

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

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Item 2 (b) of the provisional agenda

**Recommendations made by the Sub-Committee on its thirty-ninth,
fortieth and forty-first sessions and pending issues: listing, classification and packing**

Comments on ST/SG/AC.10/C.3/2012/91 – Adsorbed gas classification and packaging

Transmitted by the Compressed Gas Association (CGA)

Introduction

1. In ST/SG/AC.10/C.3/2012/91, the Council on Safe Transportation of Hazardous Articles (COSTHA) proposes to add new requirements in the Model Regulations regarding the classification and packaging of adsorbed gases.
2. CGA generally supports the proposals in ST/SG/AC.10/C.3/2012/91 but would like to provide the following comments for consideration.

New entries in the Dangerous Goods List

3. In paragraph 45 of ST/SG/AC.10/C.3/2012/91, nine new N.O.S. entries are proposed for adsorbed gases, with the various possible combinations of hazard division and subsidiary risks.
4. CGA has some concern regarding consolidating all adsorbed gases into only the nine N.O.S. entries, as it may over-generalise information for emergency responders and product handlers. For example, certain handling and emergency response measures may be different for very toxic gases with LC₅₀ less than or equal to 200 ml/m³ (ppm), compared to those for other less toxic gases (which may have LC₅₀ values up to 5000 ml/m³ (ppm)). However, as proposed in ST/SG/AC.10/C.3/2012/91, all adsorbed gases of Division 2.3, regardless of LC₅₀ values, would be transported as “UN 3AAA ADSORBED GAS, TOXIC, N.O.S.”. CGA recognises that COSTHA’s proposal includes the application of special provision 274, which would require that the proper shipping name be supplemented with the technical name of the gas, for documentation and package marking. However, getting specific handling and emergency response information may be difficult or delayed when specifying the technical name especially for less commonly-known gases; attaining such specific information may be easier and more prompt if it is associated with a UN number specific to a particular gas.
5. In paragraph 44 of ST/SG/AC.10/C.3/2012/91, it is proposed to amend 2.2.1.2 of the Model Regulations to add a new transport condition of a gas, “adsorbed gas”, in a new paragraph (e). The other transport conditions of gases currently specified in 2.2.1.2(a) to (d) are “compressed gas”, “liquefied gas”, “refrigerated liquefied gas”, and “dissolved gas”. For gases, the transport condition can be an important part of determining how to handle or

respond with respect to a specific gas. In the Dangerous Goods List, there are already separate entries for a gas under different transport conditions, for example:

UN 1049	HYDROGEN, COMPRESSED
UN 1966	HYDROGEN, REFRIGERATED LIQUID
UN 1013	CARBON DIOXIDE
UN 2187	CARBON DIOXIDE, REFRIGERATED LIQUID
UN 1050	HYDROGEN CHLORIDE, ANHYDROUS
UN 2186	HYDROGEN CHLORIDE, REFRIGERATED LIQUID
UN 1001	ACETYLENE, DISSOLVED
UN 3374	ACETYLENE, SOLVENT FREE

(Note that the proper shipping names for “liquefied gases” are differentiated by having no additional text regarding the transport condition, for example as shown for carbon dioxide and hydrogen chloride above.)

6. CGA proposes that the following specific gases, which already have individual UN numbers for their liquefied gas transport condition and are currently known to be transported as adsorbed gases, be assigned new individual entries for their adsorbed gas transport condition. The liquefied gases are as follows:

UN 1008	BORON TRIFLUORIDE	2.3 (8)
UN 1017	CHLORINE	2.3 (5.1) (8)
UN 1859	SILICON TETRAFLUORIDE	2.3 (8)
UN 2188	ARSINE	2.3 (2.1)
UN 2192	GERMANE	2.3 (2.1)
UN 2198	PHOSPHORUS PENTAFLUORIDE	2.3 (8)
UN 2199	PHOSPHINE	2.3 (2.1)
UN 2202	HYDROGEN SELENIDE, ANHYDROUS	2.3 (2.1)

The proposed adsorbed gases would be as follows:

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

For these eight new proposed adsorbed gas entries above, columns 5 to 11 in the Dangerous Goods List would be the same as for the proposed N.O.S. entries in paragraph 45 of ST/SG/AC.10/C.3/2012/91, except that special provision 274 would not apply for these specific adsorbed gas entries.

7. There are also three other specific gases that are currently known to be transported as adsorbed gases:

arsenic pentafluoride
germanium tetrafluoride
phosphorus trifluoride

As liquefied gases, these three gases are currently transported as UN 3308 LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.

As adsorbed gases, CGA supports these gases being transported for the time being as “UN 3EEE ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.” as proposed in paragraph 45 of ST/SG/AC.10/C.3/2012/91.

In the future, the Sub-Committee could perhaps consider creating six new entries in the Dangerous Goods List for these three specific gases in their liquefied and adsorbed transport conditions. (Other requirements in the Model Regulations would have to be amended accordingly, such as Table 2 in P200 for the liquefied gases.)

8. It is anticipated that other gases will be transported as adsorbed gases in the future, as the technology becomes more accessible. CGA supports the nine proposed N.O.S. entries, as described in paragraph 45 of ST/SG/AC.10/C.3/2012/91, to facilitate the transport of other gases that are not presently transported as adsorbed gases but may be in the future.

Special provision XYZ

9. In paragraph 46 of ST/SG/AC.10/C.3/2012/91, a new special provision XYZ is proposed. In the second paragraph of the proposed special provision XYZ, it states: “At any time during the normal condition of transport, the internal pressure of the pressure receptacle cannot exceed the working pressure of the receptacle.”

10. “Working pressure” of the pressure receptacle is not further specified in the proposals in ST/SG/AC.10/C.3/2012/91 for adsorbed gases. “Working pressure” is also not defined in the proposed referenced standard ISO 11513:2011, and there is only a note in the proposed referenced standard ISO 9809-1:2010 describing the general concept of “working pressure” for cylinders for compressed gases. In the Model Regulations, “working pressure” is only specified for compressed gases and a limited number of liquefied and dissolved gases in P200.

11. In the proposed special provision XYZ, CGA recommends that the aforementioned sentence referring to “working pressure” be deleted, as this term is not well specified for adsorbed gases, and the proposal adequately requires that the internal pressure at 65 °C not exceed the test pressure of the pressure receptacle:

XYZ ...

The pressure receptacle containing the adsorbed gas shall be at a pressure less than 101.3 kPa at the time the filled pressure receptacle is closed and thermally equilibrated to 20 °C. The internal pressure of the filled pressure receptacle shall not exceed 300 kPa at 50 °C. ~~At any time during the normal condition of transport, the internal pressure of the pressure receptacle cannot exceed the working pressure of the receptacle.~~—In no case shall the internal pressure at 65 °C exceed the test pressure of the pressure receptacle.

...

Packing instruction P2YY

12. In paragraph 47 of ST/SG/AC.10/C.3/2012/91, a new packing instruction P2YY is proposed. In (1) of the proposed packing instruction P2YY, it is required that the requirements of 4.1.6.1 of the Model Regulations be met, as well as ISO 11513:2011 or ISO 9809-1:2010.

13. Although there are requirements throughout 4.1.6.1 of the Model Regulations to meet certain requirements of Chapter 6.2, CGA proposes that it be clarified in the proposed packing instruction P2YY that the requirements of Chapter 6.2 must be met:

P2YY ...

- (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.
- (2) ...

ISO standards referenced in 6.2.2

14. In paragraph 49 of ST/SG/AC.10/C.3/2012/91, a new 6.2.2.1.6 is proposed, listing the standards that apply for the design, construction, and initial inspection and test of UN cylinders for adsorbed gases.

15. In the current Model Regulations, although ISO 9809-1 is already included in the list of standards for UN cylinders in 6.2.2.1.1, ISO 9809-1 is again included in the list of standards in 6.2.2.1.3 to specify that it applies for UN acetylene cylinder shells. CGA recommends that ISO 9809-1 also be added to the list of standards in the proposed 6.2.2.1.6, to clarify that ISO 9809-1:2010 also applies for UN cylinders for adsorbed gases:

6.2.2.1.6 The following standards ~~applyies~~ 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:~~

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
<u>ISO 9809-1:2010</u>	<u>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</u>