

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

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**Issues relating to the Globally Harmonized System
of Classification and Labelling of Chemicals:**

Joint work with the GHS Sub-Committee

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

Thirty-fifth session

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Item 3 (b) of the provisional agenda

Review of Chapter 2.1

A sketch of a revised Chapter 2.1 for the GHS (Explosives)

Transmitted by the expert from Sweden

1. In working document 7 (WD7) to the 35:th session of the SCEGHS¹, an outline for a potential amended classification and labelling system for Explosives in the GHS is discussed. This informal paper is intended to supplement that working document and presents how Chapter 2.1 of the GHS could look if that amended system was implemented. The same tentative criteria and labelling elements as presented in WD7 are used herein for consistency and no other changes have been made, in order to keep focus on the main issue under consideration as described in the working document.

2. This informal paper represents the ideas of the expert from Sweden only, and does not necessarily represent his views on the various issues relating to a revised Chapter 2.1 as such. What is presented herein is merely intended to serve as an aid in the discussions on WD7. Although a draft of a revised Chapter 2.1 has previously been brought up by the expert from Sweden within the Informal Correspondence Group (ICG) that works on the item, any actual proposal for an amended chapter has yet to be discussed in that group.

3. A sketch of a revised Chapter 2.1 is presented in Annex 1 to this paper. As the changes compared to the current texts of Chapter 2.1 are many, it is difficult to present them in a directly visible way. Instead, the new texts are displayed using red coloured font while the texts that have been removed are not displayed at all. In essence, virtually all of sections 2.1.2 (Criteria) and 2.1.3 (Hazard communication) have been rewritten and a new (rough) decision logic has been introduced in sub-section 2.1.4.1, while section 2.1.1 (Definitions and general considerations) and sub-section 2.1.4.2 (Screening procedure) remain intact.

4. To provide an overview, the consequential amendments to Table A1.1 of the Classification and Labelling Summary Tables in Annex 1 to the GHS are shown in Annex 2 to this paper. In Annex 3 to this paper, the consequential changes to the GHS-labels are shown. These labels only display the hazard communication elements (pictogram, signal word and hazard statement) and a potential new precautionary statement "Division ... as originally packaged/ configured for transport.", as further discussed in WD7.

¹ Working document 33 to the 53:rd session of the SCETDG, ST/SG/AC.10/C.4/2018/7- ST/SG/AC.10/C.3/2018/33

Annex 1 – A possible revised Chapter 2.1 of the GHS

CHAPTER 2.1

EXPLOSIVES

2.1.1 Definitions and general considerations

2.1.1.1 An *explosive substance (or mixture)* is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.

A *pyrotechnic substance (or mixture)* is a substance or mixture of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative self-sustaining exothermic chemical reactions.

An *explosive article* is an article containing one or more explosive substances or mixtures.

A *pyrotechnic article* is an article containing one or more pyrotechnic substances or mixtures.

2.1.1.2 The class of explosives comprises:

- (a) Explosive substances and mixtures;
- (b) Explosive articles, except devices containing explosive substances or mixtures in such quantity or of such a character that their inadvertent or accidental ignition or initiation shall not cause a hazardous effect external to the device either by projection, fire, smoke, heat or loud noise; and
- (c) Substances, mixtures and articles not mentioned under (a) and (b) above which are manufactured with the view to producing a practical, explosive or pyrotechnic effect.

2.1.2 Classification criteria

The classification of a substance, mixture or article in the hazard class of Explosives consists of up to three layers; the division, the category and the sub-category. For substances, mixtures and articles in Category 1 no division or sub-category can be assigned, see 2.1.2.2 and 2.1.2.3.

NOTE: Some explosive substances and mixtures are wetted with water or alcohols, diluted with other substances or dissolved or suspended in water or other liquid substances to reduce their explosive properties. They may be a candidate for classification as desensitized explosives (see Chapter 2.17) or may be treated differently for some regulatory purposes (e.g. transport), see 1.3.2.4.5.2.

NOTE: For classification tests on solid substances or mixtures, the tests should be performed on the substance or mixture as presented. If for example, for the purposes of supply or transport, the same chemical is to be presented in a physical form different from that which was tested and which is considered likely to materially alter its performance in a classification test, the substance or mixture must also be tested in the new form.

2.1.2.1 Assignment to a division

Substances, mixtures and articles may be assigned to a division within the class of explosives. The procedure for classification into such a division is laid out in Part I of the *UN Recommendations on the Transport of Dangerous Goods – Manual of Tests and Criteria*, and to some extent relies on a certain packaging or configuration, e.g. for transport. The six divisions are characterised by the following:

Table 2.1.1(a): Description of divisions of explosives

Division	Description
1.1	Substance mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually simultaneously).
1.2	Substance mixtures and articles which have a projection hazard but not a mass explosion hazard.
1.3	Substance mixtures and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard: (i) combustion of which gives rise to considerable radiant heat; or (ii) which burn one after another, producing minor blast or projection effects or both
1.4	Substances, mixtures and articles which present no significant hazard: substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package;
1.5	Very insensitive substances or mixtures which have a mass explosion hazard: substances and mixtures which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions;
1.6	Extremely insensitive articles which do not have a mass explosion hazard: articles which predominantly contain extremely insensitive substances or mixtures and which demonstrate a negligible probability of accidental initiation or propagation.

In addition, substance, mixtures or articles assigned to a division may be assigned a compatibility group in accordance with section 2.1.2 in Chapter 2.1 of the *UN Recommendations on the Transport of Dangerous Goods – Model Regulations*, e.g. for transport.

2.1.2.2 Assignment to a Category

Depending on whether a division has been assigned, substances, mixtures and articles are assigned one of two categories in accordance with the following criteria:

Table 2.1.1(b): Criteria for categories of explosives

Category	Criteria
1	Substances, mixtures and articles which: <ul style="list-style-type: none"> - are manufactured with the intention of producing a practical explosive or pyrotechnic effect; or - are substances or mixtures that give positive results in Test series 2; or - [are articles that give positive results in Test series 4; or] - are [candidates for] ANE that give positive results in Test 8(a), unless they <ul style="list-style-type: none"> - meet the criteria for a Division within Class 1 for transport the class of explosives according to the <i>Manual of Tests and Criteria</i>; or - are substances or mixtures not manufactured with the intention of producing a practical explosive or pyrotechnic effect which are excluded from this hazard class by results in Test series 6; or - are articles excluded by definition in 2.1.1.2(b); or - are [candidates for] ANE that give negative results in Tests 8(a) - (c).
2	Substances, mixtures and articles which meet the criteria for a Division within Class 1 for transport the class of explosives according to the <i>Manual of Tests and Criteria</i> .

2.1.2.3 Assignment to a sub-category

Substances, mixtures and articles in Category 2 are assigned one of three sub-categories in accordance with the following criteria:

Table 2.1.1(c): Criteria for sub-categories of explosives

Sub-category	Criteria
2A	Substances, mixtures and articles not meeting the criteria for Sub-categories 2B or 2C.
2B	Substances, mixtures and articles meeting the criteria for Division 1.4, Compatibility group C or G, according to the <i>Model Regulations</i> and where: <ul style="list-style-type: none"> - there is no indication that the packaging is designed such that the hazard is reduced, e.g. no special packing instructions/criteria required, and no special orientation or dividers required to pass Test series 6 as Division 1.4; and - there is no violent reaction in Test 6a or 6b without mass explosion; and - [for unintentional explosives possible further criteria based on data from other tests.]
2C	Substances, mixtures and articles meeting the criteria for Division 1.4, Compatibility group S, according to the <i>Model Regulations</i> and where: <ul style="list-style-type: none"> - there is no indication that the packaging is designed such that the hazard is reduced, e.g. no special packing instructions/criteria required, and no special orientation or dividers required to pass Test Series 6 as Division 1.4, Compatibility group S; and - there is no violent reaction in Test 6a or 6b without mass explosion; and - [for articles, the individual article or the smallest inner packaging unit fulfils the criteria of Division 1.4, Compatibility group S, according to Test 6(d); and] - [for unintentional explosives possible further criteria based on data from other tests; and] - [the explosive is Compatibility group C or G outside of the packaging.]

NOTE: Explosives in Category 2 where there is not enough information to assign them to Sub-category 2B or 2C shall be assigned Sub-category 2A.

NOTE: Explosives that meet the criteria for Sub-category 2B or 2C may be assigned to Sub-category 2A on basis of further considerations, e.g. complementary test results, indicating that this is a more adequate classification in relation to the hazard they pose.

2.1.3 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 2.1.2: Label elements for explosives

Division	No Division	1.1	1.2	1.3	1.5	1.6	1.4
Category	1	2					
Sub-category	n/a	2A			2B		2C
Symbol	Exploding bomb	Exploding bomb <i>or</i> 1.4, 1.5 or 1.6 on orange background*			Exploding bomb <i>or</i> 1.4 on orange background*		<i>No symbol</i> <i>or</i> 1.4 on orange background*
Signal word	Danger	Danger			Warning		Warning
Hazard statement	<i>To be determined</i>	Explosive			Fire or projection hazard		Fire or projection hazard

* Applies to substances, mixtures and articles subject to some regulatory purposes (e.g. transport).

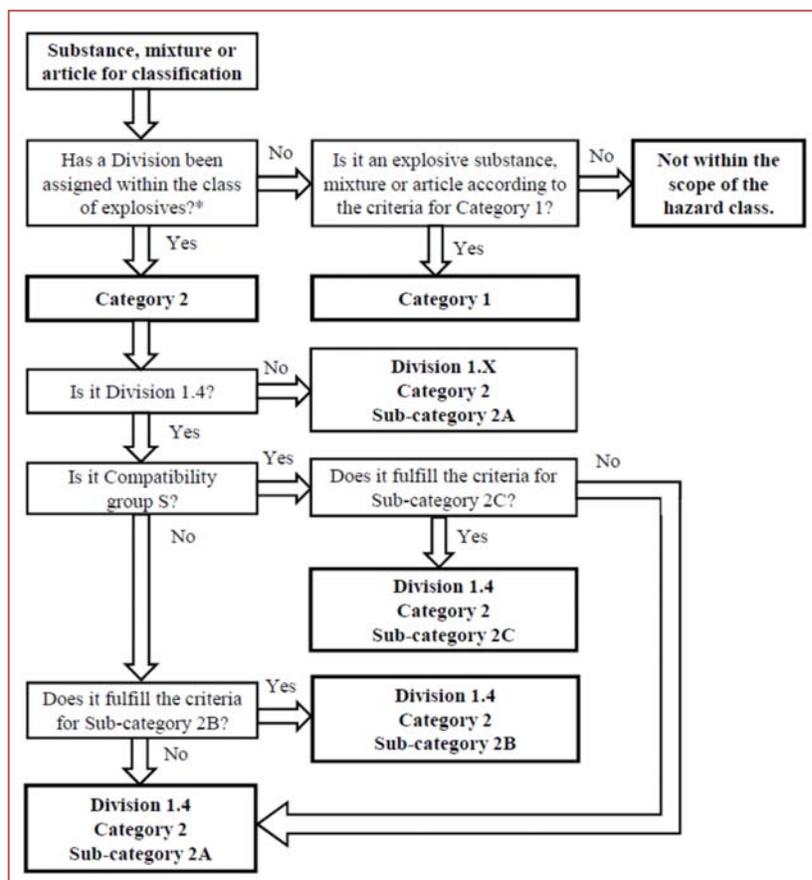
NOTE: Substances and mixtures, as supplied, with a positive result in Test Series 2 in Part I, Section 12, of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, which are exempted from classification as explosives (based on a negative result in Test Series 6 in Part I, Section 16 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria,) still have explosive properties. The user should be informed of these intrinsic explosive properties because they have to be considered for handling – especially if the substance or mixture is removed from its packaging or is repackaged – and for storage. For this reason, the explosive properties of the substance or mixture should be communicated in Section 2 (Hazard identification) and Section 9 (Physical and chemical properties) of the Safety Data Sheet in accordance with Table 1.5.2, and other sections of the Safety Data Sheet, as appropriate.

2.1.4 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.

2.1.4.1 Decision logic

The classification of substances, mixtures and articles in the class of explosives is a complex procedure and reference to Part I of the *UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*, is necessary in particular for the assignment of a Division. The following flow chart illustrates the basic procedure.



* See Part I of the *UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*.

2.1.4.2 Screening procedure

[The text of this section would remain as in current Chapter 2.1.]

Annex 2 – Consequential amendments to the Classification and Labelling Summary Table for Explosives

Annex 1 of the GHS contains the Classification and Labelling Summary Tables for all hazard classes. Table A1.1 is the table for Explosives, and below an amended Table A1.1 is shown, were the classification and labelling as in Annex 1 to this paper to be implemented.

A1.1 Explosives (see Chapter 2.1 for classification criteria)

Classification			Labelling				Classification code
Hazard class	Division	Hazard category	Pictogram		Signal word	Hazard statement	
			GHS	UN Model Regulations			
Explosives	No Division assigned	1		Not applicable	Danger	To be determined	H20X
	1.1	2A			Danger	Explosive	H20Y
	1.2						
	1.3						
	1.5						
	1.6						
	1.4						
	2B			Warning	Fire or projection hazard	H20Z	
	2C	No pictogram					

Annex 3 – Consequential changes to the GHS-label

The left column displays the GHS-label as currently prescribed in Table 2.1.2 of Chapter 2.1. The right column displays the corresponding GHS-label as it would look if the corresponding table of the revised Chapter 2.1 as in Annex 1 would be implemented, including a new precautionary statement “Division ... as packaged/configured for transport”.

Division 1.1, Category 2A	
Current GHS label	Future GHS-label
 DANGER Explosive; mass explosion hazard	 DANGER Explosive Division 1.1 as originally packaged for transport.
Division 1.2, Category 2A	
Current GHS label	Future GHS-label
 DANGER Explosive; severe projection hazard	 DANGER Explosive Division 1.2 as originally configured for transport.
Division 1.3, Category 2A	
Current GHS label	Future GHS-label
 DANGER Explosive; fire blast or projection hazard	 DANGER Explosive Division 1.3 as originally packaged for transport.
Division 1.5, Category 2A	
Current GHS label	Future GHS-label
DANGER May mass explode in fire	 DANGER Explosive Division 1.5 as originally configured for transport.

Division 1.6, Category 2A	
Current GHS label	Future GHS-label
	 DANGER Explosive Division 1.6 as originally packaged for transport.
Division 1.4, Category 2A	
Current GHS label	Future GHS-label
 WARNING Fire or projection hazard	 DANGER Explosive Division 1.4 as originally packaged for transport.
Division 1.4, Category 2B	
Current GHS label	Future GHS-label
 WARNING Fire or projection hazard	 WARNING Fire or projection hazard Division 1.4 as originally packaged for transport.
Division 1.4, Category 2C	
Current GHS label	Future GHS-label
 WARNING Fire or projection hazard	WARNING Fire or projection hazard Division 1.4 as originally packaged for transport.