

## **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 of the provisional agenda

**Explosives and related matters**

### **Criteria for excluding articles from Class 1**

#### **Revision of document ST/SG/AC.10/C.3/2010/29**

**Transmitted by the expert from the United States of America**

#### **Introduction**

1. At its thirty-first session, the Sub-Committee considered informal document INF.36 which discussed prospective criteria for classifying an article as non-explosive under the general guidance provided in section 2.1.1.1(b) of the Model Regulations. As this informal paper was favourably received by a number of experts, a formal proposal to amend the Model Regulations was submitted for further consideration at the thirty-third session as ST/SG/AC.10/C.3/2008/54. Based on comments made during the July 2008 session of the Working Group on Explosives, the proposal was further modified to include additional technical references and experimental results (see ST/SG/AC.10/C.3/2009/22). While the proposal was again favourably received, some delegates requested the referencing of an appropriate ISO standard for the acoustical measurements and additional examples of articles which might be eligible for exclusion from Class 1. This revised proposal includes the appropriate ISO standard references together with additional experimental results for a number of articles (see annex) for further consideration by the Sub-Committee.

#### **Definitions and general provisions for Class 1**

2. In Chapter 2.1 of the Model Regulations, the definitions and general provisions section 2.1.1.1 states that Class 1 comprises: (b) “Explosive articles, except devices containing explosive substances in such quantity or of such character that their inadvertent or accidental ignition or initiation during transport shall not cause any effect external to the device either by projection, fire, smoke, heat or loud noise;”

#### **Harmonized criteria for exclusion from Class 1**

3. Section 2.1.3.6.1 of the Model Regulations currently states that “The Competent Authority may exclude an article or substance from Class 1 by virtue of test results and the Class 1 definition.” Specific test criteria for exclusion of substances from Class 1 is addressed in sections 2.1.3.6.2 and 2.1.3.6.3 but no test criteria are given for exclusion of articles consistent with the definitions and general provisions in section 2.1.1.1 (b). The following proposal is offered to address this issue.

## Proposal

Add a new sub-section 2.1.3.6.4 to the Model Regulations to read as follows:

2.1.3.6.4 An article shall be excluded from Class 1 when not less than three unpackaged articles, each individually functioned by its own means of initiation or ignition or external means to function in the designed mode, meet the following test criteria:

(a) None of the external surfaces ~~nearest the explosive substance(s), when measured using multiple calibrated thermocouples~~ in any of the test articles shall exceed 200 °C;

(b) None of the test articles shall produce any rupture or fragmentation of the external casing or shall produce movement of any article more than one metre in any direction;

(c) None of the test articles shall produce an audible report exceeding 150 decibels when measured with an Type 1 Sound Level meter calibrated using ISO Standard 389-7 or 140 decibels when measured with an Type 2 Sound Level Meter calibrated using ISO Standard 389-7 placed not more than 1 meter (39.3 inches) away; and

~~(d)~~—None of the test articles in a closed chamber (with appropriately sized blow-out panels in the event of any pressure build-up) having an approximate volume of one cubic meter for ~~smaller~~ devices less than or equal to 100 grams NEQ of explosive or pyrotechnic substances or of eight ~~(8)~~ cubic meters for ~~larger~~ devices greater than 100 grams NEQ of explosive or pyrotechnic substances, shall produce sufficient smoke, fumes or dust to reduce visibility in that chamber more than ~~fifty (50)~~ percent as measured by a calibrated light (lux) meter or radiometer located one meter from a constant light source located at the midpoint on opposite walls for the one cubic meter chamber or at the midpoint within the eight cubic meter chamber. The general guidance on Optical Density Testing in ISO Standard 5659-1 and the general guidance on the Photometric System described in Section 7.5 in ISO Standard 5659-2 may be used or similar optical density measurement methods designed to accomplish the same purpose may also be employed.

(d) A suitable hood cover surrounding the back and sides of the light meter shall be used to minimize effects of scattered or leaking light not emitted directly from the source.

## Annex

### Test results

A number of articles have been tested in the United States according to these four quantitative criteria and successfully passed with the following results:

Device	Rupture or Fragmentation/ Movement, Meters	Outer Surface Temperature, °C.	ANSI type I Sound Level, Decibels	Smoke Obscuration, Percent
Br1.5 Seat Belt Pretensioner	No rupture or fragmentation/ 0.64m., 0.39m, 0.25m. (all horizontal) <u>(Pass)</u>	44, 41, 39 <u>(Pass)</u>	119.8, 120.3, 120.6 <u>(Pass)</u>	None. <u>(Pass)</u>
MLL Retractor Seat Belt Pretensioner	No rupture or fragmentation/ 0.53m., 0.27m, 0.15m.(all horizontal) <u>(Pass)</u>	37,37,38 <u>(Pass)</u>	17.1, 118.2, 118.6 <u>(Pass)</u>	None. <u>(Pass)</u>
RP2IS Retractor Seat Belt Pretensioner	No rupture or fragmentation/ 0.48m, 0.43m., 0.41m. (all vertical) <u>(Pass)</u>	35,36,36 <u>(Pass)</u>	121.1, 123,.3, 123.8 <u>(Pass)</u>	None. <u>(Pass)</u>
RP+ Retractor Seat Belt Pretensioner	No rupture or fragmentation/ 0.61m. (vertical), 0.30m.(vertical), 0.51m. (horizontal) <u>(Pass)</u>	39, 39, 40 <u>(Pass)</u>	116.7, 118, 123.1 <u>(Pass)</u>	None. <u>(Pass)</u>
AFS-1, (Four Pack) Fire Suppression Apparatus	No rupture, fragmentation or movement (the unit was quite large and heavy) <u>(Pass)</u>	184, 191, 196 (measured beneath the heat shielding) <u>(Pass)</u>	124.7, 125.5, 131.7 <u>(Pass)</u>	15,18,20 <u>(Pass)</u>
<del>Electrical Surge Arrester with AV601Y Isolator with voltage ratings between 3KV and 800KV (contains only a .22 cal blank cartridge)</del>	<del>No rupture, fragmentation or movement</del>	<del>Could not be measured in laboratory due to high voltage required to activate isolator</del>	<del>113-115</del>	<del>None.</del>
Retractable pyrotechnical piston actuator P/N IMT- 262-M2 (Contains 9 mg of Barium stypnate and 3.5 mg of lead azide)	No rupture, fragmentation or movement <u>(Pass)</u>	No measurable skin temperature rise on activation <u>(Pass)</u>	53 (below the background noise) <u>(Pass)</u>	None <u>(Pass)</u>

Micro-Miniature Switch Family (contains 5 mg of KDNBF)	No rupture, fragmentation or movement <u>(Pass)</u>	No measurable skin temperature rise on activation <u>(Pass)</u>	51 (below the background noise) <u>(Pass)</u>	None. <u>(Pass)</u>
Active Crew-Compartment Explosion Suppression Life-Saving System for Up-armored military vehicles (Contains 0.7 grams of 1.1D initiating pyrotechnic mixtures and 368 grams of 1.3C solid propellant/expellant)	No rupture or fragmentation. Maximum observed movements were 25 cm horizontal and 46 cm vertical. <u>(Pass)</u>	Skin temperatures ranged from 43-46 degrees Celsius in 3 trials <u>(Pass)</u>	133, 133, 134 <u>(Pass)</u>	Maximum visibility reduction of 10% <del>due to dispersion of fire suppression chemicals</del> <u>(Pass)</u>
Tether Cutter- P/N EE616752 (contains one micro-initiator device)	No rupture or fragmentation. Maximum observed movement was 18-20 cm in the horizontal direction. None in the vertical direction. <u>(Pass)</u>	51,64,66 <u>(Pass)</u>	78.0, 78.5, 77.2 <u>(Pass)</u>	None. <u>(Pass)</u>
“Alexa Staccato” Pyrotechnically activated Medicinal Inhaler (metal-foil/plastic laminate package)	No rupture, fragmentation or movement. <u>(Pass)</u>	44, 44, 44 (after 6 minutes) <u>(Pass)</u>	55 (below the background noise) <u>(Pass)</u>	None. <u>(Pass)</u>