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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

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TRANSPORT OF GASES

Proposals to amend the criterion for classifying gas mixtures as oxidizing

Transmitted by The European Industrial Gases Association (EIGA)

Introduction

Comments received on the EIGA proposed document ST/SG/AC.10/C.3/2004/5 indicate that the objective and the consequences of the EIGA proposal require further clarification.

Objective:

1. The objective of the EIGA proposal is to qualify the criteria for oxidizing gases in:

   2.2.2.1 (b) (ii):.....*contribute to the combustion of other material more than air does*.

2. The question is how much is more? 1 ppm, 1000 ppm, 1% from the normal concentration? The same question can be raised for mixtures that should be considered as asphyxiants according to 2.2.2.1 (b) (i) because they contain less oxygen than in the atmosphere. Is a mixture containing 20% of oxygen asphyxiant? Everybody accepts that there is an area around the "standard" concentration of 21% of oxygen where mixtures with oxygen are considered to be "similar to air".

3. This range of concentrations "similar to air", where no additional precautions is necessary, is generally accepted in the Gases Industry to be between 19.5% and 23.5% of oxygen.

4. The low threshold has no significance for the classification of breathing or respiratory mixtures because they would remain *non-flammable, non-toxic, non-oxidizing* and mixtures with less than 21% are distributed without being considered as "asphyxiants".

5. On the high threshold side, the practice has only been recognised for *UN 1002 air, compressed* with the introduction of SP292. But other respiratory mixtures of oxygen are on the market without being considered as oxidizing (e.g. 22% oxygen in Helium is a respiratory medical gas in Europe).

6. *ISO 10156:1996 Transportable gas cylinders - Gases and gas mixtures - Determination of flammability and oxidizing ability of gases and gas mixtures* is being revised at ISO and the draft revised text includes the new criterion of 23.5 instead of 21.

Consequences

Gas mixtures containing oxygen or other oxidizing gases are generally not classified by testing but by calculation method included in ISO 10156 with the criterion:

$$OP = \sum_i x_i C_i \geq 21$$

Where:
OP = oxidizing power
Xi = the concentrations of the oxidizing components
Ci = the coefficient of oxygen equivalency oxidizing power of the different oxidizing components

Ci is 1 for oxygen and the proposed values in IS0 10156 are as follows:

Table 1 — Coefficients of oxygen equivalency (Ci) of toxic and corrosive gases

Oxidizing gas	Ci coefficient
Bis-trifluoromethylperoxide	40 [a]
Bromine pentafluoride	40 [a]
Bromine trifluoride	40 [a]
Chlorine	0,7
Chlorine pentafluoride	40 [a]
Chlorine trifluoride	40 [a]
Fluorine	40 [a]
Iodine pentafluoride	40 [a]
Nitric oxide	0,3
Nitrogen dioxide	1 [b]
Nitrogen trifluoride	1,6
Nitrogen trioxide	40 [a]
Oxygen difluoride	40 [a]
Ozone	40 [a]
Tetraflurohydrazine	40 [a]

[a] For non tested oxidizing gases, the C_i values are fixed conservatively to be 40.

[b] Derived from nitric oxide and nitrogen trifluoride (see annex A).

Example:
If the oxidising gas has a Ci of 40 (e.g. Fluorine) the cut-off value of mixtures containing that gas will become 0.5875% (23.5/40) instead of 0.525 % (21/40).

Conclusions

The proposal of EIGA to add a note after 2.2.2.1 (b) (ii) is in line with Industry practices and the forthcoming revision of ISO 10156.

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