

**Sub-Committee of Experts on the  
Transport of Dangerous Goods**  
(Nineteenth session,  
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## EXPLOSIVES, SELF-REACTIVE SUBSTANCES AND ORGANIC PEROXIDES

### **Classification of ammonium nitrate emulsions, suspensions and gels**

#### **Comments on ST/SG/AC.10/C.3/2001/6 Madrid Working Group Meeting Report on classification of ammonium nitrate emulsions**

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

### **Introduction**

1. This paper serves two purposes: 1) to fulfil the United States commitment at the Madrid Meeting to provide a proposal addressing the transport of ammonium nitrate emulsions in portable tanks and IBCs; and 2) to provide comments relative to the working group report.

### **Portable tank requirements**

2. The following is proposed:

In the Dangerous Goods List assign T1 to UN3375 in column (10) and TP17, TPxy in column (11).

T1 means the portable tank shall meet the following requirements:

Minimum test pressure: 1.5 bar

Shell thickness - Varies according to the size of the tank (5/6mm). (See 6.7.2.4.2 for details).

Pressure-relief devices - Normal (See 6.7.2.8 for details).

Bottom opening - Two shut off in series (See 6.7.2.6.2 for details)

Since assigning T1 authorizes shippers to use portable tanks with a minimum test pressure up to 10 bar there is a need to add a special tank provision to address concerns of over confinement if the portable tank is engulfed in a fire. To address this issue it is proposed to set the pressure relief device to function at a lower pressure than the test pressure for portable tanks with a test pressure greater than 4 bar by adding a new special tank provision (TPxy). This new tank provision is proposed to address the set pressure, relief capacity and the types of pressure relief devices that can be used. TP17 is proposed to indicate that only inorganic non-combustible material may be used for the thermal insulation.

In paragraph 4.2.4.3 add a new TP as follows:

TPxy: To avoid unnecessary confinement, each portable tank constructed of metal shall be fitted with a pressure-relief device that may be of the reclosing spring loaded type, a frangible disc or a fusible element. The set to discharge or burst pressure, as applicable, shall not be greater than 2.65 bar for portable tanks with minimum test pressures greater than 4 bar. The pressure-relief devices shall have sufficient relief capacity to prevent rupture of the shell due to over pressurization or vacuum resulting from filling, discharging or from heating of the contents including fire engulfment.

## Comments on the working group reports

3. **Test Methods** - As we previously expressed during the course of discussion on this subject, some of the test methods chosen by the working group are not appropriate. The following comments are provided with respect to the proposed test methods:

Test 8(a): Thermal Stability Test - This test method is intended for measuring the thermal stability of the emulsions. Test data collected to date indicates that emulsions are thermally stable and do not possess the thermal instability of self-reactive substances. The test method chosen by the working group is Test H.4 Heat Accumulation Storage Test ( 28.4.4 - Part II of Test Manual) which is designed to measure the potential of exothermic decomposition reaction of thermally unstable substances (See 28.4.4.1.1 of the Test Manual).

### Proposal

We propose replacing Test 8(a) with Test 3(c): Thermal Stability Test at 75 °C (See 13.6 of the Test Manual). If necessary the sample size of the test can be increased to compensate for deficiencies perceived by some of the working group members concerning the use of a small sample size.

Test 8 (b): ANE Gap Test – Paragraph 18.4.2.1 of the report stated that the test is to measure the shock sensitivity of emulsions but the test conditions and criteria set forth are intended to distinguish between “Non-sensitized emulsions” and “Sensitized emulsions”. The use of a very large “booster” (in a ratio exceeding 1:1 of booster to sample) in the test is contradictory to the intent for classifying emulsions as UN 3375, Division 5.1 substances for the following reasons:

(i) SP 309 is assigned to UN 3375 and clearly states that UN 3375 is only applicable to “Non-sensitized” emulsions. There is no need to design a test method to distinguish between sensitized and non-sensitized emulsions;

(ii) The current requirement (Test 1 (a) and 2(a)) for classifying a blasting explosive as UN 0332, Division 1.5D uses a much smaller booster than the proposed 8(b) test.

### Proposal

It is proposed that Test 8(b) be replaced with Test 2(a). Our proposal is supported by the Swedish proposal in ST/SG/AC.10/C.3/2001/23 which would require emulsions that fail to meet the criteria for a Division 5.1 substance to be classed as a Division 1.5D explosives when tested in accordance with Test Series 1 and 2.

Test 8(c): Koenen Test – The expert from the United States supports this test.

Test 8(d): Vented Pipe Test – Although we proposed this test, we did not propose it for purposes of classification. The purpose of this test was to determine if Division 5.1 emulsions are suitable for transport in portable tanks. However, if the Sub-Committee decides to include this test as a part of classification tests we could support it.

4. **Revision of SP306** – The working group proposed to revise SP 306 to require emulsions to be tested by the proposed Test Series 8 tests. The expert from the United States does not support this revision because SP 306 is also assigned to UN 1942 and UN 2067.

5. **Transport of emulsions in IBCs** -Blasting explosives assigned to UN 0241 or UN 0332 are authorized to be transported in IBCs in accordance with packing method IBC 100. Metal IBCs are required to have some minimum venting capacity while non-metallic IBCs are not considered to have over confinement concerns in a fire. We propose to change IBC 02 to IBC 100 in Column (8) of the Dangerous Goods List for UN 3375 without the proposed 0.005 m<sup>2</sup>/m<sup>3</sup> requirement.

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