INF.20 E

ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

Working Party on the Transport of Dangerous Goods

Joint Meeting of the RID Safety Committee and the Working Party on the Transport of Dangerous Goods (Bern, 7-11 March 2005, agenda item 7)

WORKING GROUP ON CHAPTER 6.2

Transmitted by the European Industrial Gases Association (EIGA)

SUMMARY

Executive summary:

A document giving a side-by-side comparison of part of Chapter 6.2 of the RID/ADR is attached. It shows considerable scope for removing text from the RID/ADR.

Action to be taken:

In order to make progress more rapidly and reduce the length of discussions by the Working Group EIGA requests that the Joint Meeting agrees to the appointment of a drafting sub-group and gives views on how the RID/ADR text should dealt with.

Introduction

1. This paper is intended to be read after INF. 5 and poses questions that are relevant if the Joint Meeting agrees to the further work proposed in INF. 5.

Method of working

2. 24 delegates attended the Working Group meeting in Brussels. Such a large number of people makes for protracted discussions on small matters of text. Since it is clear that there will be many such discussions, EIGA requests that the Joint Meeting permits the Chairman to appoint a small drafting sub-group to prepare text and present it and arising issues for resolution by the full Working Group. Without such preparatory work, the Working Group may need many meetings and may be unable to complete its work within this biennium.

Criteria for removing text

3. On the following pages is the first part of the paper prepared by the ACI showing a side-by-side comparison of the UN and ADR text. The full paper has been circulated to the Working Group.

Text that only appears in RID/ADR is shown in red and this text will either be transferred to the new sections 6.2.3 or 6.2.5 described in INF. 5 or will be discarded.

4. It was clear that some delegates to the first meeting were strongly committed to the existing text in RID/ADR and wanted to preserve most of the details. Others were in favour of removing text in the view of the considerable body of standards within Chapter 6.2. Now the comparison document shows the scope of the possible deletions, EIGA will seek to establish consensus in the Working Group on how to place or discard the RID/ADR text. However EIGA would welcome a discussion in the Joint Meeting on the following points so that the Working Group has some idea of the general guidance on how to proceed.

5. For the decades in which the RID and ADR have been developed, it has had a negligible number of standards and had to include technical detail to specify not only what had to be achieved, but also how it had to be done. The programme of re-working Chapter 6.2 presents an opportunity to remove some of that detail to and enables the Regulations to concentrate on the safety objectives. The following paragraphs set out criteria for the consideration of the Joint Meeting.

6. Text should be removed if it only explains technical details of how the safety objectives are to be designed. Examples of this are shown in the following document in:

   - the left-hand column of 6.2.1.1.1 which sets out how to calculate wall thickness (pages 3, 4)

   - the left-hand column shown alongside the UN text 6.2.1.2.2 (page 8).

7. Text should be discarded if the requirements are covered adequately in the packing instructions. Candidates for deletion include:

   - the RID/ADR catalogue of materials shown in 6.2.1.2 (pages 6, 7).which could be deleted because P200 and P203 and give guidance on the selection of materials backed up by ISO 1114-1 and 11114-2.

   - the left hand column at 6.2.1.1.2 (pages 7, 8) where the requirements are shown for acetylene cylinders which are covered by P200 special packing provision ‘p’.

Comparison of UN 14th edition and ADR 2005

	UN 14th Draft	ADR 2005	
	CHAPTER 6.2 **REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PRESSURE RECEPTACLES, 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**	**General requirements**	6.2.1
	***NOTE**: For aerosol dispensers and small receptacles containing gas (gas cartridges) see 6.2.4.*	***NOTE**: For aerosol dispensers and small receptacles containing gas (gas cartridges) see 6.2.4.*	
6.2.1.1	***Design and construction***	***Design and construction***	6.2.1.1
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.	Pressure receptacles and their closures shall be designed, calculated, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during their normal use and during normal conditions of carriage. 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.	6.2.1.1.1
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.		
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.	Normally the wall thickness shall be determined by calculation, accompanied, if needed, by experimental stress analysis. 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.	6.2.1.1.1
6.2.1.1.4	For welded pressure receptacles, only metals of weldable quality shall be used.	For welded pressure receptacles, only metals of weldable quality whose adequate impact strength at an ambient temperature of -20o C can be guaranteed shall be used.	6.2.1.1.1
6.2.1.1.5	The test pressure of 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.	The test pressure of pressure receptacles is prescribed in packing instruction P200 in 4.1.4.1 for cylinders, tubes, pressure drums and bundles of cylinders. The test pressure for cryogenic receptacles, closed, shall not be less than 1.3 times the maximum working pressure increased by 1 bar for vacuum insulated pressure receptacles.	6.2.1.1.1
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	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	6.2.1.1.3

	the structural assembly and movement that would result in the concentration of harmful local stresses.	structural assembly and movement that would result in the concentration of harmful local stresses.	
	Manifolds shall be designed such that they are protected from impact.	Manifolds shall be designed such that they are protected from impact.	
	For toxic liquefied gases, means shall be provided to ensure that each pressure receptacle can be filled separately and that no interchange of pressure receptacle contents can occur during transport.	For toxic liquefied gases with a classification code of 2T, 2TF, 2TC, 2TO, 2TFC or 2TOC, means shall be provided to ensure that each pressure receptacle can be separately filled and that no interchange of pressure receptacle contents can occur during carriage.	
6.2.1.1.7	Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.	Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.	6.2.1.1.4
6.2.1.1.8	*Additional requirements for the construction of closed cryogenic receptacles for refrigerated liquefied gases*	*The following requirements apply to the construction of closed cryogenic receptacles for refrigerated liquefied gases:*	6.2.1.1.5
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.	The mechanical properties of the metal used shall be established for each pressure receptacle, including the impact strength and the bending coefficient; with regard to the impact strength see 6.8.5.3;	6.2.1.1.5.1
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.	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 recognized 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.	6.2.1.1.5.2

6.2.1.1.8.3	Closed cryogenic receptacles intended for the transport of refrigerated liquefied gases having a boiling point below -182 °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.	Closed cryogenic receptacles intended for the carriage of refrigerated liquefied gases having a boiling point below -182 °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.	6.2.1.1.5.3
6.2.1.1.8.4	Closed cryogenic receptacles shall be designed and constructed with suitable lifting and securing arrangements.	Closed cryogenic receptacles shall be designed and constructed with suitable lifting and securing arrangements.	6.2.1.1.5.4
6.2.1.2	***Materials***	***Materials of pressure receptacles***	**6.2.1.2**
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.	The materials of which the pressure receptacles and their closures are made as well as all substances that might come into contact with the contents shall not be liable to attack the contents or form harmful or dangerous compounds therewith. The following materials may be used: (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.

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: 6.2.1.1.2

(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.	
6.2.1.2.2	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 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.	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.	6.2.1.1.1
6.2.1.3	***Service equipment***	***Service equipment***	**6.2.1.3**
6.2.1.3.1	Except for pressure relief devices, valves, piping, fittings and other equipment subjected to pressure, shall be designed and constructed to withstand at least 1.5 times the test pressure of the pressure receptacles.	*Openings*	6.2.1.3.1
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. 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.	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. (e) 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;	