



**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****Fifty-fourth session**

Geneva, 26 November–4 December 2018

Item 7 (e) of the provisional agenda

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

Geneva, 5–7 December 2018

Item 3 (a) of the provisional agenda

**Classification criteria and related hazard communication:
work of the Sub-Committee of Experts on the Transport of
Dangerous Goods (TDG) on matters of interest to the GHS
Sub-Committee****Proposal to classify chemicals under pressure within
Chapter 2.3 of the GHS and in SP362 of the Model
Regulations****Submitted by the European Chemical Industry Council (CEFIC) and
the European Industrial Gases Association (EIGA)*****Introduction**

1. In the joint session of the TDG and the GHS sub-committees in July, the proposal in ST/SG/AC.10/C.3/2018/5-ST/SG/AC.10/C.4/2018/3 (CEFIC, EIGA) was accepted in its principles provided that:

- (a) Consolidated text with the relevant editorial amendments proposed by Germany in informal document INF.51 (TDG, fifty-third session)-INF.17 (GHS, thirty-fifth session) is submitted at the December sessions;
- (b) Proposals to amend special provision SP362 to avoid conflicting classifications are submitted. Experts from the TDG Sub-Committee would join experts from the GHS Sub-Committee in an intersessional working group to that effect.

* In accordance with the programme of work of the Sub-Committee for 2017–2018 approved by the Committee at its eighth session (see ST/SG/AC.10/C.3/100, paragraph 98 and ST/SG/AC.10/44, para. 14).

2. This intersessional working group had a telephone conference on 17 August 2018 and agreed to submit the following proposal to amend SP362.

Chemicals under pressure in Chapter 2.3 of the GHS

3. A consolidated version of the proposed sub-section 2.3.2 of the GHS is submitted below.

Chemicals under pressure in SP362 of the Model Regulations

4. “Chemicals under pressure” are defined in SP362 as “liquids, pastes or powders, pressurized with a propellant which meets the definition of a gas in 2.2.1.1 (=compressed gas) and 2.2.1.2 (a) or (b) (=liquefied gas). This broad definition would include every mixture of a liquid and a gas provided that the internal pressure in the container is higher than 2 bar (gauge) in order to be considered as a Class 2 dangerous good and not as a liquid.

5. In the absence of a threshold for a minimum quantity of liquids in the mixture and in order to differentiate “gas mixtures” from “chemicals under pressure”, EIGA members applied independently their own threshold to consider that the hazard in case of intended or non-intended release of the mixture is predominantly the production of an aerosol cloud instead of the production of a gas cloud. The thresholds selected independently by EIGA members varied between 20 and 40%. In the absence of scientific data to justify a threshold, EIGA members adopted a common value of 50% as representative of the concept of “predominantly”.

6. For the classification for flammability of the chemical under pressure, SP362 refers to the (very) different flammability criteria of the gaseous, liquid or solid components. In many cases, when the majority of the components (gaseous, liquid or solid) are flammable, this complexity is not an issue and the classification as flammable/non-flammable can be taken without hesitation. For the other cases, CEFIC and EIGA have proposed to adopt the criteria used for the flammability of aerosols: the mass percentage of the flammable components and the specific heat of combustion of the mixture.

Proposals of amendments to the Model Regulations and to the GHS

7. In order to avoid discrepancies between the classifications of chemicals under pressure according to SP362 with the classifications according to chapter 2.3 of the GHS the following amendments to SP362 are proposed.

Proposals of amendments to the Model Regulations

8. Align the definition of chemicals under pressure in SP362, first sentence, with that in chapter 2.3 of the GHS to distinguish between GASES UNDER PRESSURE and CHEMICAL UNDER PRESSURE as follows. The new text is underlined, deleted text is strikethrough:

“This entry applies to ~~liquid, paste or powders, pressurized with a propellant which meets the definition of a gas in 2.2.1.1 and 2.2.1.2 (a) or (b)~~ mixtures containing 50% or more by mass of liquids or solids (e.g., pastes or powders) and one or more gases, in pressure receptacles”

other than aerosol dispensers, at a pressure of 200 kPa (gauge) or more at 20 °C. The gas can be a compressed, liquefied or dissolved gas according to 2.2.1.1 and 2.2.1.2 (a), (b) or (d).”.

Existing Note to become Note 1.

Insert the following new Note 2:

“NOTE 2: Mixtures containing less than 50% by mass of liquids or solids (i.e. more than 50% of gases) should be classified as gas mixtures according to the classification rules outlined in Chapter 2.2 Gases.”.

9. In the second paragraph of SP362, amend the introductory sentence and the provisions described in (a) in order to introduce a cut-off limit to distinguish between non-flammable and flammable CHEMICAL UNDER PRESSURE, in analogy to UN1950 AEROSOLS. The new text is underlined, deleted text is strikethrough:

“The following provisions shall apply:

~~(a)~~ The chemical under pressure shall be classified based on the hazard characteristics of the components in the different states:

- The propellant;
- The liquid; or
- The solid.

~~If one of these components, which can be a pure substance or a mixture, needs to be classified as flammable, the chemical under pressure shall be classified as flammable in Division 2.1~~

(a) The chemical under pressure shall be classified for flammability based on the amount of flammable components in the mixture and their heat of combustion.

A chemical under pressure shall be classified as flammable if

- (i) It contains > 1% of flammable components (by mass); or
- (ii) It has a heat of combustion > 20 kJ/g.

A chemical under pressure shall be classified as non-flammable if:

- (i) It contains < 1% of flammable components (by mass); and
- (ii) It has a heat of combustion < 20 kJ/g.

Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:

- (i) A flammable liquid is a liquid having a flashpoint of not more than 93 °C.
- (ii) A flammable solid is a solid which meets the criteria in 2.4.2.2 of these Regulations;
- (iii) A flammable gas is a gas which meets the criteria in 2.2.2.1 of these Regulations.”.

(b) to (e) *Unchanged.*

Proposals of amendments to the GHS

Amendments to Chapter 2.3

10. Amend Chapter 2.3 as follows:

In the heading, insert “and chemicals under pressure”.

Add a new 2.3.0 to read as follows:

“2.3.0 Introduction

This chapter contains the definitions, classification criteria, hazard communication elements, decision logics and guidance for aerosols and chemicals under pressure. Although they present similar hazards, aerosols and chemicals under pressure are separate hazard classes and are covered in separate sections. While the hazards are similar and the classification is based on flammable properties and heat of combustion, they are presented in two different sections due to allowable pressure, capacity and construction of the two kinds of receptacles. A substance or mixture is classified as either an aerosol in accordance with 2.3.1 or a chemical under pressure in accordance with 2.3.2.”

Add the following new section heading “2.3.1 Aerosols” and insert in this section the text of existing 2.3.1 to 2.3.4.1 as amended in ST/SG/AC.10/C.4/70, Annex I, with appropriate renumbering.

Add the following new section:

“2.3.2 Chemicals under pressure

2.3.2.1 Definition

Chemicals under pressure are mixtures containing 50% or more by mass of liquids or solids (e.g., pastes or powders) and one or more gases, in pressure receptacles other than aerosol dispensers, at a pressure of 200 kPa (gauge) or more at 20 °C. The gas can be a compressed, liquefied or dissolved gas under pressure.

NOTE: *Mixtures, containing less than 50% by mass of liquids or solids, (e.g., pastes or powders), should be considered for classification as gases under pressure (see chapter 2.5) or, if not meeting the criteria for classification as gases under pressure, should be considered for other physical hazard classes appropriate for liquids or solids (see decision logic 2.3.2).*

2.3.2.2 Classification criteria

2.3.2.2.1 Mixtures containing liquids or solids (i.e., pastes or powders) and gases, in pressure receptacles other than an aerosol dispenser are classified as chemicals under pressure if they contain 50 % or more of liquids and/or solids and the pressure in the receptacle is higher than 200 kPa at 20 °C. They are classified in one of three categories of this hazard class, according to Table 2.3.2, depending on their content of flammable components and their heat of combustion (see 2.3.2.4.1).

2.3.2.2.2 Flammable components are components which are classified as flammable according to the GHS criteria, i.e.:

- Flammable gases (see Chapter 2.2);
- Flammable liquids (see Chapter 2.6);
- Flammable solids (see Chapter 2.7).

Table 2.3.2 Criteria for chemicals under pressure

Category	Criteria
1	Any chemical under pressure that a) contains $\geq 85\%$ flammable components (by mass) and b) has a heat of combustion of ≥ 20 kJ/g.
2	Any chemical under pressure that a) contains $> 1\%$ flammable components (by mass) and b) has a heat of combustion < 20 kJ/g or that a) contains $< 85\%$ flammable components (by mass) and b) has a heat of combustion ≥ 20 kJ/g.
3	Any chemical under pressure that a) contains $\leq 1\%$ flammable components (by mass) and b) has a heat of combustion of < 20 kJ/g."

NOTE 1: The flammable components in a chemical under pressure do not include pyrophoric, self-heating or water-reactive, substances and mixtures because such components are not allowed in chemicals under pressure according to the Recommendations on the Transport of Dangerous Goods, Model Regulations.

NOTE 2: Chemicals under pressure do not fall additionally within the scope of section 2.3.1 (aerosols), chapters 2.2 (flammable gases), 2.5 (gases under pressure), 2.6 (flammable liquids) and 2.7 (flammable solids). Depending on their contents, chemicals under pressure may however fall within the scope of other hazard classes, including their labelling elements.

2.3.2.3 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 2.3.2.1: Label elements for chemicals under pressure

	Category 1	Category 2	Category 3
Symbol	Flame Gas cylinder	Flame Gas cylinder	Gas cylinder
Signal word	Danger	Warning	Warning
Hazard statement	Extremely flammable chemical under pressure: May explode if heated	Flammable chemical under pressure: May explode if heated	Chemical under pressure: May explode if heated

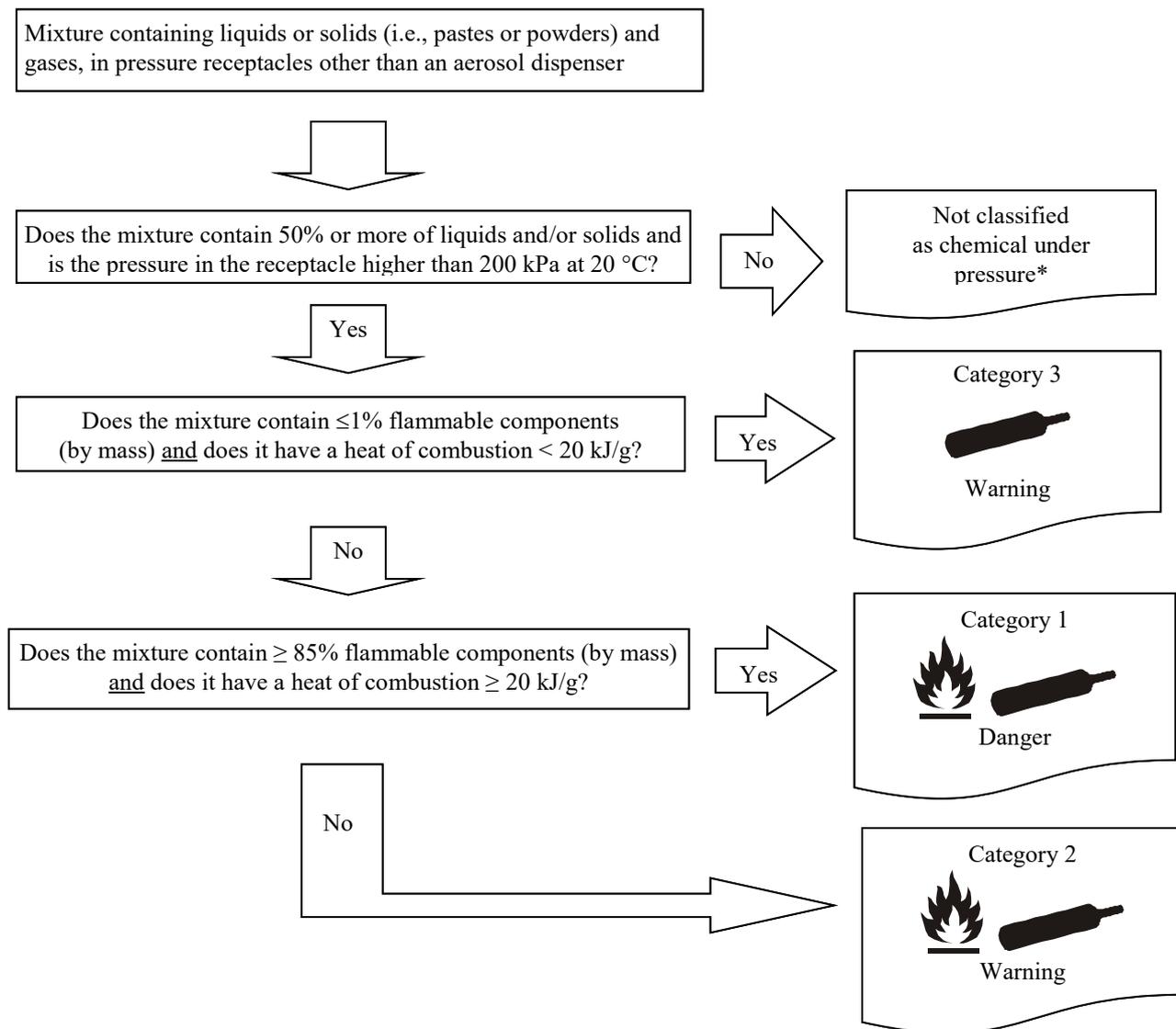
2.3.2.4 Decision logic

The decision logic 2.3.2 has been provided as additional guidance. It is strongly recommended that the person responsible for classification studies the criteria before and during use of the decision logic.

2.3.2.4.1 *Decision logic*

To classify a mixture as chemicals under pressure, data on its pressure, its flammable components, and on its specific heat of combustion are required. Classification should be made according to decision logic 2.3.2.

Decision logic 2.3.2



*should be considered for classification in other physical hazard classes as appropriate”.

2.3.4.2 (as amended in ST/SG/AC.10/C.4/70, Annex I) is renumbered as 2.3.3.

Consequential amendments to the GHS

Chapter 2.5 “Gases under Pressure”

Amend the note under 2.5.2.1 to read as follows (*new text is underlined*):

“NOTE: Aerosols and chemicals under pressure should not be classified as gases under pressure. See Chapter 2.3.

Annex 1

Amend table A1.3 as follows (*new text is underlined*):

“A1.3 Aerosols and Chemicals under pressure (see Chapter 2.3 for classification criteria)

Classification		Labelling			Hazard statement codes	
Hazard class	Hazard category	Pictogram		Signal word		Hazard statement
		GHS	UN Model Regulations ^a			
Aerosols (section 2.3.1)	1			Danger	Extremely flammable aerosol Pressurized container: may burst if heated	H222 H229
	2			Warning	Flammable aerosol Pressurized container: may burst if heated	H223 H229
	3	No pictogram		Warning	Pressurized container: may burst if heated	H229
Chemicals under pressure (section 2.3.2)	<u>1</u>	 		<u>Danger</u>	<u>Extremely flammable chemical under pressure: may explode if heated</u>	<u>H282</u>
	<u>2</u>	 		<u>Warning</u>	<u>Flammable chemical under pressure: may explode if heated</u>	<u>H283</u>
	<u>3</u>			<u>Warning</u>	<u>Chemical under pressure: may explode if heated</u>	<u>H284</u>

^a Under the UN Recommendations on the Transport of Dangerous Goods, Model Regulations, the symbol, number and border line may be shown in black or white. The background colour is red for categories 1 and 2 and green for category 3.”.

Annex 3, Section 1, Table A3.1.1

Insert the following rows:

Code (1)	Physical hazard statements (2)	Hazard class (GHS chapter) (3)	Hazard category (4)
H282	Extremely flammable chemical under pressure: May explode if heated	Chemicals under pressure (chapter 2.3)	1
H283	Flammable chemical under pressure: May explode if heated	Chemicals under pressure (chapter 2.3)	2
H284	Chemical under pressure: May explode if heated	Chemicals under pressure (chapter 2.3)	3

Annex 3, Section 2, Table A3.2.2

Insert the following rows:

Code (1)	Prevention precautionary statement (2)	Hazard class (3)	Hazard category (4)	Conditions for use (5)
P210	Keep away from heat, hot surfaces, sparks open flames and other ignition sources. No smoking	Chemicals under pressure (chapter 2.3)	1, 2, 3	
P211	Do not spray on an open flame or other ignition source	Chemicals under pressure (chapter 2.3)	1, 2	

Annex 3, Section 2, Table A3.2.3

Insert the following rows:

Code (1)	Response precautionary statement (2)	Hazard class (3)	Hazard category (4)	Conditions for use (5)
P381	In case of leakage, eliminate all ignition sources.	Chemicals under pressure (chapter 2.3)	1,2	
P376	Stop leak if safe to do so.	Chemicals under pressure (chapter 2.3)	1, 2, 3	
P370 + P378	In case of fire, use to extinguish.	Chemicals under pressure (chapter 2.3)	1, 2	Manufacturer/supplier or the competent authority to specify appropriate media.

Annex 3, Section 2, Table A3.2.4

Insert the following rows:

Code (1)	Storage precautionary statement (2)	Hazard class (3)	Hazard Category (4)	Conditions for use (5)
P403	Store in a well-ventilated place.	Chemicals under pressure (chapter 2.3)	1, 2, 3	

P410	Protect from sunlight.	Chemicals under pressure (chapter 2.3)	1, 2, 3	<i>May be omitted for chemicals under pressure filled in transportable cylinders in accordance with packing instruction P200 of the UN Recommendations on the Transport of Dangerous Goods, Model Regulations, unless those chemicals under pressure are subject to (slow) decomposition or polymerization, or the competent authority provides otherwise.</i>
P410 + P403	Protect from sunlight. Store in a well-ventilated place.	Chemicals under pressure (chapter 2.3)	1, 2, 3	<i>P410 may be omitted for chemicals under pressure filled in transportable cylinders in accordance with packing instruction P200 of the UN Recommendations on the Transport of Dangerous Goods, Model Regulations, unless those chemicals under pressure are subject to (slow) decomposition or polymerization, or the competent authority provides otherwise.</i>

Annex 3, Section 3, Matrix of precautionary statements by hazard class/category

Insert the following tables:

“Chemicals under pressure (Chapter 2.3 section 2.3.2)

Hazard category	Symbol	Signal word	Hazard statement
1	Flame and gas cylinder	Danger	H282 Extremely flammable chemical under pressure: May explode if heated
2	Flame and gas cylinder	Warning	H283 Flammable chemical under pressure: May explode if heated



Precautionary statements			
Prevention	Response	Storage	Disposal
P210 Keep away from heat, hot surfaces, sparks open flames and other ignition sources. No smoking. P211 Do not spray on an open flame or other ignition source.	P381 In case of leakage, eliminate all ignition sources. P376 Stop leak if safe to do so. P370 + P378 In case of fire, use to extinguish.	P410 + P403 Protect from sunlight. Store in a well-ventilated place. <i>P410 may be omitted for chemicals under pressure filled in transportable cylinders in accordance with packing instruction P200 of the UN Recommendations on the Transport of Dangerous Goods, Model Regulations, unless those chemicals under pressure are subject to (slow)decomposition or polymerisation, or the competent authority provides otherwise.</i>	

Hazard category	Symbol	Signal word	Hazard statement
3	Gas cylinder	Warning	H284 Chemical under pressure: May explode if heated



Precautionary statements			
Prevention	Response	Storage	Disposal
P210 Keep away from heat, hot surfaces, sparks open flames and other ignition sources. No smoking.	P376 Stop leak if safe to do so.	P410 + P403 Protect from sunlight. Store in a well-ventilated place. <i>P410 may be omitted for chemicals under pressure filled in transportable cylinders in accordance with packing instruction P200 of the UN Recommendations on the Transport of Dangerous Goods, Model Regulations, unless those chemicals under pressure are subject to (slow) decomposition or polymerization, or the competent authority provides otherwise.</i>	

Annex 4, section 9, Table A4.3.9.2 (Data relevant with regard to physical hazard classes (supplemental))

Add a new row for chemicals under pressure as follows:

Chapter	Hazard Class	Property/Safety characteristic/ Test result and Remarks/Guidance
2.3; section 2.3.2	Chemicals under pressure	<ul style="list-style-type: none">– indicate the total percentage (by mass) of flammable components– indicate the specific heat of combustion (generally in kJ/g)