



---

**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****Forty-fourth session**

Geneva,

Item 10 (a) of the provisional agenda

**Issues relating to the Globally Harmonized****System of Classification and Labelling of Chemicals:  
desensitized explosives****Sub-Committee of Experts on the Globally Harmonized  
System of Classification and Labelling of Chemicals****Twenty-sixth session**

Geneva,

Item 2 (a) of the provisional agenda

**Classification criteria and hazard communication****Work of the Sub-Committee of Experts on the Transport  
of Dangerous Goods on physical hazards****Implementation of a new Chapter 2.17 “Desensitized  
Explosives” in the GHS and implementation of  
“Classification procedures, test methods and criteria relating  
to the class of desensitized explosives” in a new Part V of the  
Manual of Tests and Criteria****Transmitted by the expert from Germany<sup>1</sup>****Introduction**

1. During the last sessions of the Sub-Committee of Experts on the Transport of Dangerous Goods (TDG Sub-Committee), the Working Group on Explosives and the Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals (GHS Sub-Committee), the proposal for implementation of a new chapter 2.17 “Desensitized Explosives” in the GHS and implementation of “Classification procedures, test methods and criteria relating to the class of desensitized explosives” in a new part of the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria was discussed (Informal documents INF.13 (TDG Sub-Committee) and INF.5 (GHS Sub-Committee)).

---

<sup>1</sup> In accordance with the programme of work of the Sub-Committee for 2013–2014 approved by the Committee at its sixth session (see ST/SG/AC.10/C.3/84, para. 86 and ST/SG/AC.10/40, para. 14).

2. The TDG Sub-Committee noted that the Working Group on Explosives had welcomed and unanimously supported informal document INF.13 (ST/SG/AC.10/C.3/86 para 26).
3. The GHS Sub-Committee concurred in principle with the TDG Sub-Committee on its support for the development of a new hazard class for desensitized explosives in the GHS as mentioned in informal document INF.5 (ST/SG/AC.10/C.4/50, para.10).
4. The expert of Germany prepared this proposal taking into account the comments from the Working Group on Explosives and from the experts of both sub-committees.
5. The expert from Germany proposes:
  - (a) To include a new chapter 2.17 “Desensitized Explosives in the GHS”, as reproduced in Annex I;
  - (b) To include a new Part in the Manual of Tests and Criteria containing classification procedures, test methods and criteria relating to the GHS, including a test method for classification of desensitized explosives in four different categories of the GHS, as reproduced in Annex II, on the understanding that it would not be applicable for transport classification.
  - (c) To amend the Manual of Tests and Criteria and the GHS consequentially as proposed in Annex III.

## Annex I

### Chapter 2.17 Desensitized explosives

#### 2.17.1 Definitions and general considerations

2.17.1.1 *Desensitized explosives* are solid or liquid explosive substances or mixtures which are desensitized to suppress their explosive properties in such a manner that they do not mass explode and do not burn too rapidly and therefore may be excluded from the hazard class “Explosives” (Chapter 2.1, see also Note 2 of Chapter 2.1.2.2).\*

2.17.1.2 The class of desensitized explosives comprises:

- (a) Solid desensitized explosives are explosive substances or mixtures which are wetted with water or alcohols or are diluted with other substances, to form a homogeneous solid mixture, to suppress their explosive properties.

*NOTE:* This includes desensitization achieved by formation of hydrates of the substances.

- (b) Liquid desensitized explosives are explosive substances or mixtures which are dissolved or suspended in water or other liquid substances, to form a homogeneous liquid mixture to suppress their explosive properties.

#### 2.17.2 Classification criteria

2.17.2.1 Any desensitized explosive shall be considered in this class, unless

- (a) They are manufactured with the view to producing a practical, explosive or pyrotechnic effect or
- (b) They have a mass explosion hazard according to Test Series 6a/6b or their corrected burning rate according to the burning rate test X is too high or
- (c) Their heat of decomposition is less than 300 J/g.

*NOTE 1:* Substances or mixtures which meet the criterion (c) may fall within the scope of other hazard classes.

*NOTE 2:* The heat of decomposition should be determined using the homogenous part of the desensitized explosive; (see 20.3.3.3 in Part II of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria).

---

\* Also unstable explosives according to chapter 2.1 can be stabilized by desensitization and consequently may be classified as desensitized explosive, provided all criteria are met. In this case the desensitized explosive should be tested according to test series 3 (Part I of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria) because the mechanical sensitivity of such desensitized explosives is likely to be important for safe handling and use. The results should be communicated in the safety data sheet.

2.17.2.2 Desensitized explosives shall be classified as packaged for supply and use in one of the four categories of this class depending on the corrected burning rate ( $A_C$ ) using the test “burning rate test (external fire)” described in Part V, sub-section 51.4 of the UN Recommendations of the Transport of Dangerous Goods, Manual of Tests and Criteria, according to Table 2.17.1:

**Table 2.17.1: Criteria for desensitized explosives**

Category	Criteria
1	Desensitized explosives with a corrected burning rate ( $A_C$ ) equal to or more than 300 kg/min but not more than 1200 kg/min.
2	Desensitized explosives with a corrected burning rate ( $A_C$ ) equal to or more than 140 kg/min but less than 300 kg/min.
3	Desensitized explosives with a corrected burning rate ( $A_C$ ) equal to or more than 60 kg/min but less than 140 kg/min.
4	Desensitized explosives with a corrected burning rate ( $A_C$ ) less than 60 kg/min.

**NOTE 1:** Desensitized explosives shall be prepared so that they remain homogeneous and will not separate during storage and handling.

**NOTE 2:** Desensitized explosives may be treated differently for some regulatory purposes (e.g. transport).

**NOTE 3:** Explosive properties of desensitized explosives have to be determined by test series 2 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, and shall be communicated in the safety data sheet.

**NOTE 4:** Desensitized explosives do not fall additionally within the scope of chapters 2.1 (explosives), 2.6 (flammable liquids) and 2.7 (flammable solids).

### 2.17.3 Hazard communication

General and specific considerations concerning labelling requirements are provided in *Hazard communication: Labelling* (Chapter 1.4). Annex 1 contains summary tables about classification and labelling. Annex 3 contains examples of precautionary statements and pictograms which can be used where allowed by the competent authority.

**Table 2.17.2: Label elements for desensitized explosives**

	Category 1	Category 2	Category 3	Category 4
Symbol	Flame	Flame	Flame	Flame
Signal word	Danger	Danger	Warning	Warning
Hazard statement	Desensitized explosive; Fire, blast or projection hazard	Desensitized explosive; Fire or projection hazard	Desensitized explosive; Fire or projection hazard	Desensitized explosive; Fire hazard

#### **2.17.4 Decision logic and guidance**

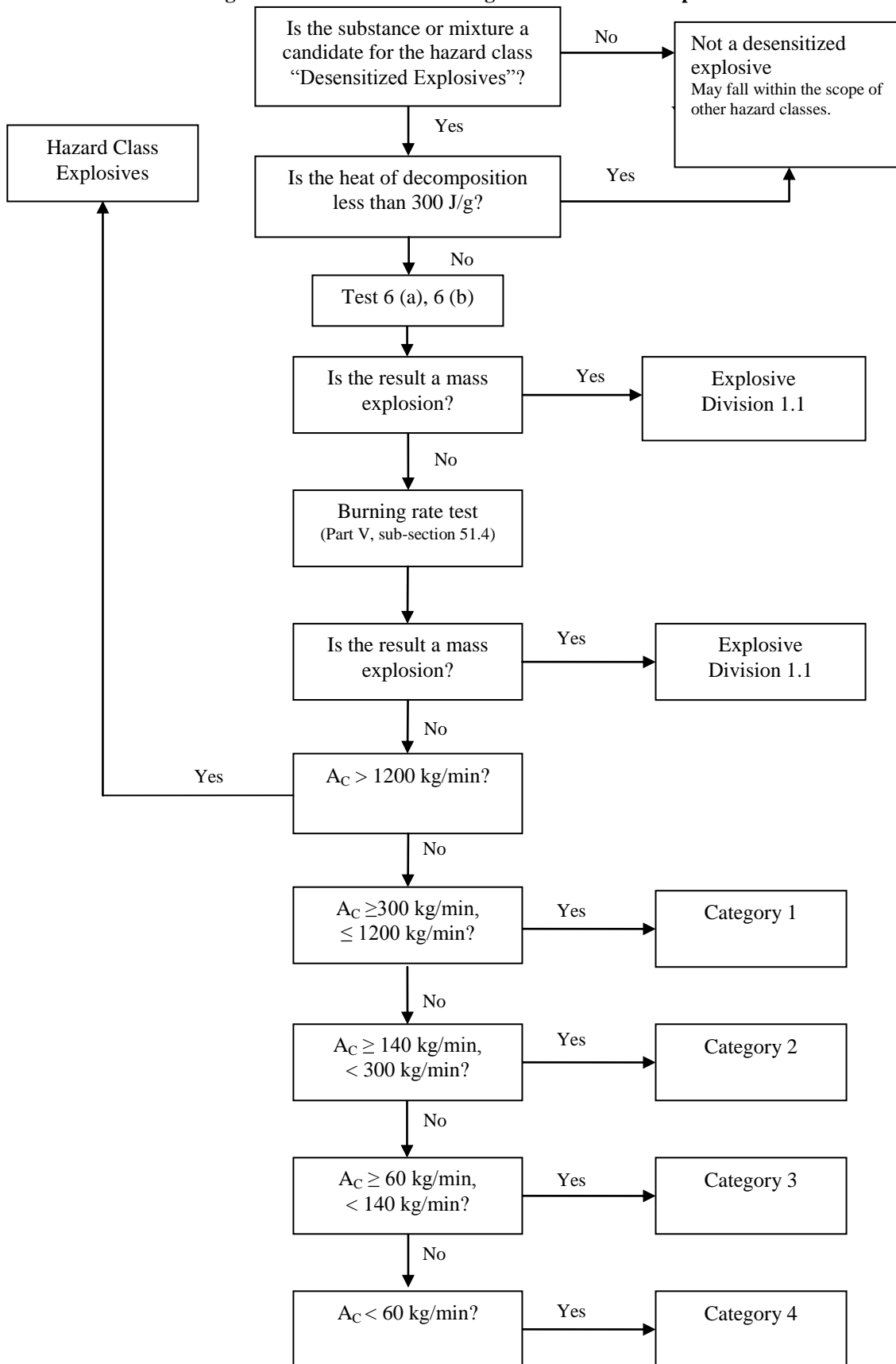
The decision logic and guidance, which follow, are not part of the harmonized classification system, but have been provided here as additional guidance. It is strongly recommended that the person responsible for classification studies the criteria before and during use of the decision logic.

##### **2.17.4.1 Decision logic**

To classify desensitized explosives, data for the explosion behavior and the corrected burning rate has to be determined. Reference to Part V of the *UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*, is necessary.

The classification procedure is according to the following decision logic.

Figure 2.17.1: Decision logic for desensitized explosives



**2.17.4.2 Guidance**

- 2.17.4.2.1 The classification procedure for desensitized explosives does not apply if:
- (a) There are no explosives according to the GHS criteria of Chapter 2.1 present;
  - (b) The exothermic decomposition energy is less than 300 J/g.
- 2.17.4.2.2 The heat of decomposition should be determined using the homogenous part of desensitized explosives; see 20.3.3.3 in Part II of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria.

## **Annex II**

### **Part V**

#### **Classification procedures, test methods and criteria relating to the Globally Harmonized System of Classification and Labelling of Chemicals**



**Contents of Part V**

<b>Section</b>		<b>Page</b>
<b>50.</b>	<b>Introduction to Part V</b>	<b>XX</b>
	50.1 Purpose	XX
	50.2 Scope	XX
<b>51.</b>	<b>Classification procedures, test methods and criteria relating to the hazard class desensitized explosives</b>	<b>XX</b>
	51.1 Purpose	XX
	51.2 Scope	XX
	51.3 Classification procedure	XX
	51.4 Burning rate test (external fire) (D)	XX
	51.4.1 Introduction	XX
	51.4.2 Apparatus and materials	XX
	51.4.3 Procedure	XX
	51.4.4 Test criteria and method of assessing results	XX
	51.4.5 Examples of results	XX
	51.4.6 Example of calculation	XX

## **Section 50**

### **Introduction to Part V**

#### **50.1 Purpose**

Part V of the Manual presents the United Nations schemes for the classification of

- (a) Desensitized explosives

for supply and use according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

#### **50.2 Scope**

The test methods of this Part should be applied when required by the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

## Section 51

### Classification procedures, test methods and criteria relating to the hazard class desensitized explosives

#### 51.1 Purpose

This section presents the United Nations scheme of the classification of liquid and solid desensitized explosives (see chapter 2.17 of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)). The text should be used in conjunction with the classification principles of chapter 2.17 of the GHS and the test series 6a/6b given in subsection 16.4 and 16.5 of this Manual.

#### 51.2 Scope

51.2.1 Desensitized explosives are solid or liquid explosive substances or mixtures which are desensitized to suppress their explosive properties in such a manner that they may be excluded from the hazard class “Explosives” (chapter 2.1 of GHS). Desensitized explosives, should be first tested according to the tests series 1 (type 1(a)), 2 and 6 (type (a) and (b), respectively) of this Manual<sup>2</sup>.

51.2.2 The appropriate classification procedures for desensitized explosives should be undertaken before they are offered for supply and use unless:

- a) They are manufactured with the view to producing a practical, explosive or pyrotechnic effect;
- b) They have a mass explosion hazard according to Test Series 6a/6b or their corrected burning rate according to the burning rate test X is too rapidly;
- c) Their heat of decomposition is less than 300 J/g<sup>3</sup>.

#### 51.3 Classification procedure

51.3.1 Before packaged substances or mixtures are subjected to the burning rate test, the test series 6 types 6 (a) and 6 (b) shall be performed in alphabetical order. The substances or mixtures should be tested first with a standard detonator (Appendix 1 of the Manual) and, if no explosion occurs, with an igniter just sufficient (but not more than 30 g of black powder) to ensure ignition of the substance or mixture in the packaging. Initiation system which gives a positive result in the 6 (a) test should be used for the 6 (b) test.

51.3.2 However, it is not always necessary to conduct tests of all types. Test type 6 (b) may be waived if in each type 6 (a) test:

---

<sup>2</sup> Also unstable explosives according to chapter 2.1 can be stabilized by desensitization and consequently may be classified as desensitized explosive, provided all criteria are met. In this case the desensitized explosive should be tested according to test series 3 (Part I of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria) because the mechanical sensitivity of such desensitized explosives is likely to be important for safe handling and use. The results should be communicated in the safety data sheet.

<sup>3</sup> The heat of decomposition should be determined using the homogenous part of the desensitized explosives; (see 20.3.3.3 in Part II of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria).

- (a) The exterior of the package is undamaged by internal detonation and/or ignition; or
- (b) The contents of the package fail to explode, or explode so feebly as would exclude propagation of the explosive effect from one package to another in test type 6(b).

51.2.3 If a substance or mixture gives a negative result (no propagation of detonation) in the Series 1 type 1(a) test, the 6(a) test with a detonator may be waived<sup>4</sup>. If a substance or mixture gives a negative result (no or slow deflagration) in a Series 2 type 2(c) test, the 6 (a) test with an igniter may be waived.

51.2.4 The test for determination of the burning rate by large-scale test need not be performed if, in a test type 6 (b), there is practically instantaneous explosion of virtually the total contents of the stack. In such cases the product is assigned to Division 1.1.

#### **51.4 Burning rate test (external fire)**

##### **51.4.1 Introduction**

The test method for determination of the burning rate (10 000 kg scale burning rate) is to be used to determine the behaviour of substances or mixtures as packaged for storage and use if involved in an external fire. This test is performed with several packages of the substances or mixtures to determine

- (a) Whether there is a mass explosion hazard, a hazard from dangerous projection or a too violent burning,
- (b) A burning rate (10 000 kg scaled), which depends on the total mass.

The burning rate is defined as the extrapolated burning rate for a mass of 10 000 kg packaged material. In practice, this burning rate is determined using both a single package and stacks of packages, following by an extrapolation procedure. The tests are performed with the substances or mixtures in the packages as provided for storage and use. All types of packages are subjected to the tests unless:

- (a) A substance or mixture, as packed for supply and use, may be unambiguously assigned to a burning rate and category by a competent authority on the basis of results from other tests or of available information; or
- (b) The substance or mixture, as packed for supply and use, is assigned to the hazard class "Explosives", Division 1.1.

The corrected burning rate (10 000 kg scaled) is to be used for classification into four different categories.

##### **51.4.2 Apparatus and materials**

The test should be applied to packages of substances or mixtures in the condition and form in which they are offered for supply and use (including storage). The following items are needed:

- (a) 1, 6 and 10 packages, with packages up to a net weight of 25 kg;
- (b) 1, 3 and 6 packages, with packages with a net weight between 25 kg and 50 kg;

---

<sup>4</sup> If the type 1 (a) test is not carried out the Series 6 type 6(a) test cannot be waived.

- (c) 1 and up to six packages, up to a maximum total net weight of 500 kg, with packages with a net weight of more than 50 kg;
- (d) One or two trays with an adequate size and height to contain the wooden pallets and the packages and to protect the ground;
- (e) Wooden pallets (e.g. according to DIN 15146), wood-wool distributed between, under and above the packages;
- (f) A suitable ignition; means that the ignition of the wooden pallets/wood-wool and consequently the tested packages is guaranteed (a mixture of gasoline and light fuel oil 10/90 evenly distributed over the packages and the wood-wool is recommended);
- (g) Cine and/or video cameras and suitable equipment to measure the heat of radiation, e.g. infrared sensors and/or thermo cameras.

The number of tests and/or the total mass (whereas necessary) should be increased if the test results are ambiguous and the corresponding hazards is cannot clearly be defined.

#### **51.4.3 Procedure**

51.4.3.1 The tests are started with a single package and then the numbers of packages are successive enhanced as mentioned under 51.4.2 (a), (b) or (c). Normally the burning rate test should be performed once for each number of packages. The required numbers of packages, in the condition in which they are offered for transport, are arranged in such way, that the most severe results are anticipated, on wooden and leveled pallets. The pallets are placed in one (or two, if necessary) trays. A tray must comprise at least one complete pallet including 10 cm open space all around the pallet. Flammable material (wood-wool, paper, etc.) is placed under and around the packages in such a way that an optimum ignition is guaranteed (see 51.4.2 (f)).

*NOTE: A quantity of about 10 kg dry wood-wool is usually sufficient. The wooden pallets and the dry wood-wool shall be soaked with a liquid mixture of fuel (about 10 liter, see 51.4.2 (f)).*

51.4.3.2 The heat of radiation is measured during the test by suitable equipment, at least at three locations with three different distances from the seat of fire (the distances depend on the sensitivity of the equipment (sensors, thermo camera, etc.) and should be calculated before the test.

51.4.3 The signals are continuously recorded. The starting-point of the fire outbreak is defined as the moment when a reaction of the substance is detected. The end of the fire is determined from registered radiation curves.

51.4.3.4 If a mass explosion or individual explosions or metallic projections (fragments) are observed this should be noted in the test report.

**51.4.4 Test Criteria and method of assessing results**

51.4.4.1 The burning rates  $A$  and  $A_{10t}$  are determined as follows:

- (a) The starting point of the fire is defined as the moment at which the substance or mixture reacts detectably. The end of the fire is characterized by a decrease in radiation level  $I$  (as caused by the fire) to less than 5 % of the maximum level ( $I_{max}$ ) (see Figure 43.3.1);
- (b) The effect of either remainder or burning materials, if present, shall be taken into account in the evaluation;
- (c) The burning time  $t$  is the time span between the starting point and the end of the fire;
- (d) The burning rate  $A$  [kg/min] can be calculated for each tested quantity  $m$  [kg] and its corresponding burning time  $t$  [min] from the equation:

$$A = \frac{m}{t}$$

- (e) Log  $A$  is plotted against log  $m$ , where  $A$  is the determined burning rate, and  $m$  is the mass of substance or mixture used for the test. The observed test results are extrapolated by means of this graph to an uncorrected burning rate  $A_{10t}$  for a mass of 10 000 kg by applying of the formula:

$$A_{10t} = \left( \frac{10000 \text{ kg}}{m} \right)^{\frac{2}{3}} \cdot A$$

51.4.4.2 The corrected burning rate  $A_C$  is determined as follows:

- (a) The energy included in the substance is partially converted into radiation. The percent average radiation efficiency  $\eta$  at a distance from the fire is determined from the measured radiation level ( $dose_{measured}$ ) and the theoretical maximum energy ( $dose_{calculated}$ );

$$\eta = \frac{dose_{measured}}{dose_{calculated}}$$

- (b) The theoretical maximum energy is calculated by multiplying the individual mass of tested substance  $m$  [kg] with the heat of combustion  $H_v$  [kJ/kg]<sup>4</sup>

$$dose_{calculated} = H_v \cdot m$$

- (c) The amount of energy that in practice appears to be transferred by radiation is determined by integrating the area below the measured radiation curve;

$$dose_{measured} = f(t) = \left[ \sum_{t=start}^{end} \frac{(I_{(t+\Delta t)} + I_t)}{2} \cdot \Delta t \right] \cdot 4 \pi \cdot r^2$$

The numerical integration of the radiation intensities  $I_t$  [W/m<sup>2</sup>] over the total burning time delivers  $dose_{measured}$  [kJ] at the distance  $r$  [m].

<sup>4</sup> Should be determined by a suitable technique e.g. combustion calorimeter.

(d) To this end a graph is made showing the radiation level  $I$  [ $\text{kW}/\text{m}^2$ ] as a function of time. The complete radiation dose is calculated by integration of the smoothed and corrected curve down to 1 % to 5 % of  $I_{max}$ ;

(e)  $I_{relevant}$  is obtained from the maximum of the curve of heat radiation calculated as average value of the radiation by converting the integrated area in a rectangle of equal size during the same time span;

(f) The form factor  $f$  that must be taken into account during the maximum fire intensity can be averaged from the formula:

$$f = \frac{I_{relevant}}{I_{calculated}}$$

(g) The corrected burning rate  $A_c$  is calculated as follows:

$$A_c = A_{10t} \cdot \frac{H_v}{33500} \cdot \frac{\eta}{0.25} \cdot \frac{f}{2.78}$$

Where  $H_v$  is the heat of combustion of the substance [ $\text{kJ}/\text{kg}$ ] (i.e. reaction enthalpy of the burning reaction);  $\eta$  is the radiation efficiency and  $f$  the form factor.  $A_c$  is the corrected burning rate [ $\text{kg}/\text{min}$ ] for a quantity of 10 000 kg.

51.4.4.3 If a mass explosion or individual explosions or metallic projections (fragments) occur the substance or mixture is classified in the class explosives.

51.4.4.4 The test results are assessed on the basis of the corrected burning rate  $A_c$  for a quantity of 10 000 kg of the packaged substance or mixture.

51.4.4.5 The test criteria for determining the burning behavior of substances or mixtures are:

Category 1: Any substance or mixture with a corrected burning rate  $A_c$  equal or more than 300  $\text{kg}/\text{min}$  but not higher than 1200  $\text{kg}/\text{min}$ ;

Category 2: Any substance or mixture with a corrected burning rate  $A_c$  equal or more than 140  $\text{kg}/\text{min}$  but less than 300  $\text{kg}/\text{min}$ ;

Category 3: Any substance or mixture with a corrected burning rate  $A_c$  equal or more than 60  $\text{kg}/\text{min}$  but less than 140  $\text{kg}/\text{min}$ ;

Category 4: Any substance or mixture with a corrected burning rate  $A_c$  less 60  $\text{kg}/\text{min}$ .

Any substance or mixture with a corrected burning rate higher than 1200  $\text{kg}/\text{min}$  is classified as an explosive of chapter 2.1.

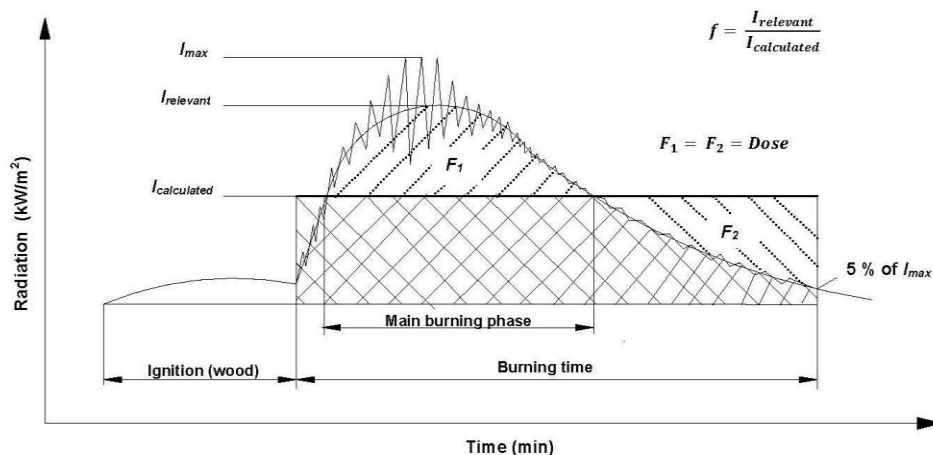


Figure 51.4.1: Measurement of radiation as a function of time

#### 51.4.5 Examples of results

The nitrocellulose formulations are packed in fiber drums (1G) with a maximum mass of 140 kg and fiber board boxes (4G) with a maximum mass of 25 kg, assigned to categories as follows:

Ester soluble (E-grades) nitrocellulose formulations with different phlegmatizers and a nitrogen content of 11.8 % to 12.3 %

NC-type	IPA 35 %	IPA 30 %	ETH 35 %	ETH 30 %	BUT 35 %	BUT 30 %	Water	Chips <sup>a)</sup>
12E	3	2	4	3	2	1 (330 kg/min)	4	1 (1115 kg/min)
22E	3	3	4	3	3	3	4	1 (1115 kg/min)
25E	3	3	4	3	3	3	3	1 (1115 kg/min)

IPA (Isopropanol), ETH (Ethanol), BUT (Butanol), <sup>a)</sup> NC-Chips with 20 % plasticizer

Medium soluble (M-grades) nitrocellulose formulations with different phlegmatizers and a nitrogen content of 11.3 % to 11.8 %



NC-type	IPA 35 %	IPA 30 %	ETH 35 %	ETH 30 %	BUT 35 %	BUT 30 %	Water	Chips <sup>a)</sup>
15M	-	-	-	-	3	2	-	
27M	3	3	4	4	3	3	4	1 (1115 kg/min)
34M	3	3	4	4	4	-	-	1 (1115 kg/min)

IPA (Isopropanol), ETH (Ethanol), BUT (Butanol), <sup>a)</sup> NC-Chips with 20 % plasticizer  
Alcohol soluble (A-grades) nitrocellulose formulations with different phlegmatizers and a nitrogen content of 10.7 % to 11.3 %

NC-type	IPA 35 %	IPA 30 %	ETH 35 %	ETH 30 %	BUT 35 %	BUT 30 %	Water	Chips <sup>a)</sup>
15A	4	3	4	3	3	2	-	1 (1115 kg/min)
30A	4	3	4	4	3	3	4	1 (1115 kg/min)
32 A	4	3	4	4	4	3	-	-

#### 51.4.6 Example of a calculation:

NC-formulation (nitrogen content 10.7 % to 11.2 %) wetted with 30 % isopropanol:

Mass of the tested NC formulation:  $m = 285 \text{ kg}$   
 Burning time:  $t = 9.7 \text{ min}$   
 Form factor:  $f = 3.73$   
 Radiation efficiency:  $\eta = 0.24$   
 Enthalpy of combustion:  $H_v = 15626 \text{ kJ/kg}$

Calculation of the burning rate  $A$ :

$$A = \frac{m}{t} = \frac{285 \text{ kg}}{9.7 \text{ min}} = 29.4 \frac{\text{kg}}{\text{min}}$$

Calculation of the burning rate  $A_{10t}$ :

$$A_{10t} = \left( \frac{10000 \text{ kg}}{m} \right)^{\frac{2}{3}} \cdot A = \left( \frac{10000 \text{ kg}}{285 \text{ kg}} \right)^{\frac{2}{3}} \cdot 29.4 \frac{\text{kg}}{\text{min}} = 315 \frac{\text{kg}}{\text{min}}$$

Calculation of the corrected burning rate  $A_c$ :

$$A_c = A_{10t} \cdot \frac{H_v}{33500} \cdot \frac{\eta}{0.25} \cdot \frac{f}{2.78} = 315 \frac{\text{kg}}{\text{min}} \cdot \frac{15626 \frac{\text{kJ}}{\text{kg}}}{33500 \frac{\text{kJ}}{\text{kg}}} \cdot \frac{0.24}{0.25} \cdot \frac{3.73}{2.78} = 189 \frac{\text{kg}}{\text{min}}$$

The desensitized explosive is classified in category 2.

## References

- [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

## Annex III

### Consequential amendments

#### A. GHS

1. Insert in TABLE OF CONTENTS, Part 2. Physical hazard chapter 2.17 , Desensitized explosives, Page 107.

2. Add in chapter 1.2 the definition for desensitized explosives as follows:





Desensitized explosives are solid or liquid explosive substances or mixtures which are desensitized to suppress their explosive properties in such a manner that they do not mass explode and do not burn too rapidly and therefore may be excluded from the hazard class “Explosives” (Chapter 2.1, see also Note 2 of Chapter 2.1.2.2).

3. Amend in chapter 2.1.2.2 Note 2 as follows:

**NOTE 2:** Some explosives substances and mixtures are wetted with water or alcohols or diluted with other substances to suppress or reduce their explosive properties. They may be a candidate for classification as desensitized explosives (see chapter 2.17) or may be treated differently from explosive substances and mixtures (as desensitized explosives) for some regulatory purposes (e.g. transport) see 1.3.2.4.5.2.

4. Insert Table A1.17 for the new Hazard Class “Desensitized explosives” in Annex I (new style for GHS Rev.5 according to ST/SG/AC.10/C.4/2012/22).

**A1.17 Desensitized explosives** (see Chapter 2.17 for classification criteria)

Classification		Labelling				
Hazard class	Hazard category	Pictogram		Signal word	Hazard Statement	Code
		GHS	UN Model Regulations			
Desensitized explosives	1		<i>Not applicable</i>	Danger	Desensitized explosive; Fire, blast or projection hazard	H206
	2		<i>Not applicable</i>		Desensitized explosive; Fire or projection hazard	H207
	3		<i>Not applicable</i>	Warning	Desensitized explosive; Fire or projection hazard	H207
	4		<i>Not applicable</i>		Desensitized explosive; Fire hazard	H208

5. Insert in Annex 3, Section 1, Table A3.1.1 the following hazard statement

<i>Code (1)</i>	<i>Physical hazard statements (2)</i>	<i>Hazard class (GHS chapter) (3)</i>	<i>Hazard category (4)</i>
H206	<b>Desensitized explosive; Fire, blast or projection hazard</b>	Desensitized explosives (chapter 2.17)	1
H207	<b>Desensitized explosive; Fire or projection hazard</b>	Desensitized explosives (chapter 2.17)	2, 3
H208	<b>Desensitized explosive; Fire hazard</b>	Desensitized explosives (chapter 2.17)	4

6. Insert in Annex 3, Section 2, Table A3.2.2 the following new precautionary statement

<i>Code (1)</i>	<i>Prevention precautionary statements (2)</i>	<i>Hazard class (3)</i>	<i>Hazard category (4)</i>	<i>Conditions for use (5)</i>
P212	<b>Avoid heating under confinement or reducing of diluents or phlegmatizer due the risk of explosion.</b>	Desensitized explosives (chapter 2.17)	1, 2 ,3,4	

7. Amend the entry for P230 for explosives as follows:

<i>Code (1)</i>	<i>Prevention precautionary statements (2)</i>	<i>Hazard class (3)</i>	<i>Hazard category (4)</i>	<i>Conditions for use (5)</i>
P230	<b>Keep wetted with....</b>	Explosives (chapter 2.1)	Division s 1.1, 1.2, 1.3, 1.5	... for substances and mixtures which are wetted, diluted, dissolved or suspended with a phlegmatizer in order to reduce <del>or suppress</del> their explosive properties <del>(desensitized explosives)</del> .  ...Manufacturer/supplier or the competent authority to specify appropriate material

8. Implement desensitized explosives in Annex 3, Section 2, table A.3.2.2 as follows:

<i>Code (1)</i>	<i>Prevention precautionary statements (2)</i>	<i>Hazard class (3)</i>	<i>Hazard category (4)</i>	<i>Conditions for use (5)</i>
P210	<b>Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.</b>	Desensitized explosives (chapter 2.17)	1, 2 ,3,4	
P230	<b>Keep wetted with....</b>	Desensitized explosives (chapter 2.17)	1, 2 ,3,4	...Manufacturer/supplier or the competent authority to specify appropriate material
P233	<b>Keep container tightly closed.</b>	Desensitized explosives (chapter 2.17)	1, 2 ,3,4	
P280	<b>Wear protective gloves/protective clothing/eye protection/face protection</b>	Desensitized explosives (chapter 2.17)	1, 2 ,3,4	...Manufacturer/supplier or the competent authority to specify he appropriate type of equipment
P370	<b>In case of fire:</b>	Desensitized explosives (chapter 2.17)	1, 2 ,3,4	
P371	<b>In case of major fire and large quantities:</b>	Desensitized explosives (chapter 2.17)	4	
P375	<b>Fight fire remotely due to the risk of explosion</b>	Desensitized explosives (chapter 2.17)	1, 2 ,3	
P380	<b>Evacuate area</b>	Desensitized explosives (chapter 2.17)	1, 2 ,3,4	

9. Implement desensitized explosives in Annex 3, Section 2, table A.3.2.3 as follows:

<i>Code (1)</i>	<i>Response precautionary statements (2)</i>	<i>Hazard class (3)</i>	<i>Hazard category (4)</i>	<i>Conditions for use (5)</i>
P370 + P380 + P375	<b>In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.</b>	Desensitized explosives (chapter 2.17)	1, 2, 3,	
P371 + P380 + P375	<b>In case of major fire and large quantities: Fight fire remotely due the risk of explosion</b>	Desensitized explosives (chapter 2.17)	4	

10. Implement desensitized explosives in Annex 3, Section 2, table A.3.2.4 as follows:

<i>Code (1)</i>	<i>Storage precautionary statements (2)</i>	<i>Hazard class (3)</i>	<i>Hazard category (4)</i>	<i>Conditions for use (5)</i>
P401	<b>Store in accordance with...</b>	Desensitized explosives (chapter 2.17)	1,2,3,4	...Manufacturer/supplier or the competent authority to specify local/regional/national/international regulations as applicable.

11. Implement desensitized explosives in Annex 3, Section 2, table A.3.2.5 as follows:

<i>Code (1)</i>	<i>Disposal precautionary statements (2)</i>	<i>Hazard class (3)</i>	<i>Hazard category (4)</i>	<i>Conditions for use (5)</i>
P501	<b>Dispose of contents/containers to...</b>	Desensitized explosives (chapter 2.17)	1, 2, 3,4	..in accordance with local/regional/national/international regulations (to be specified).  Manufacturer/supplier or the competent authority to specify whether disposal requirements apply to contents, container or both.

12. Implement in Annex 3, Section 3 new tables as follows:

**DESENSITIZED EXPLOSIVES**  
(Chapter 2.17)

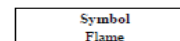
Symbol  
Flame



Hazard category	Signal word	Hazard statement
1	Danger	H206 Desensitized explosive, Fire, blast or projection hazard
2	Danger	H207 Desensitized explosive Fire or projection hazard
3	Warning	H207 Desensitized explosive Fire or projection hazard

Precautionary statements			
Prevention	Response	Storage	Disposal
P210 <b>Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.</b>  P212 <b>Avoid heating under confinement or reducing of diluents or phlegmatizer due the risk of explosion.</b>  P230 <b>Keep wetted with...</b> ...Manufacturer/supplier or the competent authority to specify appropriate material. P233 <b>Keep container tightly closed</b>  P280 <b>Wear protective gloves/protective clothing/eye protection/face protection</b>	P370+P380+P375 <b>In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion</b>	P401 <b>Store in accordance with...</b> ...Manufacturer/supplier or the competent authority to specify local/regional/national/international regulations as applicable.	P501 <b>Dispose of contents/containers to...</b> ...in accordance with local/regional/national/international regulations (to be specified).  Manufacturer/supplier or the competent authority to specify whether disposal requirements apply to contents, container or both.

**DESENSITIZED EXPLOSIVES**  
(Chapter 2.17)



Hazard category	Signal word	Hazard statement
4	Warning	H208 Desensitized explosive, Fire hazard

Precautionary statements			
Prevention	Response	Storage	Disposal
<p>P210 <b>Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.</b></p> <p>P212 <b>Avoid heating under confinement or reducing of diluents or phlegmatizer due the risk of explosion.</b></p> <p>P230 <b>Keep wetted with:</b> ...Manufacturer/supplier or the competent authority to specify appropriate material:</p> <p>P233 <b>Keep container tightly closed.</b></p> <p>P280 <b>Wear protective gloves/protective clothing/eye protection/face protection</b></p>	<p>P371+P380+P375 <b>In case of major fire and large quantities: Fight fire remotely due the risk of explosion.</b></p>	<p>P401 <b>Store in accordance with</b> Manufacturer/supplier or the competent authority to specify local/regional/national/international regulations as applicable.</p>	<p>P501 <b>Dispose of contents/containers to</b> ..in accordance with local/regional/national/international regulations (to be specified).  Manufacturer/supplier or the competent authority to specify whether disposal requirements apply to contents, container or both.</p>

**B. Manual of Tests and Criteria**

- 13. Insert in general, Table of contents
- PART V: Classification procedures, test methods and criteria relating to the Globally Harmonized System of Classification and Labelling of Chemicals
- 50. Introduction to Part V (Purpose, Scope)
- 51. Classification procedures, test methods and criteria relating to the Hazard class desensitized explosives