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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 **7 December 2012**

Forty-second session
Geneva, 3 – 11 December 2012
Item 2 (c) of the provisional agenda
Recommendations made by the Sub-Committee on its thirty-ninth, fortieth and forty-first sessions and pending issues: electric storage systems

Adsorbed Gas Classification and Packaging

Transmitted by the Council on Safe Transportation of Hazardous Articles (COSTHA)

Agenda for Lunchtime Working Group

To facilitate discussions on the Adsorbed Gas proposals in 2012/91 and INF35, the following items will be discussed:

1. Review of revised text incorporating comments received from Subcommittee
2. Discussion on Entries
   - (a) New entries vs. Existing entries
   - (b) New entries (phased approach?)
     - (i) N.O.S.
     - (ii) Additional specific gas entries (CGA proposal)
3. Inspection interval
   - (a) 5 vs. 10 year
   - (b) Alternate language

Proposals

4. Amend 2.2.1.2 to include a new transport condition of a gas as follows:

" (e) Adsorbed Gas—a gas which when packaged for transport is adsorbed onto a solid porous material resulting in an internal receptacle pressure of less than 101.3 kPa at 20 ℃ and less than 300 kPa at 50 ℃."

5. Add nine new entries (UN 3XXX, UN 3YYY, UN 3AAA, UN 3BBB, UN 3CCC, UN 3DDD, UN 3EEE, UN 3FFF, UN 3GGG) in Class 2.

(a) Add nine new entries to the Dangerous Goods List, as follows:

UN No.	Name and description	Class or Division	Subsi-diary risk	UN Packing group	Special provi-sions	Limited and excepted quantities		Packagings and IBC's		Portable tanks and bulk containers	
								Packaging instructions	Special packing provisions	Instruc-tions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3XXX	ADSORBED GAS, FLAMMABLE, N.O.S.	2.1			274 XYZ	0	E0	P2YY			
3YYY	ADSORBED GAS, N.O.S.	2.2			274 XYZ	0	E0	P2YY			
3AAA	ADSORBED GAS, TOXIC, N.O.S.	2.3			274 XYZ	0	E0	P2YY			
3BBB	ADSORBED GAS, OXIDIZING, N.O.S.	2.2	5.1		274 XYZ	0	E0	P2YY			
3CCC	ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		274 XYZ	0	E0	P2YY			
3DDD	ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.	2.3	5.1		274 XYZ	0	E0	P2YY			
3EEE	ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.	2.3	8		274 XYZ	0	E0	P2YY			
3FFF	ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2.3	2.1 8		274 XYZ	0	E0	P2YY			
3GGG	ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2.3	5.1 8		274 XYZ	0	E0	P2YY			

(b) Add the nine new N.O.S. entries to Appendix A

6. Add a new packing instruction P2YY as follows:

P2YY PACKING INSTRUCTION P2YY

This instruction applies to Class 2 adsorbed gases.

(1) The following packagings are authorized provided the general packaging requirements of 4.1.6.1 are met.

(a) Cylinders constructed as specified in Chapter 6.2 and in accordance with ISO 11513:2011 or ISO 9809-1:2010; or

(b) [Cylinders constructed before [1 January 2015] in accordance with a specification approved by the competent authority.]

(2)The pressure of each filled adsorbed gas cylinder shall be less than 101.3 kPa at 20 °C and shall not exceed 300 kPa at 50 °C.

(3) The minimum test pressure of the cylinder shall be 21 bar.

(4) The burst pressure of the cylinder shall not be less than 94.5 bar.

(5) In no case shall the internal pressure at 65 °C of the filled adsorbed gas cylinder exceed the test pressure of the cylinder.

(6) The adsorbent material shall be compatible with the cylinder and shall not form harmful or dangerous compounds with the gas to be adsorbed. The gas in combination with the adsorbent material shall not affect or weaken the cylinder or cause a dangerous reaction (e.g. a catalyzing reaction).

(7) The quality of the adsorbent shall be verified at the time of each fill to assure the pressure and chemical stability requirements of packing instruction P2YY are met each time an adsorbed gas package is offered for transport.

(8) The adsorbent material shall not meet the criteria of any of the Classes or Divisions in these Regulations.

(9) Requirements for adsorbed gas cylinders and closures containing toxic gases with an LC_{50} less than or equal to 200 ml/m^3 (ppm).

a. Valve outlets shall be fitted with pressure retaining gas-tight plugs or caps having threads matching those of the valve outlets.
b. Each valve shall either be of the packless type with non-perforated diaphragm, or be of a type which prevents leakage through or past the packing.
c. Each adsorbed gas cylinder and closure shall be tested for leakage after filling.
d. Each valve shall be capable of withstanding the test pressure of the cylinder and be directly connected to the cylinder by either a tapered thread or other means which meets the requirements of ISO 10692-2:2001.
e. Adsorbed gas cylinders and valves shall not be fitted with a pressure relief device.

(10) Valve outlets for adsorbed gas cylinders containing pyrophoric gases shall be fitted with gas-tight plugs or caps having threads matching those of the valve outlets.

(11) The following material compatibility special packaging provisions shall apply to adsorbed gas cylinders for the specific gas being adsorbed:

Material compatibility

a: Aluminium alloy cylinders shall not be used.

b: Copper valves shall not be used.

c: Metal parts in contact with the contents shall not contain more than 65% copper.

d: When steel cylinders are used, only those bearing the "H" mark in accordance with 6.2.2.7.4 (p) are permitted.

(12) Each cylinder shall be leak tested using a helium leak test as specified in ISO 11513:2011

(13) The filling procedure shall be in accordance with Annex A of ISO 11513:2011

(14) The maximum test period for periodic inspections shall be [10] years.

(15) [The interval between periodic inspections for adsorbed gas cylinders may be extended to 10 years if approved by the competent authority of the country of use.]

(16) Periodic inspection and test shall be in accordance with Annex B of ISO 11513:2011

7. Amend 6.2.1.1.5 as follows:

The test pressure of cylinders, tubes, pressure drums and bundles of cylinders shall be in accordance with packing instructions P 200, or, for a chemical under pressure, with packing instruction P206. The test pressure of a closed cryogenic receptacle shall be in accordance with packing instruction P203. The test pressure of a metal hydride storage system shall be in accordance with packing instruction P205. <u>The test pressure of a cylinder for a gas adsorbed onto a porous solid shall be in accordance with packing instruction P2YY.</u>

8. Add ISO 11513:2011 and ISO 9809-2 :2010 to the list of UN pressure receptacles in sub section 6.2.2.1 in the new sub section 6.2.2.1.6 as follows :

"6.2.2.1.6 The following standards apply for the design, construction and initial inspection and test of UN cylinders for gases adsorbed onto a porous solid, except that the inspection requirements related to the conformity assessment system and approval for cylinders shall be in accordance with 6.2.2.5.

Reference	**Title**
ISO 11513:2011	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection
ISO 9809-1:2010	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa

9. Amend the list of standards for periodic inspection and test in 6.2.2.4 to include ISO 11513:2011 by adding the standard to the end of the list as follows :

ISO 11513:2011	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection

Additional Entries To Be Considered

UN 3HHH	BORON TRIFLUORIDE, ADSORBED	2.3 (8)
UN 3JJJ	CHLORINE, ADSORBED	2.3 (5.1) (8)
UN 3KKK	SILICON TETRAFLUORIDE, ADSORBED	2.3 (8)
UN 3LLL	ARSINE, ADSORBED	2.3 (2.1)
UN 3MMM	GERMANE, ADSORBED	2.3 (2.1)
UN 3NNN	PHOSPHORUS PENTAFLUORIDE, ADSORBED	2.3 (8)
UN 3PPP	PHOSPHINE, ADSORBED	2.3 (2.1)
UN 3RRR	HYDROGEN SELENIDE, ADSORBED	2.3 (2.1)