 2A and also UN No. 1033 dimethyl ether; UN No. 1037 ethyl chloride; UN No. 1063 methyl chloride; UN No. 1079 sulphur dioxide; UN No. 1085 vinyl bromide; UN No. 1086 vinyl chloride; and UN No. 3300 ethylene oxide and carbon dioxide mixture with more than 87% ethylene oxide;
 - (iii) gases of classification codes 3A, 3O and 3F;
- (d) aluminium alloy: see special requirement "a" of packing instruction P200 (10) in 4.1.4.1;

- (e) composite material for compressed, liquefied, refrigerated liquefied gases and dissolved gases;
- (f) synthetic materials for refrigerated liquefied gases; and
- (g) glass for the refrigerated liquefied gases of classification code 3A other than UN No. 2187 carbon dioxide, refrigerated, liquid or mixtures thereof, and gases of classification code 3O.

6.2.5.2 Service equipment

(Reserved)

6.2.5.3 Metal cylinders, tubes, pressure drums and bundles of cylinders

At the test pressure, the stress in the metal at the most severely stressed point of the pressure receptacle shall not exceed 77% of the guaranteed minimum yield stress (Re).

"Yield stress" means the stress at which a permanent elongation of 2 per thousand (i.e. 0.2%) or, for austenitic steels, 1% of the gauge length on the test-piece, has been produced.

NOTE: *In the case of sheet-metal the axis of the tensile test-piece shall be at right angles to the direction of rolling. The permanent elongation at fracture, shall be measured on a test-piece of circular cross-section in which the gauge length "l" is equal to five times the diameter "d" (l=5d); if test pieces of rectangular cross-section are used, the gauge length "l" shall be calculated by the formula:*

$$l = 5.65 \sqrt{F_0}$$

where F_0 indicates the initial cross-sectional area of the test-piece.

Pressure receptacles and their closures shall be made of suitable materials which shall be resistant to brittle fracture and to stress corrosion cracking between – 20 °C and +50 °C.

Welds shall be skilfully made and shall afford the fullest safety.

6.2.5.4 Additional provisions relating to aluminium-alloy pressure receptacles for compressed gases, liquefied gases, dissolved gases and non pressurized gases subject to special requirements (gas samples) as well as articles containing gas under pressure other than aerosol dispensers and small receptacles containing gas (gas cartridges)

6.2.5.4.1 *The materials of aluminium-alloy pressure receptacles which are to be accepted shall satisfy the following requirements:*

	A	B	C	D
Tensile strength, Rm, in MPa (=N/mm ²)	49 to 186	196 to 372	196 to 372	343 to 490
Yield stress, Re, in MPa (=N/mm ²) (permanent set λg = 0.2%)	10 to 167	59 to 314	137 to 334	206 to 412
Permanent elongation at fracture (l = 5d) in per cent	12 to 40	12 to 30	12 to 30	11 to 16
Bend test (diameter of former d = n × e, where e is the thickness of the test piece)	n=5(Rm ≤ 98) n=6(Rm > 98)	n=6(Rm ≤ 325) n=7(Rm > 325)	n=6(Rm ≤ 325) n=7(Rm > 325)	n=7(Rm ≤ 392) n=8(Rm > 392)
Aluminium Association Series Number ^a	1 000	5 000	6 000	2 000

^a See "Aluminium Standards and Data", Fifth edition, January 1976, published by the Aluminium Association, 750 Third Avenue, New York.

The actual properties will depend on the composition of the alloy concerned and on the final treatment of the pressure receptacle, but whatever alloy is used the thickness of the pressure receptacle shall be calculated by one of the following formulae:

$$e = \frac{P_{\text{MPa}} D}{\frac{2Re}{1.3} + P_{\text{MPa}}} \quad \text{or} \quad e = \frac{P_{\text{bar}} D}{\frac{20Re}{1.3} + P_{\text{bar}}}$$

where e = minimum thickness of pressure receptacle wall, in mm
 P_{MPa} = test pressure, in MPa
 P_{bar} = test pressure, in bar
D = nominal external diameter of the pressure receptacle, in mm;
and
Re = guaranteed minimum proof stress with 0.2% proof stress, in Mpa (=N/mm²)

In addition, the value of the minimum guaranteed proof stress (Re) introduced into the formula is in no case to be greater than 0.85 times the guaranteed minimum tensile strength (Rm), whatever the type of alloy used.

NOTE 1: *The above characteristics are based on previous experience with the following materials used for pressure receptacles:*

Column A: Aluminium, unalloyed, 99.5 g pure;

Column B: Alloys of aluminium and magnesium;

Column C: Alloys of aluminium, silicon and magnesium, such as ISO/R209-Al-Si-Mg (Aluminium Association 6351);

Column D: Alloys of aluminium, copper and magnesium.

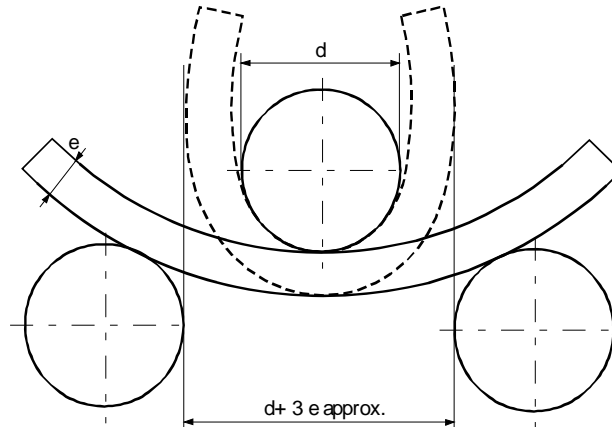
NOTE 2: *The permanent elongation at fracture is measured by means of test-pieces of circular cross-section in which the gauge length "l" is equal to five times the diameter "d" ($l = 5d$); if test-pieces of rectangular section are used the gauge length shall be calculated by the formula:*

$$l = 5.65 \sqrt{F_0}$$

where F_0 is the initial cross-section area of the test-piece.

- NOTE 3:**
- (a) *The bend test (see diagram) shall be carried out on specimens obtained by cutting into two equal parts of width $3e$, but in no case less than 25 mm, an annular section of a cylinder. The specimens shall not be machined elsewhere than on the edges;*
 - (b) *The bend test shall be carried out between a mandrel of diameter (d) and two circular supports separated by a distance of $(d + 3e)$. During the test the inner faces shall be separated by a distance not greater than the diameter of the mandrel;*
 - (c) *The specimen shall not exhibit cracks when it has been bent inwards around the mandrel until the inner faces are separated by a distance not greater than the diameter of the mandrel;*
 - (d) *The ratio (n) between the diameter of the mandrel and the thickness of the specimen shall conform to the values given in the table.*

Diagram of bend test



6.2.5.4.2 A lower minimum elongation value is acceptable on condition that an additional test approved by the competent authority of the country in which the pressure receptacles are made proves that safety of carriage is ensured to the same extent as in the case of pressure receptacles constructed to comply with the characteristics given in the table in 6.2.3.2.1-6.2.5.4.1 (see also EN 1975:1999 + A1:2003).

6.2.5.4.3 The wall thickness of the pressure receptacles at the thinnest point shall be the following:

- where the diameter of the pressure receptacle is less than 50 mm: not less than 1.5 mm;
- where the diameter of the pressure receptacle is from 50 to 150 mm: not less than 2 mm; and
- where the diameter of the pressure receptacle is more than 150 mm: not less than 3 mm.

6.2.5.4.4 The ends of the pressure receptacles shall have a semicircular, elliptical or "basket-handle" section; they shall afford the same degree of safety as the body of the pressure receptacle.

6.2.5.5 *Pressure receptacles in composite materials*

For composite cylinders, tubes, pressure drums and bundles of cylinders which make use of composite materials ~~i.e. comprising a liner hoop wrapped or fully wrapped with reinforcement material~~, the construction shall be such that a minimum burst ratio (burst pressure divided by test pressure) is:

- 1.67 for hoop wrapped pressure receptacles;

- 2.00 for fully wrapped pressure receptacles.

Explanation deleted since it is no longer necessary and pressure receptacles of composite construction without liners are also covered.

6.2.5.6 Closed cryogenic receptacles

The following requirements apply to the construction of closed cryogenic receptacles for refrigerated liquefied gases:

- 6.2.5.6.1 If non-metallic materials are used, they shall resist brittle fracture at the lowest working temperature of the pressure receptacle and its fittings;
- 6.2.5.6.2 ~~Pressure receptacles shall be fitted with a safety valve which shall be capable of opening at the working pressure shown on the pressure receptacle.~~ The pressure relief devices ~~valves~~ shall be so constructed as to work perfectly even at their lowest working temperature. Their reliability of functioning at that temperature shall be established and checked by testing each ~~valve~~ device or a sample of ~~valves~~ devices of the same type of construction;

The first sentence deleted, since this requirement is already covered by 6.2.1.3.6.4/5

- 6.2.5.6.3 The vents and ~~safety valves~~ pressure relief devices of pressure receptacles shall be so designed as to prevent the liquid from splashing out;

6.2.6 General requirements for aerosol dispensers and small receptacles containing gas (gas cartridges)

Text of the existing RID/ADR 6.2.4 to be inserted by the secretariat with the section numbering changed.

Annex 3

Proposals for Chapter 6.8

Introduction

In order to introduce these specifications for tanks, battery vehicles/wagons and MEGCs special provisions TA4 and TT9 shall be introduced in 6.8.4 and designated in column 13 in table A of Chapter 3.2 for each Class 2 substance authorised by a tank code and for UN Nos. 1052 and 1790.

Proposal

Insert in 6.8.4:

TA4 The conformity assessment procedures of section 1.8.7 shall be applied by the competent authority, its delegate or inspection body conforming to 1.8.6.4 and accredited according to EN ISO/IEC 17020: 2004 type A.

TT9 For inspections and tests (including supervision of the manufacture) the procedures of section 1.8.7 shall be applied by the competent authority, its delegate or inspection body conforming to 1.8.6.4 and accredited according to EN ISO/IEC 17020: 2004 type A

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Annex 4

The following is text from RID/ADR 2007 which has not been transposed into this proposal and for which there is no UN text covering the requirement. Reasons are given in boxes. The paragraph numbering refers to RID/ADR 2007.

6.2.1.1.1 In the design of pressure receptacles, all relevant factors shall be taken into account such as:

- internal pressure;
- ambient and operational temperatures, including during carriage;
- dynamic loads.

P200 and the new 6.2.1 will cover this

Material characteristics to be considered are, when applicable:

- yield stress;
- tensile strength;
- time-dependent strength;
- fatigue data;
- Young's modulus (modulus of elasticity);
- appropriate amount of plastic strain;
- impact strength;
- fracture resistance.

This text was discarded since it only gave a non-binding interpretation of the general requirement of new 6.2.1.

6.2.1.3.2 (c) Pressure drums and cryogenic receptacles, which are not capable of being rolled, shall be fitted with devices (skids, rings, straps,) ensuring that they can be safely handled by mechanical means and so arranged as not to impair the strength of, nor cause undue stresses in, the wall of the pressure receptacle;

Covered more generally by new 6.2.1.3.3.

6.2.1.4.5 The particular certification process the manufacturer intends to apply shall be taken into consideration.

This is an obvious feature of the assessment of a manufacturer's proficiency and it is unnecessary to state it.
