

COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the
Transport of Dangerous Goods
(Twenty-fifth session, 5-14 July 2004
agenda item 2)

PROVISIONS FOR THE TRANSPORT OF GASES

Report of the Working Group

General

1. The Working Group on Provisions for the Transport of Gases met on 6th and 7th July under the chairmanship of Mr. H. Puype (EIGA). Representatives of Austria, Germany, Sweden, Switzerland, the United Kingdom, the United States of America, The European Commission, International Organization for Standardization (ISO), European Liquefied Petroleum Gas Association (AEGPL), Compressed Gas Association (CGA), the European Cylinder Makers Association (ECMA), the International Council of Chemical Associations (ICCA) and the European Industrial Gases Association (EIGA) participated.

2. The objective of the Working Group was to review the following documents:

MEGCs

2003/43 (USA), 2004/40 (EIGA), INF. 61, (UK);
2004/58 (CGA);
2004/65 (United States of America) Section 3, INF. 72 (Belgium);
2004/10 (UIC/IUR).

Classification and entries in the dangerous goods list

2004/5 (EIGA), 2004/16 (Germany), INF. 41 (EIGA), INF. 60 (Belgium)
2004/41 (EIGA)

Proposals on P200 and 4.1.6.1

ST/SG/AC.10/C.3/46 and UN/SCETDG/23/INF.37 (report of the previous meeting of the Gases Working Group) concerning the lifting of square brackets on minimum thickness of pressure drums

2004/15 (Germany), INF. 58 (Belgium);
2004/18 (Argentina);
2004/65 (United States of America) Section 2, INF. 72 (Belgium)

Proposals to Amend Chapter 6.2

2004/63 (ECMA)
2004/65 (United States of America) Section 4, INF. 72 (Belgium)
INF. 4 (ISO)
INF. 81 (USA)

Receptacles, small, containing gas (gas cartridges)

2004/4 (Austria), INF. 24 (USA), 2004/56 (Austria), INF. 23 (USA)

Preliminary Discussion of New Proposals

INF. 28 (EIGA), INF.33 (ICCA), INF. 49 (IATA).

MEGCs

3. The four proposals in 2003/43 (USA), were discussed in turn, taking into account the comments made in the papers 2004/40 (EIGA), INF. 61, (UK). Many of the features of Proposal 1 were accepted, but the USA's request to require a PRD on every 1000 litres of capacity was not. A compromise was reached to require PRDs to be fitted on elements or groups of elements no greater than 3000 litres capacity on MEGCs carrying UN 1013 Carbon dioxide and UN 1070 Nitrous oxide.

Accordingly, it was agreed to replace the first sentence of 6.7.5.4.1 with the following two sentences.

6.7.5.4.1 The elements of MEGCs used for the transport of UN1013 carbon dioxide and UN1070 nitrous oxide shall be isolated by a valve into assemblies of not more than 3000 litres. Each assembly shall be fitted with one or more pressure relief devices. *(Existing final sentence unchanged)*

4. Proposal 2 of 2003/43 was judged to be unsatisfactory because the use of a code approved by a competent authority reduced the current level of harmonization. The working group discussed the options and agreed to continue to use the CGA standards for calculating the flow capacity of PRDs. The first sentence of 6.7.5.5.1 was deleted because it was covered more precisely by the requirements of the CGA standards.

~~6.7.5.5.1 The combined delivery capacity of the pressure relief device when fitted shall be sufficient that, in the event of total fire engulfment of the MEGC, the pressure (including accumulation) inside the elements does not exceed 120% of the set pressure of the relief device. (remainder unchanged)~~

5. The working group agreed that the current requirements for marking PRDs on MEGCs were impractical as described on 2003/43 Proposal 3. After discussing the options, the UK's proposal in INF. 61 was adopted with Germany's suggested addition of 'the set pressure or the set temperature'. Accordingly, the text of 6.7.5.6 was changed to the following.

6.7.5.6.1 Pressure relief devices shall be clearly and permanently marked with the following:

- (a) the manufacturer's name and relevant catalogue number
- (b) the set pressure and/or the set temperature
- (c) the date of the last test.

6.7.5.6.2 *Delete existing text*

6.7.5.6.3 *Renumber as 6.7.5.6.2*

6. Proposal 4 of 2003/43 was considered in conjunction with 2004/58 (CGA). Both papers proposed adopting the latest GCA standards and these proposals were accepted necessitating the following

changes.

- Footnote to 6.2.1.3.6.5.4:
“*See for example CGA Publications S-1.1-~~2001~~2003 and S-1.2-~~1995~~2003.*”
 - Footnote to 6.7.3.8.1.1:
“*...(see for example CGA S-1.2-~~1995~~2003).*”
 - Footnote to 6.7.4.7.4:
“*See for example CGA Pamphlet S-1.2-~~1995~~2003.*”
 - 6.7.5.5.1:
“...The formula provided in CGA S-1.2-~~1995~~2003 shall be used to determine the minimum total flow capacity for the system of pressure relief devices. CGA S-1.1-~~1994~~2003 may be used to determine the relief capacity of individual elements....”
 - 6.7.5.5.2:
“...(see, for example, CGA S-1.2-~~1995~~2003 for low pressure liquefied gases and CGA S-1.1-~~1994~~2003 for high pressure liquefied gases).”
7. Proposal 2004/65 (United States of America) Section 3 was discussed with INF. 72 (Belgium). The proposal (a) to make additional marking on MEGCs to show the method used for the periodic test was not accepted because it was considered unnecessary for the purposes of enforcement. The type of test used is available in documentary form at the time of periodic inspection. Members were of the opinion that all approved methods are equally valid to allow for continued use of the pressure receptacles.
 8. Members pointed out that the proposal 3(b) was already covered by the requirement in 4.2.4.5.2 to not fill a unit in excess of the lowest working pressure of any given element. The proposal was withdrawn.
 9. On proposal 3(c) members explained (supported by INF. 72) that the two marking plates served different purposes and should not be consolidated. The proposal was withdrawn.
 10. Proposal 3(d) was accepted so the third sentence of 6.7.5.8.1 should start “For flammable, pyrophoric and oxidizing gases”
 11. The final proposal (e) requested that the same isolation requirements in the final sentence 6.7.5.3.2 should be applied to gases of Division 2.2. with a subsidiary oxidizing risk as were applicable to flammable gases. The working group did not accept that oxidizing gases and flammable gases presented an equivalent risk so the USA withdrew the proposal.
 12. The UICs proposal (2004/10) gave two options for showing which gases are permitted to be transported in MEGCs. The first option of continuing to refer to the P200 was preferred, since other required provisions only appeared in that section. It was decided, however, that the most elegant solution was to request a change in the Dangerous Goods List to the heading of Column 8 and 9 to include MEGCs since the column8 includes P200 already. The consequential changes were limited to:

Change the heading of Columns 8 and 9 to “Packagings, IBCs and MEGCs”

Amend the text to 3.2.1 in the paragraph explaining Column 8, starting in the second sentence as follows. “The packing instructions indicate the packagings (including IBCs, MEGCs and large packagings), which may be used for the transport of substances and/or articles.

Classification and entries in the dangerous goods list

13. The following documents dealing with the classification of oxidizing gases were reviewed 2004/5 (EIGA), 2004/16 (Germany), INF. 41 (EIGA), INF. 60 (Belgium). There was no general support for the EIGA proposal to include a note that mixtures containing more than 23.5% oxygen by volume shall be classified as oxidizing. Germany suggested that a special provision based on the existing SP 292 be elaborated to meet the concern of the industry of not having to label mixtures of oxygen with inert gases other than nitrogen without having to re-classify them as oxidizing below the threshold of 23.5% of oxygen. Accordingly, the working group recommended that SP 292 be applied to UN 1956 and reworded as follows

“292 Mixtures containing no more than 23.5% oxygen may be transported under this entry when no other oxidizing gases are present. A Division 5.1 subsidiary risk label is not required for any concentrations within this limit.”

Insert 292 in Column 6 of the Dangerous Goods List against UN 1956 Compressed gas N.O.S.

14. Proposal 2004/41 from EIGA to delete certain ill-defined UN numbers was supported by CGA and all other working group members. The following list is proposed for deletion.

Delete the following entries from the Dangerous Goods List and P200

1014 Carbon dioxide and oxygen mixtures, compressed

1015 Carbon dioxide and nitrous oxide mixture

1979 Rare gases mixture, compressed

1980 Rare gases and oxygen mixture, compressed

1981 Rare gases and nitrogen mixture, compressed

2600 Carbon monoxide and hydrogen mixture, compressed.

Proposals on P200 and 4.1.6.1

15. The outstanding decision to decide on the minimum wall thickness of pressure drums used to transport toxic gases with an LC₅₀ below 200 ppmV was discussed. The CGA reported a single value for large pressure drums but other delegates considered that giving a single value was not adequate to cover the widely diverging volumes and diameters of pressure drums. ISO mentioned that the standards foresee a calculation formula related to the diameter that more accurately reflects the puncture risk. Members of the working group were requested to investigate current practice (wall thickness, use of aluminium, etc.) with these gases for discussion at the next meeting. ISO was requested to forward a proposal indicating typical values at various volumes and diameters in time for the December meeting.
16. Germany’s proposal (2004/15) concerning Fluorine bundles was considered and the USA and CGA were concerned that the manifold under pressure was vulnerable to damage. European delegates pointed out the existing European standard involved two different drop tests which ensured the integrity of the manifold. It was further explained that the risk of having one valve and a manifold under pressure connecting three cylinders was comparable or less than three separate valves on the three cylinders provided that manifold is protected according to 6.2.1.1.6. Furthermore, the standard EN 13769 puts stringent protection requirements on the manifold

protection. EIGA will send a copy of EN 13769 to the CGA and the USA for further evaluation and Germany will revise its proposal taking into consideration comments made by the working group and the Belgian INF. 58.

17. The proposal made by Argentina (2004/18) concerning the special provision l in P200 was accepted with the editorial change proposed by the UK to align it with other packing provisions.

Amend the final sentence of special packing provision l in P200 as follows.

“~~The total quantity~~ maximum net mass of ethylene oxide in any outer packaging shall not exceed 2.5 kg.”

18. 2004/65 (USA) Section 2 and INF. 72 (Belgium) were discussed and the principle of proposal (a) to clearly indicate that the working pressure given in Table 1 of P200 constitutes a maximum was adopted. The suggestions for the proposed note b made by the USA and Belgium were reviewed and considered unnecessary. The working group then agreed on the following amendment:

Change the heading of Column 13 of P200 Table 1 from “Working pressure, bar” to “Maximum working pressure, bar”.

19. Proposal (b) was also accepted since all agreed that for nitrogen trifluoride filling ratios in excess of 0.50 were now recognized as hazardous. Accordingly, the second entries in the P200 Table 2 in the columns Test pressure and Filling ratio for UN 2451 Nitrogen trifluoride should be deleted, i.e. ~~300~~ and ~~0.75~~ respectively.
20. The proposal (c) to forbid the use of aluminium alloy cylinders in acetylene service was not accepted because the technical justification was flawed. There followed a discussion on the temperatures to which cylinders were subjected during massing and as to whether this caused a deleterious effect on the strength of the aluminium alloy. It was concluded that practice in the acetylene industry should be checked and a decision should be made on this proposal at the December meeting, according to the information obtained.
21. Proposal (d) of 2004/65 suggested making the formulae for calculating filling ratios optional. There was not a consensus to adopt this. The working group agreed that the mandatory use of the formulae for calculating filling ratios in P200 (3) would provide very conservative filling ratios and there was scope to provide opportunity to use experimental data. EIGA agreed to provide new text in an official proposal for the December meeting.
22. The introduction of a new special packing provision for UN 1062 Methyl bromide as proposed in 2004/65 2(e) was not favoured by the working group, supported by the Belgian INF. 72, due to the impending phasing out of this substance. Therefore the need to introduce this provision was reduced. Germany also advised that this substance could be transported satisfactorily within the requirements of the regulations in UN 2037 Receptacles, small, containing gas (gas cartridges). The USA agreed to suspend its proposal pending further consultation.
23. The editorial changes suggested by proposal 2004/65 2(f) were withdrawn since it was agreed that the observations of INF. 72 (Belgium) were correct and that the insertion of the word ‘paragraph’ was not necessary.
24. The Chairman invited Germany to describe the status of the dialogue between NIST and BAM on the topic of filling ratios in P200. It appeared that some of the final figures from NIST had to be

clarified. The delegates from the USA and Germany (BAM) agreed to redouble their efforts to propose agreed figures for changes in the P200. The Chairman also emphasized the urgency to provide new, more accurate values and formulae for use in the P200.

ECMA requested that the test pressures in P200 for low pressure liquefied gases be brought into alignment with the current requirement of P200 (3) (c) i.e. they should equate to the vapour pressure developed at 65°C.

Proposals to Amend Chapter 6.2

25. The proposal 2004/63 (ECMA) was accepted unanimously. CGA pointed out that the accuracy of the tare could be significantly affected by the weight of the cylinder coating. It was therefore decided to recommend the following amendment:

6.2.2.7.2 The following operational marks shall be applied:

- (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 mass for acetylene. The empty 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 UN 1001 acetylene, dissolved and UN 3374 acetylene, solvent free, at least one digit shall be shown after the decimal point;
- (k) In the case of UN 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 ~~two~~ three significant figures rounded down to the last digit followed by the letters "KG". At least one digit shall be shown after the decimal point. For cylinders 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 UN 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 ~~two~~ three significant figures rounded down to the last digit followed by the letters "KG". At least one digit shall be shown after the decimal point. For cylinders of less than 1 kg, the mass shall be expressed to two significant figures rounded down to the last digit.

26. 2004/65 (United States of America) Section 4 and the comments in INF. 72 (Belgium) were considered in turn.

(a) Editorial changes were agreed in 6.2.2.5.3.1 as follows

The contents shall in particular include adequate descriptions of:

- (a) the organisational structure; and responsibilities of personnel, ~~and power of the management~~ with regard to design and product quality;
- (b) the design control and design verification techniques, processes; and systematic actions procedures that will be used when designing the pressure receptacles;

Delete the commas before 'and' in (c) and (d)

(b) The proposal was not accepted because the original wording had been derived as a compromise after lengthy debate in ISO and in the UN gases working group.

(c) It was accepted to clarify the text in 6.2.2.5.4.10 as follows:

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.

27. Note was taken from INF.4 (ISO) of the pending publication of the Cryogenic Receptacle standard. ISO was requested to forward an official proposal in good time for inclusion in the UN Model Regulations.
28. INF. 81 from the USA was reviewed and note taken of the developments in standards. In particular, it was noted that the expert from the USA now recommends the referencing of ISO 11119-3 fully wrapped fibre reinforced composite gas cylinders with non-load sharing liners, subject to the existing Notes 1 and 2 for composite cylinders. ISO was requested to include the standard in their formal proposal.
29. The working group also took note that the expert from the USA intends to make proposals clarifying 6.2.3 Requirements for non-UN pressure receptacles. The USA will also make a proposal restricting the use of ISO 7866 for high strength aluminium cylinders without including additional tests.

Receptacles, small, containing gas (gas cartridges)

30. The papers 2004/56 (Austria), INF. 23 (USA) 2004/4 (Austria), INF. 24 (USA) were discussed together and the discussions between Austria and the USA were explained. It had been agreed that the UN Model Regulations do not impose a pressure limit on UN 2037 "Receptacles, small, containing gas (gas cartridges) without a release device, non-refillable". Therefore the Austrian proposals 2004/4 and 2004/56 were withdrawn and an amendment proposed to clarify SP 191 as follows:

191 Receptacles, small, containing gas ~~may be considered as similar to aerosols except that they~~ are not fitted with a release device. Receptacles with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to these Regulations.

Furthermore, the USA seeks to clarify SP 303 by the following amendment:

303 Receptacles shall be assigned to the division and, if any, subsidiary hazard of the gas or mixture of ~~The classification of UN 2037 shall be based on the~~ gases contained therein determined in accordance with the provisions of Chapter 2.2

31. The Chairman stated his view that the above constituted an acceptable interim solution but a

working group of experts in the field should consider all small receptacles such as capsules, cartridges, etc. with the aim of issuing consistent provisions and clear guidance for the manufacturers and users.

Preliminary Discussion of New Proposals

32. EIGA introduced its discussion paper INF. 28 on the definition in section 2.2.2.1 (b) of non-flammable non-toxic gases and its exclusion of low pressure gases. EIGA was of the opinion that such an exclusion should appear as an exemption not in a definition. At the end of the discussion opinions were divided but EIGA agreed to formulate a formal proposal for further discussion at the next meeting.
33. INF. 33 was presented by the representative of the ICCA. The working group endorsed the proposal to allow the transport of UN 2495 Iodine pentafluoride in pressure drums and recommended ICCA to introduce a formal proposal.
34. INF. 49 from IATA was supported by EIGA but several members requested more time to thoroughly evaluate the consequent implications of the proposed change. IATA was recommended to submit the INF. Paper as a formal proposal, except that the text of 4.1.6.1.8 (e).should appear as .
 - (e) Pressure receptacles are transported in an ~~outer packaging~~overpack. The ~~packaging~~package as prepared for transport shall be capable of meeting the drop test specified in 6.1.5.3 at the packing group I performance level.
35. ISO indicated that during the revision of ISO 13769 it was noticed that the use of a ring under the valve to record periodic inspection stamping, permitted in ADR/RID, did not appear in the UN Model Regulations. EIGA would make a proposal for the December meeting.

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