

**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**
(Twentieth session, 3-11 December 2001,
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ADDITIONAL PROVISIONS FOR THE TRANSPORT OF GASES

**Pressure receptacles and refrigerated liquefied gases,
including comments on proposed text in ST/SG/AC.10/C.3/2001/48**

Transmitted by the expert from Canada

The expert from Canada respectfully submits the following comments for consideration with regard to the development of provisions for the transport of pressure receptacles and refrigerated liquefied gases. Specific comments are given with reference to the text contained in the document ST/SG/AC.10/C.3/2001/48 transmitted by the European Industrial Gases Association (EIGA).

Comment on Introduction

1. (p. 1)

Since this proposal excludes open cryogenic receptacles, and since throughout the proposal, references to “closed cryogenic receptacles” have been changed to “cryogenic receptacles”, the definition for “cryogenic receptacles” in 1.2.1 should be amended as follows:

“*Cryogenic receptacles* are closed transportable thermally-insulated pressure receptacles for refrigerated liquefied gases, of a water capacity of not more than 1000 litres;”.

Comments on Proposal 1

2. (p. 2) **4.1.6.1.2(b)**

(A) The word “mass” should be changed to “porous material” (to use terminology consistent with the beginning of the sentence).

(B) (Editorial) The last sentence, “In the case of UN 1001....”, was not intended to be a part of paragraph (b) and should be moved to a new line.

3. (p. 2) **4.1.6.1.4**

(Editorial) The second paragraph, “Prior to filling....”, was intended to be a separate section 4.1.6.1.5. Consequently, 4.1.6.1.5 to 4.1.6.1.12 should also be re-numbered 4.1.6.1.6 to 4.1.6.1.13.

4. (p. 3) **4.1.6.1.7**

(A) (Editorial) In the second paragraph, “gas cylinders” should be changed to “cylinders” in two places. (The term “cylinder” is defined in 1.2.1.)

(B) The scope of ISO 11117:1998 is not specifically limited to cylinders with a water capacity less than or equal to 150 L. Should the requirement to follow ISO 11117:1998 only be applicable to “cylinders” (i.e. with a water capacity not exceeding 150 L)?

(C) The reference to “unprotected valves of gas cylinders as described in the first sentence” is not clear. It should be changed to “cylinder valves with inherent protection”, or it should be left as paragraph (d) as before.

5. (p. 4) **4.1.6.1.11**

At the end of (b), “and” should be changed to “or”.

6. (p. 4) **4.1.6.1.12**

At the end of (c), “and” should be changed to “or”.

Comment on P202

7. UN 3353, Air bag inflators, compressed gas or Air bag modules, compressed gas or Seat-belt pretensioners, compressed gas, was deleted for the 12th edition of the Model Regulations. Consequently, P202 should also be deleted.

Comments on Proposal 2

8. (p. 5) **P203**

The following words should be added to the beginning of P203: “This instruction applies to Class 2 refrigerated liquefied gases.”

9. (p. 5) **P203**

Amend the third sentence as follows: “The receptacles shall be so insulated that they ~~cannot~~ do not become coated with ~~hoar~~-frost.”

10. (p. 5) **P203, 1.**

The purpose of this section is not clear.

If this section addresses the manufacture of cryogenic receptacles, it should be deleted. Other test pressures are currently used for the manufacture of cryogenic receptacles, e.g. 2 times the service pressure in North America. The test pressure should only be specified for UN certified cryogenic receptacles, once the applicable ISO/TC220 standards have been published.

If this section addresses the selection of cryogenic receptacles for filling, it should be re-worded as follows: “Refrigerated liquids shall be filled in cryogenic receptacles with the following minimum test pressures:

(a) for cryogenic receptacles with vacuum insulation, the test pressure shall not be less than 1.3 times the sum of the maximum internal pressure of the filled receptacle, including during filling and discharge, plus 100 kPa (1 bar);

(b) for other cryogenic receptacles, the test pressure shall not be less than 1.3 times the maximum internal pressure of the filled receptacle, including during filling and discharge.”

11. (p. 5) **P203, 2.**

(A) In the first sentence, change “the degree of filling” to “the liquid phase”.

(B) At the end of the first sentence, change “capacity” to “water capacity”.

(C) At the end of the second sentence, amend as follows: “...the volume of the liquid phase would reach 95% of the water capacity”.

(D) At the end of the third sentence, amend as follows: “...the volume of the liquid phase would reach 95% of the water capacity”.

12. (p. 5) **P203, 3**

At the end, add “. as specified by the competent authority of the country of use”.

13. (p. 5) **P203, 4**

The second sentence should be changed to: “The test period for periodic inspections shall be as specified by the competent authority of the country of use”.

Since there are currently no international standards for the manufacture or periodic inspection of cryogenic receptacles, and for the time being, cryogenic receptacles will be manufactured and periodically inspected in accordance with national or regional requirements, the test period should not be specified.

14. (p. 5) **P203, 5**

(A) (Editorial) Amend as follows: “In the case of cryogenic receptacles intended for the ~~carriage~~ transport of oxidising gases....”.

(B) This requirement should be applicable in all cases. The first part of the sentence could be deleted, so that the sentence begins: “The substances used to....”.

(C) Add a second sentence: “In the case of oxygen, refrigerated liquid (UN 1073) and mixtures thereof, any devices and insulating material of the cryogenic receptacle shall be made of non-combustible materials.”

Comments on Proposal 3

15. (p. 7) **5.2.2.1.13**

This proposal will need discussion. Is this label necessary for closed cryogenic receptacles, when it is not required for other receptacles for liquids and liquefied gases? Is it necessary that two opposite sides be labelled? Is the size of the label appropriate, as it is not consistent with other regulations that do require this label? Should red arrows also be permitted, as is permitted in other regulations that require this label?

In the current Canadian regulations, this label is required only on outer packagings which contain inner packagings of liquid. It is required to be placed on any surface other than the surface on which the package is intended to rest during transport. The standard size of the label is 74 mm x 105 mm, although smaller sizes are permitted in some cases. The figure may be in red or black. Please note, however, that this orientation label will no longer be required in the upcoming amended regulations.

In the current ICAO Technical Instructions, the shipper has the option of using arrows or the orientation label. The label is red or black on a contrasting background, and its dimensions are 74 mm x 105 mm.

Comments on Proposal 4

16. (p. 8) **6.2.1.1.5.2**

In the third sentence, delete “shell (see definition in 6.7.4.1)”; it is not necessary, and the reference to a definition for portable tanks is not clear.

17. (p. 8) **6.2.1.1.5.3**

(A) (Editorial) Change “minus (-) 182°C” to “-182°C”.

(B) (Editorial) At the end of the sentence, change “fluid” to “liquid”.

18. (p. 9) **6.2.1.1.5.5**

Amend the second sentence as follows: “The ~~design~~ cryogenic receptacles shall demonstrate that be designed to withstand the effects of fatigue, caused by repeated application of these loads throughout the expected life of the cryogenic receptacles, ~~have been taken into account.~~”

19. (p. 9) **6.2.1.1.5.6**

(A) This section should be deleted, as it does not apply to smaller cryogenic receptacles (which are defined as having a water capacity less than or equal to 1000 litres). (“Direction of travel” is applicable to portable tanks.)

(B) “MPGM” is not defined in Part 1 or Chapter 6.2 of the Model Regulations. If the term is necessary, perhaps the definition could be moved from 6.7.4.1 to 1.2.1 and amended as follows:

“*Maximum permissible gross mass (MPGM) means the sum of the tare mass of the cryogenic receptacle or portable tank and the heaviest load authorised for transport;*”.

20. (p. 9) **6.2.1.1.7**

(Editorial) In the last sentence, change “separately charged” to “filled separately”.

21. (p. 10) **6.2.1.3.2**

(A) In the second sentence, delete the word “sufficiently”.

(B) In the last sentence, the reference to 4.1.6.1.8 is currently incorrect, but it will be correct if the sections are re-numbered per comment 3 above.

22. (p. 10) **6.2.1.3.3**

(Editorial) At the end, change “not to impair the strength of, nor cause undue stresses, in the pressure receptacle” to “not to impair the strength of, nor cause undue stresses in, the pressure receptacle” (move the second comma).

23. (p. 10) **6.2.1.3.5.1**

In 6.2.1.3.5.1, the term “jacket” is used. In 6.2.1.1.5.2, the term “sheathing” is used. Consistent terminology should be used.

24. (p. 10) **6.2.1.3.5.2**

Delete the word “automatic”.

25. (p. 10) **6.2.1.3.5.3**

Amend as follows: “Vacuum-insulated cryogenic receptacles need not have an opening for inspection between the pressure receptacle and the jacket.” (or “sheathing”, depending on how comment 23 above is resolved).

26. (p. 11) **6.2.1.3.5.6.1**

(A) “MAWP” is not defined in Part 1 or Chapter 6.2 of the Model Regulations. If the term is necessary, perhaps the definition could be moved from 6.7.4.1 to 1.2.1 and amended as follows:

“*Maximum allowable working pressure (MAWP) means the maximum effective internal gauge pressure permissible at the top of ~~the shell~~ of a loaded cryogenic receptacle or portable tank in its operating position including the highest effective pressure during filling and discharge;*”.

(B) The second and third sentences need to be discussed. Other settings may be used, e.g. in Canada, pressure-limiting devices shall be sized and set to limit the pressure in the cylinder to not more than 125% marked service pressure when the insulation is other than a vacuum, etc.

27. (p. 10) **6.2.1.3.5.6.3**

Change “safety device” to “pressure relief device”.

28. (p. 11) **6.2.1.3.5.7.1**

(A) “MAWP” is not defined in Part 1 or Chapter 6.2 of the Model Regulations. See comment 26(A) above.

(B) This needs to be discussed. Other settings may be used, e.g. in Canada, pressure-limiting devices shall be sized and set to limit the pressure in the cylinder to not more than 125% marked service pressure less 103 kPa when the insulation is a vacuum.

29. (p. 11) **6.2.1.3.5.7.3**

(A) (Editorial) Change “relief devices” to “pressure relief devices”.

(B) Change “a well-established technical code” to “an established technical code”.

(C) In the footnote, change “CGA Pamphlet S-1.2-1995” to “CGA Publication S-1.1-2001”. S-1.2 applies to cargo and portable tanks; S-1.1 applies to cylinders.

30. (p. 11) **6.2.1.3.6**

(Editorial) It would perhaps be easier to follow if the order of 6.2.1.3.5 and 6.2.1.3.6 were switched.

31. (p. 12) **6.2.1.4.2**

(A) (Editorial) Amend as follows:

“On an adequate sample of cryogenic receptacles, ~~in addition to the inspections and tests specified in 6.2.1.4.1(a), (b), (d), and (f) shall be performed.~~ In addition, welds subject to full stress level shall be inspected by radiographic, ultrasonic, or another suitable non-destructive test method, on an adequate sample of cryogenic receptacles; this weld inspection does not apply to the jacket.

Additionally, all cryogenic receptacles shall undergo the 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.”

(B) “Welds subject to full stress level” is not clear. Perhaps it could be changed to “longitudinal welds” or “welds parallel to the longitudinal axis of the cryogenic receptacle”.

32. (p. 12) **6.2.1.5.1**

See comment 1 in UN/SCETDG/20/INF.13.

33. (p. 13) **6.2.1.5.3**

(A) (Editorial) Amend as follows: “...an inspection to verify the legibility and adequacy of the marking, ...”.

(B) The last sentence is not clear. Perhaps it could be amended as follows: “Checking of the insulation shall be....”.

34. (p. 13) **6.2.2.6**

It is not necessary to amend this section yet for cryogenic receptacles, as there will be no UN certified cryogenic receptacles until the ISO/TC 220 standards are published and referenced in 6.2.2.1. As the requirements in the ISO standards are developed, further changes to the markings might be required; other markings might be needed (e.g. service temperature?), and some markings should be repeated on both the inner pressure receptacle and the outer jacket.

35. (p. 15) **6.2.2.6.3(q)**

(Editorial) Amend as follows: “In the case of refrigerated liquefied gases....”.

36. (p. 15) **6.2.2.6.4**

(A) Perhaps “groups” should be changed to “lines”, and “grouping” should be changed to “line” (in 3 places).

(B) The second bullet point should be amended as follows: “The operational marks specified in 6.2.2.6.2 shall be the middle grouping line, shall include and the test pressure (f) which shall be immediately preceded by the working pressure (i) when the latter is required.”

37. (p. 15) **6.2.2.6.6**

See comment 2 in UN/SCETDG/20/INF.13.
