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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-first session, 1-10 July 2002,
agenda item 3 (b))

EXPLOSIVES, SELF-REACTIVE SUBSTANCES AND ORGANIC PEROXIDES

Classification of ammonium nitrate emulsions, suspensions and gels

Manual of Tests and Criteria – Test 8(d)

Transmitted by the experts from the Norway and Sweden

Background

During the twenty-first session of the Committee of Experts on the Transport of dangerous Goods, December 2000, it was decided to create a new entry for AMMONIUM NITRATE EMULSION or SUSPENSION or GEL, intermediate for blasting explosives (ANE's), in Division 5.1 (UN No. 3375).

To determine whether a substance may be classified under this new entry, a new Test series 8 was also included in the Manual of Tests and Criteria. This new test series contained four new tests, of which one, the Test 8(d), was left in square brackets pending further investigations into its suitability.

The Scandinavian industries agreed to jointly study Test 8(d), i.e. the Modified USA Vented Pipe Test, in order to investigate its suitability for discriminating defined matrixes from other formulas. The results from the tests run by the joint Scandinavian industry group Show that:

- ANE under heavy confinement in a steel vessel, as demonstrated in the Modified US Vented Pipe Test, will detonate when exposed to fire.
This was clearly demonstrated in the tests run in Scandinavia, when vessels not only with the prescribed orifices, but also open vessels and vessels with varying orifices were used. The dividing line for "no detonation" in vessels with orifices proved to be around 3 inches.
- A 3" vented pipe or orifice corresponds roughly to a total relief area of $0,1 \text{ m}^2/\text{m}^3$. With a larger vented area than described above the ANE's did not explode.

The results from these tests will be presented in a separate INF-document to the meeting.

The joint Scandinavian industry group have also made two full-scale burning tests with aluminium tanks containing 4.000 kg and 6.000 kg un-sensitised ANE.

The results of these tests show that:

An aluminium-tank containing un-sensitised emulsion matrix, exposed for a fire of approximately 1 MW, will, due to the softening of the material, open up at a low overpressure and with a large opening giving a sufficient and quick pressure relief. The risk that a fire will escalate to an explosion decreases.

These tests will be presented to the meeting in a separate INF-document.

Proposal

In Figure 10.4, after the “No” from test 8(c), add a new box with the question:

- Will the substance be transported in a tank or IBC made in a material that will soften or break under influence of fire, e.g. aluminium or fibre reinforced plastics?
 - If “Yes”, the substance is accepted into Class 5.1.
 - If “No”, carry on to test 8(d).
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