

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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Item 3 of the provisional agenda

Listing, classification and packing

Fire suppression devices that are initiated by an explosive

Presented by the Council on the Safe Transport of Hazardous Articles (COSTHA)

1. There are several innovative fire suppression safety devices that disperse fine particles using an explosive initiator that are commonly transported worldwide. The classification of these devices is sometimes challenged because they contain a small amount of Class 1, Division 1.4 explosives. The explosive device is used to disperse aerosol fire suppression material intended to extinguish fires. These devices are used in many applications including vehicles, power generation plants, data storage facilities, flammable liquid storage cabinets, unit load devices on aircraft, in restaurant frying cabinets and for many other applications. Based on statistics from one manufacturer of these fire suppression articles, nearly 500,000 of these articles have been shipped all over the world without any indication of an accidental discharge nor fire damage caused by any packaged unit.

2. The aerosol fire suppression technology is recognized as a distinct fire extinguishing technology from all other fire extinguishing technologies under NFPA 2010, Standard for Fixed Aerosol Fire-Extinguishing Systems. Under NFPA 2010, the specific description for these products is listed as “Condensed Aerosol” agents. A “Condensed Aerosol” is defined as an extinguishing medium consisting of finely divided solid particles, generally less than 10 microns in diameter, and gaseous matter, generated by a combustion process of a solid aerosol-forming compound. The solid fire suppression particles that are dispersed from the article are not combustible “smoke” that results from a typical pyrotechnic combustion or explosion, but alkali metal salts such as potassium carbonate K_2CO_3 and potassium bicarbonate $KHCO_3$. The aerosol fire suppressant extinguishes flames where the micro-particle solids come into contact with the flame as a total flooding system. The thermal decomposition of the aerosol potassium-based particle disrupts the combustion process forming the flame where the potassium radical is freed from the aerosol particle and bonds with the flame free radicals. This continuous reaction between the cloud of aerosol surrounding the flame, depletes the available flame free radicals in the combustion process causing the flame to snuff out and extinguish. In other words, this fire suppression agent interferes with the chemical chain reactions that sustain combustion and flame.

3. The fire suppression products are articles as opposed to substances that can be considered safety devices. They are not intended to function with an explosive or pyrotechnic effect and therefore have been approved by the US DOT according to DOT-SP 20600 for transport as a Safety Device, UN 3268. The DOT approved them as a safety device based on technical and test data provided and on the basis that they were subjected to the 6(c) tests

with no explosion of the device, no fragmentation of device casing or pressure receptacle, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or emergency response efforts in the immediate vicinity as required by Special Provision 280.

Special Provision 280 states: “This entry applies to safety devices for vehicles, vessels or aircraft, e.g. air bag inflators, air bag modules, seat-belt pretensioners, and pyro mechanical devices, which contain dangerous goods of Class 1 or of other classes, when transported as components parts and if these articles as presented for transport have been tested in accordance with Test Series 6(c) of Part 1 of the Manual of Tests and Criteria, with no explosion of the device, no fragmentation of device casing or pressure receptacle, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or emergency response efforts in the immediate vicinity ...”.

4. One issue that has been raised is that when the articles are intentionally activated they expel a fire suppression cloud that could be considered by the competent authority as not meeting the criteria for exclusion from Class 1 because it may obscure fire-fighting capability. Therefore, there is concern with ensuring that they can be transported worldwide without potential supply chain impacts based on questions related to their classification. While shipping under the entry “Safety devices, UN 3268, Class 9” is acceptable, owing to their innovative design and use and the increasing quantities that are being shipped it is believed that it would be best to create a new entry in the UN Model Regulations for these articles. Creating a separate new entry will avoid potential confusion and allow for specific requirements to be assessed to the new entry recognizing that the articles are used for fire suppression and life-saving purposes.

5. It is requested that the Sub-Committee provide comments relative to whether creating a new entry such as “Fire Suppression Dispersing Device, UN 35XX, Class 9” for articles that contain a small amount of explosive to disperse a fire suppression material as described in this information paper is preferred or whether the Sub-Committee believes that the articles should continue to be shipped as Safety Devices, UN 3268 Class 9.
