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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 14 October 2020** | |
| **Sub-Committee of Experts on the Transport of Dangerous Goods** |  |
| **Fifty-seventh session** |  |
| Geneva, 30 November - 8 December 2020  Item 5 (b) of the provisional agenda  **Transport of gases: miscellaneous** |  |

Information on document ST/SG/AC.10/C.3/2020/19/Rev.1 “Gas mixtures containing fluorine (UN 1045)”

Transmitted by the expert from Germany

Introduction

1. On 7 April 2020, Germany submitted document ST/SG/AC.10/C.3/2020/19/Rev.1 “Gas mixtures containing fluorine (UN 1045)”, which proposed that working pressures be laid down. So far, no working pressures and test pressures have been laid down in the Model Regulations for gas cylinders containing fluorine mixtures.
2. In the comments provided on the above document, there have been questions as to the background to the 35% limit proposed in no. 5 of the document. The 35% limit means that gas mixtures containing 35% fluorine or more have to be treated like pure fluorine and that a maximum allowable working pressure of 30 bar is laid down for them.

Background to the 35% limit

3. In the 1990s, US-based Air Products and Chemicals Inc. conducted a series of studies on the flammability of metals in fluorine, fluorine nitrogen mixtures and nitrogen trifluoride [1].

4. The tests to examine flammability using samples made of carbon steel showed that, at a fluorine concentration of 35% or more, the working pressure only had a minor influence on the flammability of the steel samples.

5. EIGA and CGA [2] used these findings as a basis when assessing fluorine gas mixtures, even though the conditions of the tests (samples, cleaning, source of ignition, etc.) differed from those to be expected in the preparation and operation of gas cylinders.

6. The 35% limit was incorporated into the German proposal to safely rule out fire and explosion hazards when dealing with mixtures containing high fluorine concentrations.



Propagation of Combustion of Carbon Steel in F2/N2 Mixtures [1]

Action to be taken

7. The Sub-Committee is asked to take note of the informal paper and consider it when taking a decision on document ST/SG/AC.10/C.3/2020/19/Rev.1.

[1] Gugliemini, C. J., Kadri, S. H., Martrich, R. L., Slusser, J. W., Vera, J., Werley, B. L., and Woytek, A. J., "Flammability of Metals in Fluorine and Nitrogen Trifluoride", Flammability and Sensitivity of Materials in Oxygen-Enriched Atmospheres: Seventh Volume, ASTM STP 1267, Dwight, D. Janoff and William T. Royals, Eds, American Society for Testing and Materials, Philadelphia, 1995.

[2] Doc 140/18, Code of Practice Compressed Fluorine and Mixtures with Inert Gases