

**Committee of Experts on the Transport of Dangerous Goods  
and on the Globally Harmonized System of Classification  
and Labelling of Chemicals**

15 June 2012

Sub-Committee of Experts on the  
Transport of Dangerous Goods

**Forty-first session**

Geneva, 25 June - 04 July 2012

Item 2 (c) of the provisional agenda:

**Explosives and related matters:**

**Desensitized explosives**

Sub-Committee of Experts on the Globally  
Harmonized System of Classification  
and Labelling of Chemicals

**Twenty-third session**

Geneva, 04 July – 06 July 2012

Item 2 (a) of the provisional agenda

**Updating the Globally Harmonized System of  
Classification and Labelling of Chemicals:**

**Physical hazards**

**Test Results on typical desensitized explosives and other  
energetic materials**

**Transmitted by the Expert from Germany**

**Introduction**

1. In document ST/SG/AC.10/C.3/2012/28-ST/SG/AC.10/C.4/2012/1 the International Council of Chemical Associations (ICCA) presents test results for industrial nitrocellulose according to the test method prescribed in the German “Guideline for the assignment of substances which may show explosive properties to storage groups (SprengLR011)” (“Determination of 10.000 kg scale burning rate”) used by the German competent authority (BAM Federal Institute for Materials Research and Testing) to assign energetic substances to storage groups.
2. In the past BAM has tested also other typical desensitized explosives according to this test method.
3. For supply and use the test method is also generally used to determine storage groups for other energetic substances, e.g., organic peroxides and self-reactive substances (see literature list, too).
4. The expert from Germany would like to present the following test results:

**Test results**

No	UN No	Substance/formulation	Packaging(s), net mass per packaging	Storage group
1	3474	1-Hydroxybenzotriazole Monohydrate	1(G), 1(H2), 50 kg/20 kg	Ib
2	1344	Trinitrophenol (Picric Acid), wetted with not less than 30 % water, by mass	1(G), 35 kg	Ia
3	1356	Trinitrotoluene (TNT), wetted with not less than 30 % water, by mass	1(G), 50 kg	Ia

No	UN No	Substance/formulation	Packaging(s), net mass per packaging	Storage group
4	1336	Nitroguanidine (Picrite), wetted with not less than 20 % water, by mass	IBC 13H2, 580 kg	III
5	3380	Propatyl Nitrate 20 %, by mass, with not less than 80 % Lactose Monohydrate, by mass	1(G), 35 kg	III
6	3319	Nitroglycerin mixture, desensitized, solid, n.o.s. with more than 2 % but not more than 10 % nitroglycerin, by mass	1(G), 50 kg	III

No	UN No	Substance/formulation	Packaging instruction, - method, net mass per packaging	Storage group
7	3104	Dibenzoyl peroxide 68 % - 77 %, water 23 % - 31 %	P520, OP6, 25 kg	II
8	3101	2,5-Dimethyl-2,5-di-(tert-butylperoxy) hexyne -3, technically pure	P520, OP5, 25 kg	Ib
9	3113	tert-Butyl peroxy-2-ethylhexanoate, technically pure	P520, OP6, 25 kg	Ib
10	3111	tert-Butyl peroxyisobutyrate 75 % - 77 %, Diluent type A 23 % - 25 %	P520, OP5, 25 kg	Ib
11	3103	tert-Butyl peroxyisopropylcarbonate 75 % - 77 %, diluent type A 23 % - 27 %	P520, OP5, 25 kg	II
12	3101	tert-Butyl peroxydiethylacetate, technically pure	P520, OP5, 25 kg	Ib
13	3104	Cyclohexanone peroxide 85 % - 91 %, water 9 % - 15 %	P520, OP6, 25 kg	II
14	3113	tert-Butyl peroxyisovalate 73 % - 77 %, diluent type A 23 % - 27 %	P520, OP5, 25 kg	Ib
15	3103	tert-Butyl hydroperoxide 77 % - 81 %, Di-tert-butyl peroxide 8 % - 10 %, water 7 % - 12 %	P520, OP5, 25 kg	Ia
16	3112	Di(-2-methylbenzoyl) peroxide 67 % - 85 %, water 15 % - 33 %	P520, OP5, 25 kg	Ib
17	3234	Azodi(isobutyronitrile), technically pure	P520, OP6, 25 kg	Ia
18	3236	2,2'-Azodi(2-methylbutyronitrile)	P520, OP7, 25 kg	Ia

## Remarks

Assignment to storage groups:

Ia: The  $A_C$  is equal or more than 300 kg/min.

Ib: The  $A_C$  is equal or more than 140 kg/min but less than 300 kg/min.

II: The  $A_C$  is equal or more than 60 kg/min but less than 140 kg/min.

III: The  $A_C$  is less 60 kg/min.

$A_c$  is the corrected burning rate for an extrapolated mass of 10.000 kg.

5. If a desensitized explosive or another energetic substance as packed for use and supply fulfils the criteria for a mass explosion effect it has to be classified as an explosive or as a type A substance if it fulfils the criteria for an assignment to the hazard classes organic peroxide or a self-reactive substance, respectively. Such substances are not under discussion here.

## Consideration

6. The test method [1] can be used to determine the different hazards (mass burning rate, heat radiation, fire) of desensitized explosives and other reactive substances for supply and use according to the GHS. The experts are invited to discuss this paper together with document ST/SG/AC.10/C.3/2012/28-ST/SG/AC.10/C.4/2012/1.

### *Literature*

[1] German “Guideline for the assignment of substances which may show explosive properties to Storage Groups (SprengLR011)”

[2] Thermal radiation hazards from organic peroxides, Roberts, T.A. and Merrifield, R., *J. Loss. Prev. Process Ind.* 1990, 3, 244.

[3] Thermal radiation hazard and separation distances for industrial cellulose nitrate, Roberts, T.A. and Merrifield, R., *J. Loss. Prev. Process Ind.* 1992, 5,311.

[4] Storage of Organic Peroxides, Publication Series on Dangerous Substances 8 (PGS 8), Ministries of Social Affairs and of the Interior, The State Secretary of Housing, Spatial Planning and Environment (VROM), The Netherlands 2006.

[5] The storage and handling of organic peroxides, Guidance Note CS21, Health and Safety Executive, 1998, United Kingdom

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