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**COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS****(Twenty-first session,
4-13 December 2000,
agenda item 2 (c))****WORK OF THE SUB-COMMITTEE OF EXPERTS
ON THE TRANSPORT OF DANGEROUS GOODS****New proposals****Listing and classification****Proposal for listing a new self-reactive substance
supplemental information to ST/SG/AC.10/C.3/2000/40****Transmitted by the expert from the United States of America****Background**

1. At the Eighteenth session of the Sub-Committee meeting the proposal from the expert of the United States of America to add 4-Nitrophenylhydrazine water wet in the List of Self-Reactive Substances in 2.4.2.3.2.3 (see ST/SG/AC.10/C.3/2000/40) was discussed briefly. Several questions were raised during the discussion concerning the substance's properties and data provided in the proposal. The proposal was deferred to the Committee meeting pending additional information to be provided by the expert of the United States of America.

Additional information

2. Explosive property of the material:

The 4-Nitrophenylhydrazine is manufactured in a water wet condition. The substance offered for transportation contains 29% to 35% water. Tests for explosive properties on the water wet substance and for classification as a Self-Reactive Substance were conducted by the Canadian Center for Mineral and Energy Technology (CANMET). Test results (Test Series 1 and 2 of Class 1 tests) concluded that the substance is not a candidate for Class 1. The testing laboratory estimated the dry substance (dried in the laboratory) would have about 49% of the strength of TNT based on impact sensitivity.

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The water wet substance is determined to have an SADT value of 60 - 77 °C in a 50 kg package. Based on this information, the expert of the United States of America considers it more appropriate to classify 4-nitrophenylhydrazine water wet as a self-reactive substance rather than as a water wetted explosive.

3. Revised data in the Test Report:

A revised Test Report is attached to this paper. Based on questions raised by the Subcommittee, revisions were made in the following sections:

- 1) Section 2.1 Composition — The concentrations of the 4-nitrophenylhydrazine and water are revised to 65-71% and 29 - 35%, respectively to be consistent with the proposal.
- 2) Section 5.2 Sample condition ---- The mass of the sample is revised from 23.1 to 24.0 g which will give a density of about 0.83 (estimated value). The previous number given was the gross weight (steel tube plus the sample).

Proposal

4. Te expert from the United States of America proposes to add 4-Nitrophenylhydrazine water wet to the List of Self-reactive Substances in 2.4.2.3.2.3 as follows:

SELF-REACTIVE SUBSTANCE	Concen- tration (%)	Packing method	Control temper- ature (°C)	Emergency temper- ature (°C)	UN generic entry	Remarks
4-Nitrophenylhydrazine, water wet	≤ 71	OP7	None	None	3226	None

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**TEST REPORT FOR 4-NITROPHENYLHYDRAZINE WATER WET
(Revised 9/11/2000)**

1. Name of substance : 4-nitrophenylhydrazine water wet
- General data
- 2.1 Composition : 65-71% 4-nitrophenylhydrazine; 29-35% water
- 2.2 Molecular formula : C₆H₇N₃O₂ · x (H₂O)
- 2.3 CAS registry number : 100-16-3
- 2.4 Physical form : Solid
- 2.5 Color : Dark orange
- 2.6 Apparent Density : Not available
- 2.7 Particle size : Not available
- 2.8 Melting point : 157.5 °C
3. Detonation (test series A)
- Box 1 of the flow chart : Does the substance propagate a detonation?
- 3.1 Method : UN Gap Test (test A.5)
- 3.2 Sample conditions : Ambient temperature
- 3.3 Observations : Tube not fully fragmented but average tube fragmentation is 271.25 mm of length (4 trials) which is 1.77 X the average inert material (table sugar) fragmentation of 153 mm (2 trials)
- 3.4 Result : "Partial"
- 3.5 Exit : 1.2
4. Deflagration (test series C)
- Box 4 of the flow chart : Does the substance propagate a deflagration?
- 4.1 Method 1 : Time/pressure test (test C.1)
- 4.2 Sample conditions : Ambient temperature
- 4.3 Observations : Did not achieve a pressure rise of 2070 kPa above atmospheric
- 4.4 Result : "No"
- 4.5 Method 2 : Deflagration test (test C.2)
- 4.6 Sample conditions : Preheated to 50 °C
- 4.7 Observations : Preliminary 14 mm tube - (1) would not sustain ignition without flame source;
Preliminary 28 mm tube - (1) would not sustain ignition without flame source;
Dewar vessel: (1) would not sustain ignition without flame source; (2) would not sustain ignition without flame source
- 4.8 Result : "No", no measurable deflagration
- 4.9 Overall result : "No"
- 4.10 Exit : 4.3
5. Heating under confinement (test series E)

- Box 8 of the flow chart : What is the effect of heating it under defined confinement?
- 5.1 Method 1 : Koenen test (test E.1)
- 5.2 Sample conditions : Mass 23.1 to 24.0 g
- 5.3 Observations : Limiting diameter 1.5 mm
- 5.4 Result : "Medium"
- 5.5 Method 2 : USA pressure vessel test (test E.3)
- 5.6 Sample conditions : Start at ambient temperature, 5.0 g/trial
- 5.7 Observations : 1.0 mm: (1) vented, no rupture, (2) Disc rupture;
1.2 mm, 1.5 mm, 2.0 mm, 2.5 mm, 3.0 mm, 3.5 mm: Each of these orifice sizes produced one rupture in one trial;
4.0 mm: (1) vented, no rupture, (2) Disc rupture;
4.5 mm: (1) vented, no rupture, (2) Disc rupture;
5.0 mm: (1) vented, no rupture, (2) vented no rupture, (3) vented, no rupture
- 5.8 Result : USA-PVT number 5.0 ; "Medium" - PVT number is between 3.5 - 8.0
- 5.9 Overall result : "Medium"
- 5.10 Exit : 8.2
6. Thermal stability (test series H)
- 6.1 Method : Heat accumulation storage test (test H.4) at 77 °C
- 6.2 Sample conditions : 250 g of substance in 0.5 liter Dewar vessel run at 77 °C
- 6.3 Observations : 77 °C trial: Observed temperature rise greater than 6 °C in 3 days
- 6.4 Result : Auto-accelerating decomposition (SADT) is less than 77 °C
- 6.5 Method : Heat accumulation storage test (test H.4) at 60 °C
- 6.6 Sample conditions : 255 g of substance in 0.5 liter Dewar vessel run at 60 °C
- 6.7 Observations : 60 °C trial: Observed maximum temperature in 7 days of 3 °C
- 6.8 Result : Auto-accelerating decomposition (SADT) is greater than 60 °C
- 6.9 Overall result : SADT for a 50 kg package is less than 77 °C and higher than 60 °C. No temperature control required
7. Proposed assignment
- 7.1 Proper shipping name : SELF-REACTIVE SOLID TYPE D
- 7.2 UN number : 3226
- 7.3 Division : 4.1
- 7.4 Technical name : 4-nitrophenylhydrazine, 29-35% water wet
- 7.5 Concentration : 65-71%
- 7.6 Diluent : 29-35% Water
- 7.7 Subsidiary risks : None
- 7.8 Packing group : II
- 7.9 Packing method : OP7
- 7.10 Control temperature : Not required
- 7.11 Emergency temperature : Not required
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