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**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**  
(Twenty-fourth session, 1-10 December 2003,  
agenda item 3)

**EXPLOSIVES, SELF-REACTIVE SUBSTANCES AND ORGANIC PEROXIDES**

**Definition of ammonium nitrate emulsions, suspensions and gels**

**Transmitted by the expert from Spain**

**SCOPE**

This proposal is to amend Special Provision 309 in order to include provision for the ingredients used in Ammonium Nitrate Suspensions and Gels.

**RELATED DOCUMENTS**

UN/SCETDG/22/INF.4 (Spain) Test results of ANE  
ST/SG/AC.10/C.3/2003/13 (Spain) Definition of ammonium nitrate emulsions, suspensions and gels  
UN/SCETDG/23/INF.12 - (Spain) Definition of ammonium nitrate emulsions, suspensions and gels  
UN/SCETDG/23/INF.32 - (Spain) Preliminary results of modified vented pipe test on ANE  
ST/SG/AC.10/C.3/46 - Report of the Sub-Committee of Experts on its 23rd session  
ST/SG/AC.10/C.3/46/Add1 (Report of the Working Group on explosives, 1-3 July 2003)

**BACKGROUND**

At its December 2002 meeting, the Committee approved the inclusion of Test Series 8 in the Manual of Tests and Criteria. Tests 8(a), 8(b) and 8(c) should be used to establish whether an ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives (ANE) may be assigned to Class 5.1 (UN 3375).

At the request of the ANE Working Group in July 2002, Spain performed draft Tests 8(a), 8(b) and 8(c), for ammonium nitrate suspensions. The formulations tested were not current commercial formulations and were chosen to test the highest likely concentrations of different ingredients.

The results of these tests were presented in the report UN/SCETDG/22/INF.4. As it is shown in this report, the formulations tested have clearly passed the Tests 8(a), 8(b) and 8(c), showing lower sensitivity than standard emulsions.

The Spanish proposal for including these test results in "Examples of results" for Tests 8(a), 8(b) and 8(c) in the new edition of the Manual of Tests and Criteria, was not adopted, because several experts considered that the tests had been performed on suspensions the composition of which did not conform to the definition in Special Provision 309. This Special Provision describes a range of formulations for emulsions, suspensions and gels, which although appropriate for usual emulsion compositions, it is not broad enough to include suspensions.

In order to rectify that situation, at the July 2003 session, the expert from Spain presented a proposal (ST/SG/AC.10/C.3/2003/13) consisting on the modification of the Special Provision 309 to include various unique ingredients used in suspensions and gels. The proposal was based on the tests presented in document UN/SCETDG/22/INF.4 and on more clarifying tests carried out by Spain and presented to the Sub-Committee as documents UN/SCETDG/23/INF.12 and UN/SCETDG/23/INF.32.

The proposal and accompanying documents were discussed in the Working Group on explosives (see ST/SG/AC.10/C.3/46/Add.1). On the suggestion of the expert from the United States of America to postpone voting until December, in order to have time to study the information presented, the expert from Spain indicated that he would present a new proposal with a modified text (see par. 24 of ST/SG/AC.10/C.3/46). The new text, as shown in the following "Recommendation" section, was drafted during the Working Group meeting. Several delegates indicated that it was a step forward and encouraged Spain to present it in December. This would give time, if necessary, to have bilaterally contacts with the Spanish delegation to get more advice. The type of perchlorates and amine nitrates to be used are clearly specified and the percentage of perchlorates has been reduced to 5%, to reflect the current commercial situation and guarantee in this way that the perchlorates remain in the liquid phase.

## RECOMMENDATION

Amend Special Provision 309 of Chapter 3.3 (amendments are shown in bold) as follows:

- "309 This entry applies to non sensitised emulsions, suspensions and gels consisting primarily of a mixture of ammonium nitrate and a fuel phase, intended to produce a Type E blasting explosive only after further processing prior to use.

The mixture **for emulsions** typically has the following composition: 60-85% ammonium nitrate; 5-30% water; 2-8% fuel; 0.5-4% emulsifier agent; 0-10% soluble flame suppressants; and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate.

**The mixture for suspensions and gels typically has the following composition: 60-85% ammonium nitrate; 0-5% sodium or potassium perchlorate; 0-17% hexamine nitrate or monomethylamine nitrate; 5-30% water; 2-15% fuel; 0.5-4% thickening agent; 0-10% soluble flame suppressants; and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate.**

Substances shall satisfactorily pass Test Series 8 of the *Manual of Tests and Criteria*, Part I, Section 18 **and be approved by the competent authority**"

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