

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

Thirty-fourth session
Geneva, 1-9 December 2008
Item 4 (b) of the provisional agenda

LISTING, CLASSIFICATION AND PACKING

Amendment to UN 3468, Hydrogen in a metal hydride storage system

Transmitted by the US Fuel Cell Council

Background

1. In response to comments received over the microphone from members of the Subcommittee as well as subsequent discussions, the USFCC submits the following INF paper for the Subcommittee's review and consideration. This INF paper contains a consolidated summary of all changes as requested.
2. As recommended by some members of the Subcommittee, this paper now proposes to incorporate a new definition for a *metal hydride storage system* into 1.2.1, in place of the previously proposed special provision 32y.
3. This paper takes into account the preference indicated by the Subcommittee to incorporate requirements for UN 3468 into a separate packing instruction P20X, and further incorporates changes into P20X as recommended both over the microphone and during subsequent discussions.
4. In particular, P20X has been amended to include the proper requirements for periodic inspection and testing, including a maximum periodicity of 5 years between inspections. Consequently, we have maintained the proposed modification to 4.1.6.1.10. Furthermore, P20X has been amended to clarify that metal hydride storage systems shall meet ISO 16111:2008 and that conformity shall be assessed in accordance with 6.2.2.5, to remove any ambiguity regarding certification or approval of the systems.
5. We agree in principle with the expert from the UK and the representative of ISO that the requirements for design and construction may be clearer if incorporated into a separate section; however, we would recommend that this would be a more appropriate task to take on as part of a

larger activity to consolidate requirements for energy storage systems or the like, potentially including fuel cells and batteries, that could be considered as a work item for the next biennium. As an interim solution, we do propose that the requirements as presently proposed be incorporated into Chapter 6.2 for the time being, until such time as a larger project can be undertaken to consider drafting a new part for the Model Regulations.

6. A number of improvements have been made to the proposed amendments to Chapter 6.2, in response to comments received from the representatives of ISO and CGA.

Proposal

1. In the Dangerous Goods List of Chapter 3.2.

In column (6) for UN 3468, add special provision 32x.

In column (8) for UN 3468, replace P099 with P20X.

2. Insert in Section 1.2.1 the following new definition:

Metal hydride storage system means a single complete hydrogen storage system, including a receptacle, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the transport of hydrogen only.

3. In Section 1.2.1, modify the following definition, with new text underlined as follows:

Pressure receptacle is a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal hydride storage systems and bundles of cylinders;

4. Insert in section 3.3.1 the following new special provision:

32x Metal hydride storage system(s) installed in conveyances or in completed conveyance components or intended to be installed in conveyances shall be approved by the competent authority before acceptance for transport. The transport document shall include an indication that the package was approved by the competent authority or a copy of the competent authority approval shall accompany each consignment.

5. Insert the following new packing instruction in sub-section 4.1.4.1.

P20X	PACKING INSTRUCTION	P20X
This instruction applies to UN 3468.		
(1)	For metal hydride storage systems, the general packing requirements of 4.1.6.1 shall be met.	
(2)	Only pressure receptacles not exceeding 150 litres in water capacity and having a maximum developed pressure not exceeding 25 MPa are covered by this packing instruction.	
(3)	Metal hydride storage systems meeting the applicable requirements for the construction and testing of pressure receptacles containing gas of Chapter 6.2 are authorised for the transport of hydrogen only.	
(4)	When steel pressure receptacles and composite pressure receptacles with steel liners are used, only those bearing the “H” mark, in accordance with 6.2.2.9.1(j) shall be used.	
(5)	Metal hydride storage systems shall meet the service conditions, design criteria, rated capacity, type tests, batch tests, routine tests, test pressure, rated charging pressure and pressure relief devices for transportable metal hydride storage systems specified in ISO 16111:2008 and their conformity and approval shall be assessed in accordance with 6.2.2.5.	
(6)	Metal hydride storage systems shall be filled with hydrogen at a pressure not exceeding the rated charging pressure shown in the permanent markings on the system as specified by ISO 16111:2008.	
(7)	The periodic test requirements for a metal hydride storage system shall be in accordance with ISO 16111:2008 and carried out in accordance with 6.2.2.6, and the maximum interval between periodic inspections shall not exceed five (5) years.	

6. Amendments to 4.1:

Add new paragraph at the bottom of 4.1.6.1.8:

“For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 shall be met.”

4.1.6.1.10 Insert “or P20X, as applicable” after “P200”, at the end of the first sentence.

7. Amendments to Chapter 6.2:

6.2.1.1.5 Add the following sentence at the end:

“The test pressure of a metal hydride storage system shall be in accordance with P20X.”

6.2.1.3.4. Add “P20X,” after “P200 (1),” and before “or 6.2.1.3.6.4”.

6.2.1.5.1 Add “and metal hydride storage systems” after “cryogenic receptacles”.

Add new paragraphs:

“6.2.1.5.3 For metal hydride storage systems, it shall be verified that the inspections and tests specified in 6.2.1.5.1 (a), (b), (c), (d), (e) if applicable, (f), (g), (h) and (i) have been performed on an adequate sample of the receptacles used in the metal hydride storage system. In addition, on an adequate sample of metal hydride storage systems, the inspections and tests specified in 6.2.1.5.1 (c) and (f) shall be performed, as well as 6.2.1.5.1 (e), if applicable, and inspection of the external conditions of the metal hydride storage system.

Additionally, all metal hydride storage systems shall undergo the initial inspections and tests specified in 6.2.1.5.1 (h) and (i), as well as a leakproofness test and a test of the satisfactory operation of the service equipment.”

6.2.2.1.5 Insert new paragraph 6.2.2.1.5 and table to read as follows:

“6.2.2.1.5 The following standards apply for the design, construction, and initial inspection and test of UN metal hydride storage systems, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride
----------------	---

“

6.2.2.2 In the introductory paragraph, insert “or P20X” after “P200” in the text between brackets

6.2.2.3 Insert the following sentence and table at the end of the current text under the current table:

“For UN metal hydride storage systems, the requirements specified in the following standard apply to closures and their protection:

ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride
----------------	---

“

6.2.2.4 In the introductory sentence, insert “and UN metal hydride storage systems” after “UN cylinders” and add the following row at the end of the table:

ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride
----------------	---

“

8. Add at the end of the first paragraph of 6.2.2.7 the following sentence:

“Marking requirements for UN metal hydride storage systems are given in 6.2.2.9.”


9. Add the following new sub-section in Chapter 6.2 regarding the marking of UN metal hydride storage systems:

“6.2.2.9 Marking of UN metal hydride storage systems

UN metal hydride storage systems shall be marked clearly and legibly with the marks listed below. These marks shall be permanently affixed (e.g. stamped, engraved, or etched) on the metal hydride storage system. The marks shall be on the shoulder, top end or neck of the metal hydride storage system or on a permanently affixed component of the metal hydride storage system. Except for the UN packaging

symbol, the minimum size of the marks shall be 5 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm and 2.5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm. The minimum size of the UN packaging symbol shall be 10 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm and 5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm.

6.2.2.9.1 The following marks shall be applied:

- (a) The United Nations packaging symbol  ;

This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5 or 6.6.

- (b) “ISO 16111” (the technical standard 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;
- (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. “/”);
- (f) The test pressure of the receptacle in bar, preceded by the letters “PH” and followed by the letters “BAR”;
- (g) The rated charging pressure of the metal hydride storage system in bar, preceded by the letters “RCP” and followed by the letters “BAR”;
- (h) 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;
- (i) The serial number assigned by the manufacturer;
- (j) In the case of steel receptacles and composite receptacles with steel liner, the letter “H” showing compatibility of the steel (see ISO 11114-1:1997); and,
- (k) In the case of metal hydride storage systems having limited life, the date of expiry, denoted by the letters “FINAL” followed by the year (four digits) followed by the month (two digits) separated by a slash (i.e. “/”).

The certification marks specified in (a) to (e) above shall appear consecutively in the sequence given. The test pressure (f) shall be immediately preceded by the rated charging pressure (g). The manufacturing marks specified in (h) to (k) above shall appear consecutively in the sequence given.

6.2.2.9.2 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. Such marks shall not conflict with required marks.

6.2.2.9.3 In addition to the preceding marks, each metal hydride storage system 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.”
