

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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Explosives and related matters: miscellaneous

Considerations on Test Series 6

Transmitted by the Expert from the United States of America

1. The 5th Revised Edition of the UN Manual of Tests and Criteria, sections 16.4.1.3.2 and 16.5.1.4 in relation to the Series 6 type (a) and type (b) tests state:

(a) “If the substance is intended to function by detonation, it should be tested with a standard detonator (Appendix 1);

(b) If the substance is intended to function by deflagration, it should be tested with an igniter just sufficient (but not more than 30 grams of black powder) to ensure ignition of the substance within one package. The igniter should be located in the centre of the substance in the package;”

(c) Substances not intended for use as explosives, but provisionally accepted into Class 1, should be tested first with a standard detonator (Appendix 1) and, if no explosion occurs, with an igniter as in (b) above....”

2. Although paragraphs (a) and (b) prescribe initiation sources based on the intended function, paragraph (c) suggests that whichever initiation system best reveals the predominant hazard of a substance, whether it be mass explosion or mass fire, should be used.

3. Certain explosive substances such as nitroglycerine, RDX and HMX and fine ammonium perchlorate may be formulated into solid propellant substances that are intended to function by deflagration, but may also demonstrate sensitivity to detonation. It is possible that a dependency upon how a substance is intended to function, whether by deflagration or detonation, could lead to lack of discovery of the predominant hazard.

Conclusion

4. In light of the foregoing, the expert from the United States is seeking information from other competent authorities concerning experience and data relevant to the need to test substances intended to function by deflagration for detonator sensitivity.

Examples of Various Propellants in the UN 5a and UN 6a Test with Detonator and Igniter

Propellant	UN 5a Cap Sensitivity Test Conducted with Standard Strength Detonator	UN 6a Test Conducted with Standard Strength Detonator	UN 6a Test Conducted with Standard Igniter
40% NG double-base powder	(+)	No Data	(-) 2 x 3.6 Kg plastic bottles in fiberboard box
20% NG double-base powder-A	(+)	No Data	(-) 2 x 3.6 Kg plastic bottles in fiberboard box
20% NG double-base powder-B	(+)	(+) 2 x 2.25Kg plastic bottles in fiberboard box	(-) 2 x 3.6 Kg plastic bottles in fiberboard box
20% NG double-base powder-C	(+)	No Data	(-) 2 x 3.6 Kg plastic bottles in fiberboard box
20% NG double-base powder-D	(+)	No Data	(-) 2 x 3.6 Kg plastic bottles in fiberboard box
98% N/C single-base powder	(+)	No Data	(-) 2x 3.6 Kg plastic bottles in fiberboard box
10 % NG double base powder	(-)	No Data	(-) 4 x 2.25 Kg plastic bottles in fiberboard box
98% N/C single base powder	(-)	No Data	(-) 2 x 3.6 Kg plastic bottles in fiberboard box