



**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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LISTING, CLASSIFICATION AND PACKING

Example of application of an additional test for 1.4S classification

Transmitted by the expert from Canada

Introduction

1. At the twenty-ninth session of the Sub-Committee, the expert from Canada made a proposal for an additional test for determining 1.4S classification (ST/SG/AC.10/C.3/2006/62). The Working Group on Explosives reviewed the proposal and requested that the expert from Canada prepare a new proposal, including text to be inserted in the Manual of Tests and Criteria (UN/SCETDG/29/INF.65). A working paper already submitted (ST/SG/AC.10/C.3/2007/29) describes the new proposal. Some example results were included in ST/SG/AC.10/C.3/2006/62, but it was not possible to provide product details at that time. The purpose of the present information paper is to provide results obtained when applying the proposed test to perforating charges for which full product details are available.

Experimental

2. The Canadian Explosives Research Laboratory conducted an Unconfined Package Test, as described in ST/SG/AC.10/C.3/2007/29, on a sample of perforators with base charges weighing less than 23 g. The test was carried out in September 2006.

3. Three trials were conducted. Two of the three trials were conducted in the open and the third trial was conducted in a blast containment tank. The trials conducted in the open were videotaped.

4. The products tested were perforators manufactured by Owen Oil Tools, Inc. The perforators (HSC-4000-306) were packed 50 to a fibreboard box, in two layers, as shown in Figure 1.

5. The charges are shown in detail in Figure 2. They measured 53.8 mm in diameter and 61.3 mm in length. The total mass of a single article was 265 g. The outer casing was in metal with a rubber sleeve. The article contained a 1 g RDX booster charge plus an 18 g RDX base charge to



Figure 1(a) Outer packaging



Figure 1(b) Intermediate packaging



Figure 1(c) Intermediate packaging



Figure 1(d) Inner packaging



Figure 2(a) Perforators as packaged



Figure 2(b) Individual perforator



Figure 2(c) Perforator end cap



Figure 2(d) Rubber cover removed

give a total of 19 g (as declared on the manufacturer’s web site).

6. In each trial, a centrally located charge was initiated with a short length of detonating cord and a detonating cord initiator.

Results

7. The results of the three trials are summarized in Table 1. In each trial, the initiations resulted in two or more charges detonating, causing the packages to blow apart, shredding the packaging (fibreboard boxes), scattering the charges and producing a perforation in each of the steel witness plates placed below the packages. Figure 3 shows the damage to the witness plates.
8. The effects were much greater than would have been expected from the initiator alone, so it was not deemed necessary to take into account the effect of the initiating system.
9. The reactions produced were judged to be “hazardous” effects outside the packages. The effect would have injured people within 5 m of the exploding packages. The behaviour of product was deemed not to be consistent with the definition of Compatibility Group S.

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Amount of material left after trial
1	Right-side up	None	Yes	None	Yes	Perforated	46/50 perforators were recovered.
2	Right-side up	None	Yes	None	Yes	Perforated	47/50 perforators were recovered
3	Right-side up	None	Yes	None	Yes	Perforated	47/50 perforators were recovered

Table 1. Summary of Results



Figure 3(a) Witness plate from Trial 1



Figure 3(b) Witness plate from Trial 2



Figure 3(b) Witness plate from Trial 3