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**COMMITTEE OF EXPERTS ON THE TRANSPORT OF
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HARMONIZED SYSTEM OF CLASSIFICATION
AND LABELLING OF CHEMICALS**

Sub-Committee of Experts on the
Transport of Dangerous Goods

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TRANSPORT OF GASES

Proposals to amend Chapter 6.2

Transmitted by the expert from Germany

1. Introduction

In this document, some aspects for the transport of gases, especially with regard to acetylene cylinders and cylinder valves and fittings are considered.

The issues addressed were revised on the occasion of a review of Chapter 6.2 of RID and ADR motivated by the intended re-alignment of the UN Recommendations on the Transport of Dangerous Goods and the ADR/RID. Issues mentioned in this document should be addressed in both the UN Recommendations and ADR/RID.

2. Porous material for acetylene cylinders

Standards which apply to the design, construction and initial inspection of acetylene cylinders are listed in 6.2.2.1.3. There, ISO 3807-1 and -2 are listed for the porous material in the acetylene cylinder. These standards describe type testing of the acetylene cylinder completed

with the porous material in order to ensure that it is suitable for acetylene cylinders and capable of preventing the spread of decomposition of the acetylene in the material. The requirement to perform these tests is given directly in the Model Regulations themselves and reads:

"Pressure receptacles for UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free, shall be filled with a porous material, uniformly distributed, of a type that conforms to the requirements and testing specified by the competent authority and which:

- (a) is compatible with the pressure receptacle and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001; and*
- (b) is capable of preventing the spread of decomposition of the acetylene in the material.*

In the case of UN 1001, the solvent shall be compatible with the pressure receptacles".

However, this requirement does not appear in Chapter 6.2 where the above-mentioned standards ISO 3807-1 and -2 are referred to but in 4.1.6.1.2 which gives special packing provisions for goods of class 2 and in general does not refer to requirements for type testing of pressure receptacles.

In general Chapter 4.1 contains the packing instructions and special packing provisions whereas Chapter 6.2 contains requirements regarding construction and testing of pressure receptacles. The differentiation between the contents of these chapters and their assignment to one of the chapters is not always unambiguous. The assignment should be done based on some general considerations regarding the addressee of the requirements and therefore the responsible acting person. Furthermore the nature of the requirement should be considered and should be classified into requirements which have to be fulfilled for each packing or charging process (packing instructions and special provisions) and into requirements which do not require passing of a procedure for each packing but relate more to the general type and condition of the receptacle (such as construction, type testing or periodic inspection).

The cited requirement refers to the type of the porous material. The type tests are carried out before the acetylene cylinder is put into service and most of the tests are destructive tests of the complete cylinder filled with the porous material (e.g. backfire test). These tests cannot be carried out in connection with each packing or charging procedure of the cylinder. Normally the porous material in an acetylene cylinder will not be removed once it has been introduced into the cylinder (only rarely the porous material is removed to re-use the cylinder shell). For these reasons the design type of the porous material is something which is part of the complete pressure receptacle the approval procedure of which is described in Chapter 6.2.

Proposal

In order to adequately reflect the nature of the requirement and to put it into the context of other responsibilities of the same responsible acting person and the standards detailing this requirement, move the following requirement from 4.1.6.1.2 to 6.2.1.1 (e.g. as a new 6.2.1.1.8):

"6.2.1.1.8 Pressure receptacles for UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free, shall be filled with a porous material, uniformly distributed, of a type that conforms to the requirements and testing specified by the competent authority and which:

(a) is compatible with the pressure receptacle and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001; and

(b) is capable of preventing the spread of decomposition of the acetylene in the material. In the case of UN 1001, the solvent shall be compatible with the pressure receptacles."

3. Responsibility for initial inspection and test

There is no information on who is supposed to carry out the initial inspection and test which are required in 6.2.1.4. This is unlike the approach in 6.2.1.5 "Periodic inspection and test" which clearly states the responsibility in the first sentence. Periodic inspections and tests shall be done by a body authorized by the competent authority. The responsibility for the approval is also clearly regulated in 6.2.1.6 on the approval of pressure receptacles. Conformity shall be assessed as required by the competent authority and shall be carried out by an inspection body. Corresponding information on the responsibility for the initial inspection should be included in 6.2.1.4.

Since some of the tests for initial inspection correspond to those for the periodic inspection such as inspection of external and internal condition, inspection of threads, hydraulic pressure test, inspection of the porous material (e.g. with regard to gap), the responsibility for the initial inspection might be the same as for the periodic inspection.

Proposal

In 6.2.1.4 on initial inspection and test, the responsibility for these tests is missing and should be clearly stated.

This might be assigned for example to a body authorized by the competent authority, as in 6.2.1.5 for periodic inspection and test.

4. Periodic inspection of acetylene cylinders

In 6.2.1.5.2 on the periodic inspection of acetylene cylinders it is stated that instead of the tests as required in 6.2.1.5.1, for acetylene cylinders only the external condition (corrosion, deformation) and the condition of the porous material (loosening, settlement) shall be examined.

This information is not completely correct because in addition pressure-relief devices including fusible plugs and valves and other accessories (if reintroduced into service) shall be examined. This is also described in ISO 10462:2005, the standard for the periodic inspection of acetylene cylinders (this standard will replace ISO 10462:1994 which currently is referred to in 6.2.2.4).

Furthermore, the information in 6.2.1.5.2 regarding the inspection of the porous material given in brackets is not exhaustive and this should be made clear by inserting "e.g.". Moreover, it does not

include the most important aspects of the inspection of the porous material and therefore could be amended by referring also to inspection for cracks and the gap between the porous material and the cylinder shell.

The verb used at the end of 6.2.1.5.2 is not adequate. The terms "shall be examined" should explore "shall be required to be examined" (actually the examination is necessary and not only the requirement).

Proposal

In 6.2.1.5.2, insert "e.g." at the beginning of the list of conditions for the porous material to be examined and add the most important aspects of the inspection of the porous material. Delete "be required to" at the end of the sentence to read "shall be examined":

6.2.1.5.2 For pressure receptacles intended for the transport of UN 1001 acetylene, dissolved and UN 3374 acetylene, solvent free, only the external condition (corrosion, deformation), ~~and~~ the condition of the porous material (e.g. cracks, loosening, settlement, gap) and, if to be reintroduced into service, valves, other accessories and pressure-relief devices shall ~~be required to~~ be examined.

5. Applicability of approval procedures to closures

The wording "pressure receptacles and their closures" is used correctly in some paragraphs of the UN Model Regulations (see 6.2.1.1.1, 6.2.1.2.1, 6.2.1.2.2). In 6.2.2.3, the word "closures" is used correctly without mentioning pressure receptacles. This reflects the applicability of the respective requirement. However, in most cases only the wording "pressure receptacle" without the addition "closures" is used. In these cases it seems necessary to check whether "pressure receptacles and their closures" or "pressure receptacles or closures" should be used. The main question is whether the requirements of Chapter 6.2 are also applicable to closures. Are closures for example to be tested, approved and marked in the same way as receptacles? Especially requirements for the marking (6.2.2.7) are not or at least not completely applicable to closures.

Proposal

In Chapter 6.2, the text should be checked with regard to the correct use of the wording "pressure receptacles" or "pressure receptacles and their closures" or "pressure receptacles or closures". The result should allow a clear distinction between the requirements which are applicable to pressure receptacles only and those which are applicable to closures as well.

6. Non-refillable cylinder shells for acetylene cylinders

Standards for acetylene cylinders are given in 6.2.2.1.3. In addition to standards for refillable seamless steel gas cylinders, there is a standard for non-refillable metallic gas cylinders mentioned for the cylinder shell of acetylene cylinders.

The expert from Germany does not know whether a non-refillable metallic gas cylinder filled with a porous mass ever has passed type testing as required for acetylene cylinders by ISO 3807-

1 or ISO 3807-2. The type tests required by these standards are rather extensive and expensive and include tests such as the backfire test or the bonfire test. The preparation of gas cylinders with porous material for the transport of acetylene is a rather complex, energy-intensive and time-consuming procedure. The service life of the porous material and the complete acetylene cylinder amounts to decades. For these reasons, we doubt that a non-refillable gas cylinder might be prepared with porous material in such a way that all requirements regarding testing and approval are followed. We rather fear that reference to non-refillable cylinders in connection with acetylene cylinders might assist misuse.

Proposal

In 6.2.2.1.3, delete the reference to standard ISO 11118:1999 for non-refillable metallic gas cylinders to be used as cylinder shells for acetylene cylinders.

7. Operational marks for acetylene cylinders

Sub-paragraph 6.2.2.7.2(j) requires that the water capacity of pressure receptacles shall be indicated for liquefied and refrigerated liquefied gases. However, this information is necessary for acetylene cylinders as well because the permissible content of acetylene is given in kg acetylene per L of cylinder water capacity (this information is given in the approval of the porous mass). This is also required by ISO/DIS 13769:2005 “Gas cylinders – Stamp marking”.

There is no sub-paragraph requiring marking of the identity of the porous mass of an acetylene cylinder. However, without knowing the identity of the porous mass, an acetylene cylinder cannot be filled because all filling conditions are given in the approval of the porous mass. This is also required by ISO/DIS 13769:2005 “Gas cylinders – Stamp marking”.

There is no sub-paragraph requiring marking of either the total mass or the acetylene content of acetylene cylinders. However, marking of the total mass is also required by ISO/DIS 13769:2005 “Gas cylinders – Stamp marking”.

Proposal

In 6.2.2.7.2(j), add cylinders for acetylene to the list of pressure receptacles for which marking of the water capacity is required.

In 6.2.2.7.2, add a sub-paragraph requiring marking of the identity of the porous material for acetylene cylinders. The wording could be:

“(x)In the case of pressure receptacles for UN 1001 acetylene dissolved and UN 3374 acetylene, solvent free, the identity of the porous material;”.

In 6.2.2.7.2, add a sub-paragraph requiring marking of the total mass or acetylene content for acetylene cylinders: The wording could be:

“(y)In the case of pressure receptacles for UN 1001 acetylene, dissolved and UN 3374 acetylene, solvent free the total mass, preceded by the letters “TOTAL” and followed by the letters “KG” or the maximum acetylene charge (see note), excluding saturation gas, preceded by the letters “MAX” and followed by the letter “KG”.

Note: The stamped value may be less than the approved value”.
