

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

10 September 2013

**Sub-Committee of Experts on the
Transport of Dangerous Goods**

Forty-fourth session

Geneva, 25 November – 4 December 2013

Item 10 (c) of the provisional agenda

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

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

Twenty-sixth session

Geneva, 4 – 6 December 2013

Item 2 (g) of the provisional agenda

Classification criteria and hazard communication

**Proposal to include pyrophoric gas in the GHS (Track-
Changes)**

Transmitted by the expert from the United States of America

1. This document contains the text of GHS Chapter 2.2, Annex 1 and Annex 3, as amended in accordance with the proposed list of amendments in document ST/SG/AC.10/C.3/2013/69; ST/SG/AC.10/C.4/2013/8. Amendments are shown in visible mode (“track-changes”).
2. Where no change is proposed for certain hazard or precautionary statements assigned to flammable gases in Annex 3, Sections 1 and 2, the text is highlighted for the convenience of the Sub-committee of Experts on the GHS. Experts are invited to consider whether the full title of the hazard chapter should be included in the assignment.

Chapter 2.2

Flammable gases (including chemically unstable gases) [and pyrophoric gases](#)

2.2.1 Definitions

2.2.1.1 A *flammable gas* is a gas having a flammable range with air at 20 °C and a standard pressure of 101.3 kPa.

2.2.1.2 A *chemically unstable gas* is a flammable gas that is able to react explosively even in the absence of air or oxygen.

[2.2.1.3 A *pyrophoric gas* is a substance or mixture in a gaseous state that will ignite spontaneously in air at a temperature of 54.4 °C or below.](#)

2.2.2 Classification criteria

2.2.2.1 A flammable gas is classified in one of the two categories for this class according to the following table:

Table 2.2.1: Criteria for flammable [and pyrophoric](#) gases

Category	Criteria
1	Gases, which at 20 °C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit.
2	Gases, other than those of Category 1, which, at 20 °C and a standard pressure of 101.3 kPa, have a flammable range while mixed in air.
Pyrophoric Gas	Gases which ignite spontaneously in air at a temperature of 54.4 °C or below.

NOTE 1: Ammonia and methyl bromide may be regarded as special cases for some regulatory purposes.

NOTE 2: Aerosols should not be classified as flammable gases. See Chapter 2.3.

NOTE 3: [Pyrophoric gases should not be classified as flammable gases, category 1 or 2. Spontaneous ignition for pyrophoric gases is not always immediate, and there may be a delay.](#)

2.2.2.2 A flammable gas, [in category 1 and ~~that 2,~~ or pyrophoric gas which](#) is also chemically unstable, is additionally classified in one of the two categories for chemically unstable gases using the methods described in Part III of the Manual of Tests and Criteria according to the following table:

Table 2.2.2: Criteria for chemically unstable gases

Category	Criteria
A	Flammable gases which are chemically unstable at 20°C and a standard pressure of 101.3 kPa
B	Flammable gases which are chemically unstable at a temperature greater than 20°C and/or a pressure greater than 101.3 kPa

2.2.3 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.

3. ~~Table 2.2.3: Label elements for flammable gases (including chemical unstable gases)~~

	Flammable gas		Chemically unstable gas	
	Category 1	Category 2	Category A	Category B
Symbol	Flame	<i>No symbol</i>	<i>No additional symbol</i>	<i>No additional symbol</i>
Signal word	Danger	Warning	<i>No additional signal word</i>	<i>No additional signal word</i>
Hazard statement	Extremely flammable gas	Flammable gas	May react explosively even in the absence of air	May react explosively even in the absence of air at elevated pressure and/or temperature

Table 2.2.3: Label elements for flammable gases (including chemically unstable gases) and pyrophoric gases

	Flammable gas		Chemically unstable gas		Pyrophoric Gas
	Category 1	Category 2	Category A	Category B	Pyrophoric Gas
Symbol	Flame	<i>No symbol</i>	<i>No additional symbol</i>	<i>No additional symbol</i>	Flame
Signal word	Danger	Warning	<i>No additional signal word</i>	<i>No additional signal word</i>	Danger
Hazard statement	Extremely flammable gas	Flammable gas	May react explosively even in the absence of air	May react explosively even in the absence of air at elevated pressure and/or temperature	Catches fire spontaneously if exposed to air

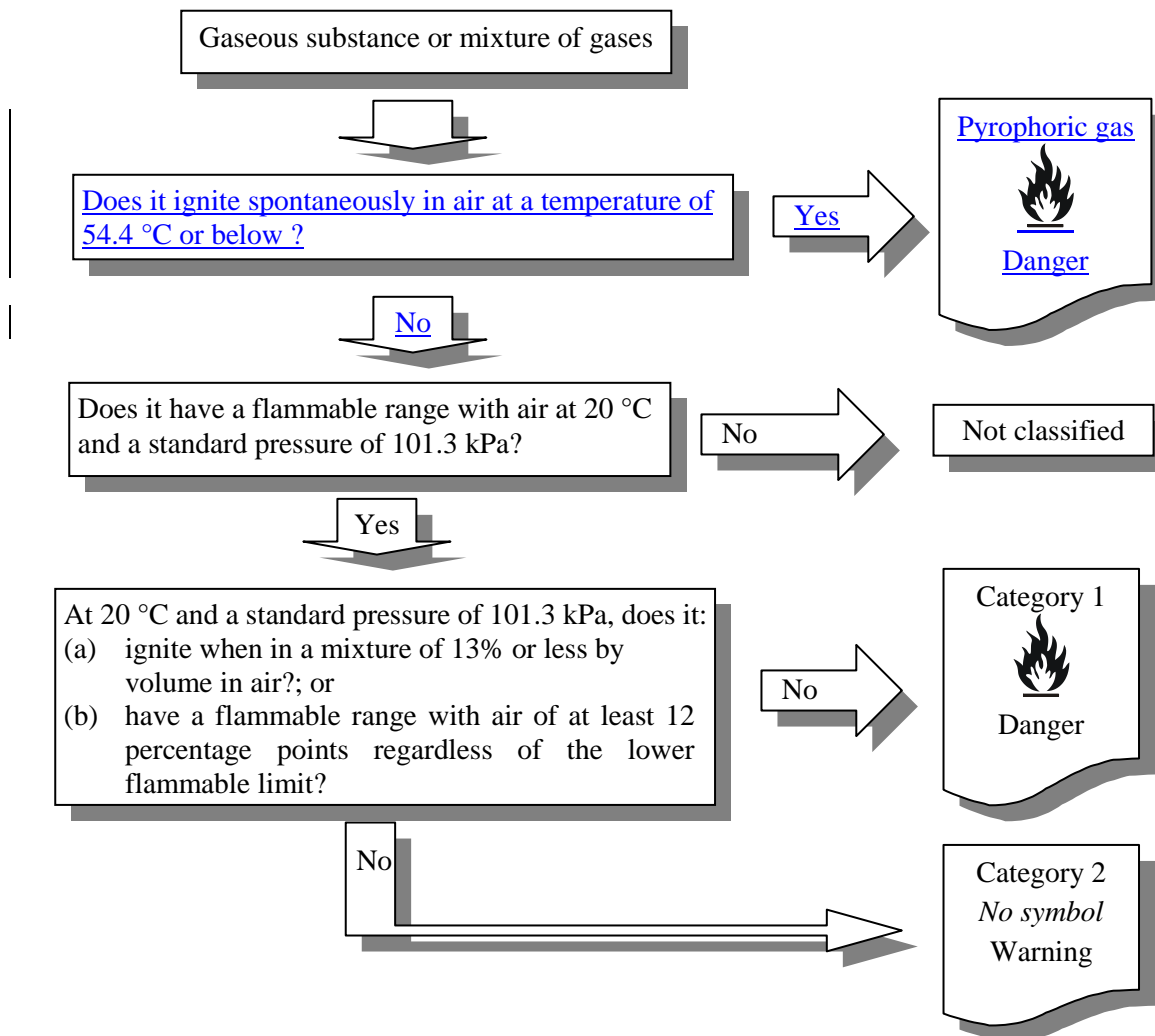
2.2.4 Decision logic and guidance

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.

2.2.4.1 Decision logic for flammable and pyrophoric gases

To classify a flammable gas, data on its flammability are required. To classify a pyrophoric gas, data on its ability to ignite with air is required. The classification is according to decision logic 2.2 (a).

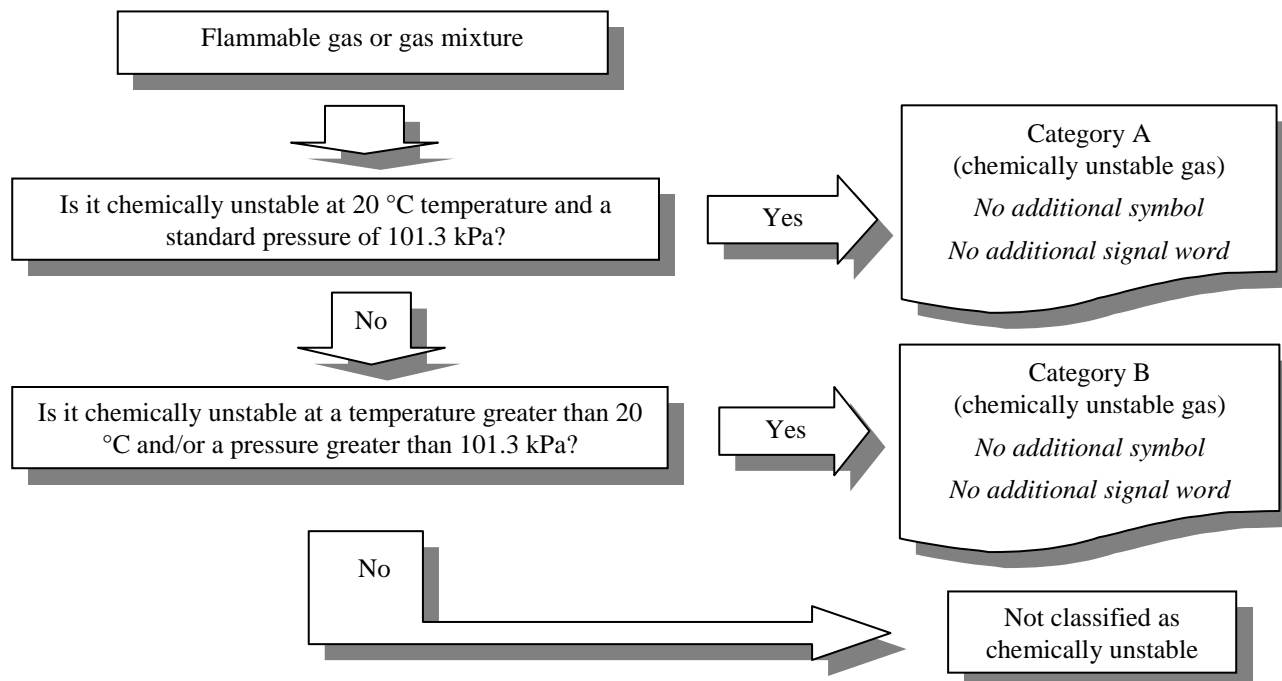
Decision logic 2.2 (a)



2.2.4.2 Decision logic for chemically unstable gases

To classify a flammable gas as chemically unstable, data on its chemical instability are required. The classification is according to decision logic 2.2 (b).

Decision logic 2.2 (b)



2.2.4.3 Guidance

2.2.4.3.1 Flammability should be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:2010 “Gases and gas mixtures – Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets”). Where insufficient data are available to use these methods, tests by a comparable method recognized by the competent authority may be used.

2.2.4.3.2 Chemical instability should be determined in accordance with the method described in Part III of the Manual of Tests and Criteria. If the calculations in accordance with ISO 10156:2010 show that a gas mixture is not flammable it is not necessary to carry out the tests for determining chemical instability for classification purposes.

2.2.4.3.3 [Pyrophoricity should be determined using any of the following methods:](#)

[IEC 60079-20-1 ed1.0 \(2010-01\)](#)

[DIN 51794](#)

2.2.5 Example: Classification of a flammable gas mixture by calculation according to ISO 10156:2010

Formula

$$\sum_i^n \frac{V_i\%}{T_{ci}}$$

where:

$V_i\%$ = the equivalent flammable gas content;

T_{ci} = the maximum concentration of a flammable gas in nitrogen at which the mixture is still not flammable in air;

i = the first gas in the mixture;

n = the nth gas in the mixture;

K_i = the equivalency factor for an inert gas versus nitrogen;

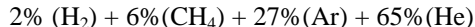
Where a gas mixture contains an inert diluent other than nitrogen, the volume of this diluent is adjusted to the equivalent volume of nitrogen using the equivalency factor for the inert gas (K_i).

Criterion:

$$\sum_i^n \frac{V_i\%}{T_{ci}} > 1$$

Gas mixture

For the purpose of this example the following is the gas mixture to be used



Calculation

1. Ascertain the equivalency factors (K_i) for the inert gases versus nitrogen:

$$K_i (\text{Ar}) = 0.5$$

$$K_i (\text{He}) = 0.5$$

2. Calculate the equivalent mixture with nitrogen as balance gas using the K_i figures for the inert gases:

$$2\% (\text{H}_2) + 6\% (\text{CH}_4) + [27\% \times 0.5 + 65\% \times 0.5] (\text{N}_2) = 2\% (\text{H}_2) + 6\% (\text{CH}_4) + 46\% (\text{N}_2) = 54\%$$

3. Adjust the sum of the contents to 100%:

$$\frac{100}{54} \times [2\% (\text{H}_2) + 6\% (\text{CH}_4) + 46\% (\text{N}_2)] = 3.7\% (\text{H}_2) + 11.1\% (\text{CH}_4) + 85.2\% (\text{N}_2)$$

4. Ascertain the T_{ci} coefficients for the flammable gases:

$$T_{ci} \text{ H}_2 = 5.7\%$$





$$T_{ci} \text{ CH}_4 = 14.3\%$$

5. Calculate the flammability of the equivalent mixture using the formula:

$$\sum_i^n \frac{V_i\%}{T_{ci}} = \frac{3.7}{5.7} + \frac{11.1}{14.3} = 1.42 \quad \mathbf{1.42 > 1}$$

Therefore the mixture is flammable in air.

A1.2 Flammable gases (including chemically unstable gases) [and pyrophoric gases](#) (see Chapter 2.2 for classification criteria)

Classification		Labelling			Hazard statement codes	
Hazard class	Hazard category	Pictogram		Signal word		Hazard statement
		GHS	UN Model Regulations ^a			
Flammable gases (including chemically unstable gases) and pyrophoric gases	1			Danger	Extremely flammable gas	H220
	2	No pictogram	Not required	Warning	Flammable gas	H221
	A (chemically unstable gases)	No additional pictogram	Not required	No additional signal word	<i>Additional hazard statement:</i> May react explosively even in the absence of air	H230
	B (chemically unstable gases)	No additional pictogram	Not required	No additional signal word	<i>Additional hazard statement:</i> May react explosively even in the absence of air at elevated pressure and/or temperature	H231
	Pyrophoric gas			Danger	Catches fire spontaneously if exposed to air	H250

^a Under the UN Recommendations on the Transport of Dangerous Goods, Model Regulations, the symbol, number and border line may be shown in black instead of white. The background colour stays red in both cases.

A3.1.2.3 In addition to individual hazard statements, a number of combined hazard statements are given in Table A3.1.2. The alphanumerical codes for the combined statements are constructed from the codes for the individual statements that are combined, conjoined with the plus (“+”) sign. For example, H300 + H310 indicates that the text to appear on the label is “Fatal if swallowed or in contact with skin”.

A3.1.2.4 All assigned hazard statements should appear on the label unless otherwise specified in 1.4.10.5.3.3. The competent authority may specify the order in which they appear. Also, where a combined hazard statement is indicated for two or more hazard statements, the competent authority may specify whether the combined hazard statement or the corresponding individual statements should appear on the label, or may leave the choice to the manufacturer/supplier.

Table A3.1.1: Hazard statement codes for physical hazards

Code (1)	Physical hazard statements (2)	Hazard class (GHS chapter) (3)	Hazard category (4)
H200	Unstable explosive	Explosives (chapter 2.1)	Unstable explosive
H201	Explosive; mass explosion hazard	Explosives (chapter 2.1)	Division 1.1
H202	Explosive; severe projection hazard	Explosives (chapter 2.1)	Division 1.2
H203	Explosive; fire, blast or projection hazard	Explosives (chapter 2.1)	Division 1.3
H204	Fire or projection hazard	Explosives (chapter 2.1)	Division 1.4
H205	May mass explode in fire	Explosives (chapter 2.1)	Division 1.5
H220	Extremely flammable gas	Flammable gases (chapter 2.2)	1
H221	Flammable gas	Flammable gases (chapter 2.2)	2
H222	Extremely flammable aerosol	Aerosols (chapter 2.3)	1
H223	Flammable aerosol	Aerosols (chapter 2.3)	2
H224	Extremely flammable liquid and vapour	Flammable liquids (chapter 2.6)	1
H225	Highly flammable liquid and vapour	Flammable liquids (chapter 2.6)	2
H226	Flammable liquid and vapour	Flammable liquids (chapter 2.6)	3
H227	Combustible liquid	Flammable liquids (chapter 2.6)	4
H228	Flammable solid	Flammable solids (chapter 2.7)	1, 2
H229	Pressurized container: may burst if heated	Aerosols (chapter 2.3)	1, 2, 3
H230	May react explosively even in the absence of air	Flammable gases (including chemically unstable gases) (chapter 2.2)	A (Chemically unstable gases)
H231	May react explosively even in the absence of air at elevated pressure and/or temperature	Flammable gases (including chemically unstable gases) (chapter 2.2)	B (Chemically unstable gases)
H240	Heating may cause an explosion	Self-reactive substances and mixtures (chapter 2.8); and Organic peroxides (chapter 2.15)	Type A
H241	Heating may cause a fire or explosion	Self-reactive substances and mixtures (chapter 2.8); and Organic peroxides (chapter 2.15)	Type B

Code (1)	Physical hazard statements (2)	Hazard class (GHS chapter) (3)	Hazard category (4)
H242	Heating may cause a fire	Self-reactive substances and mixtures (chapter 2.8); and Organic peroxides (chapter 2.15)	Types C, D, E, F
H250	Catches fire spontaneously if exposed to air	Flammable gases and pyrophoric gases (chapter 2.2) Pyrophoric liquids (chapter 2.9); Pyrophoric solids (chapter 2.10)	Pyrophoric gas 1 <u>1</u>
H251	Self-heating; may catch fire	Self-heating substances and mixtures (chapter 2.11)	1
H252	Self-heating in large quantities; may catch fire	Self-heating substances and mixtures (chapter 2.11)	2
H260	In contact with water releases flammable gases which may ignite spontaneously	Substances and mixtures which, in contact with water, emit flammable gases (chapter 2.12)	1
H261	In contact with water releases flammable gas	Substances and mixtures which, in contact with water, emit flammable gases (chapter 2.12)	2, 3
H270	May cause or intensify fire; oxidizer	Oxidizing gases (chapter 2.4)	1
H271	May cause fire or explosion; strong oxidizer	Oxidizing liquids (chapter 2.13); Oxidizing solids (chapter 2.14)	1
H272	May intensify fire; oxidizer	Oxidizing liquids (chapter 2.13); Oxidizing solids (chapter 2.14)	2, 3
H280	Contains gas under pressure; may explode if heated	Gases under pressure (chapter 2.5)	Compressed gas Liquefied gas Dissolved gas
H281	Contains refrigerated gas; may cause cryogenic burns or injury	Gases under pressure (chapter 2.5)	Refrigerated liquefied gas
H290	May be corrosive to metals	Corrosive to metals (chapter 2.16)	1

Table A3.2.2: Codification of prevention precautionary statements

Code (1)	Prevention precautionary statements (2)	Hazard class (3)	Hazard category (4)	Conditions for use (5)
P202	Do not handle until all safety precautions have been read and understood.	Flammable gases (including chemically unstable gases) (chapter 2.2)	A, B (chemically unstable gases)	
Germ cell mutagenicity (chapter 3.5)		1A, 1B, 2		
Carcinogenicity (chapter 3.6)		1A, 1B, 2		
Reproductive toxicity (chapter 3.7)		1A, 1B, 2		

Code (1)	Prevention precautionary statements (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.	Explosives (chapter 2.1)	Divisions 1.1, 1.2, 1.3, 1.4, 1.5	
		Flammable gases and pyrophoric gases (chapter 2.2)	1, 2, Pyrophoric gas	
		Aerosols (chapter 2.3)	1, 2, 3	
		Flammable liquids (chapter 2.6)	1, 2, 3, 4	
		Flammable solids (chapter 2.7)	1, 2	
		Self-reactive substances and mixtures (chapter 2.8)	Types A, B, C, D, E, F	
		Pyrophoric liquids (chapter 2.9)	1	
		Pyrophoric solids (chapter 2.10)	1	
		Oxidizing liquids (chapter 2.13)	1, 2, 3	
		Oxidizing solids (chapter 2.14)	Types A, B, C, D, E, F	
	Organic peroxides (chapter 2.15)	1, 2, 3		
P222	Do not allow contact with air.	Flammable gases and pyrophoric gases (chapter 2.2)	Pyrophoric gas	<i>– if emphasis of the hazard statement is deemed necessary</i>
		Pyrophoric liquids (chapter 2.9)	1	<i>– if emphasis of the hazard statement is deemed necessary.</i>
		Pyrophoric solids (chapter 2.10)	1	
P233	Keep container tightly closed.	Flammable liquids (chapter 2.6)	1, 2, 3	<i>– if the liquid is volatile and may generate an explosive atmosphere.</i>
		Flammable gases and pyrophoric gases (chapter 2.2)	Pyrophoric gas	
		Pyrophoric liquids (chapter 2.9)	1	
		Pyrophoric solids (chapter 2.10)	1	
		Acute toxicity, inhalation (chapter 3.1)	1, 2, 3	<i>– if the chemical is volatile and may generate a hazardous atmosphere.</i>
	Specific target organ toxicity, single exposure; respiratory tract irritation (chapter 3.8)	3		

Code (1)	Prevention precautionary statements (2)	Hazard class (3)	Hazard category (4)	Conditions for use (5)
P243	Take action to prevent static discharges.	Flammable liquids (chapter 2.6)	1, 2, 3	– if the liquid is volatile and may generate an explosive atmosphere. – may be omitted where local or national legislation introduces more specific provisions.
P244	Keep valves and fittings free from oil and grease.	Oxidizing gases (chapter 2.4)	1	
P280	Wear protective gloves/protective clothing/eye protection/face protection.	Explosives (chapter 2.1)	Unstable explosives and divisions 1.1, 1.2, 1.3, 1.4, 1.5	Manufacturer/supplier or the competent authority to specify the appropriate type of equipment.
		Flammable gases and pyrophoric gases (chapter 2.2)	Pyrophoric gas	Manufacturer/supplier or the competent authority to specify the appropriate type of equipment.
		Flammable liquids (chapter 2.6)	1, 2, 3, 4	Manufacturer/supplier or the competent authority to specify the appropriate type of equipment.
		Flammable solids (chapter 2.7)	1, 2	
		Self-reactive substances and mixtures (chapter 2.8)	Types A, B, C, D, E, F	
		Pyrophoric liquids (chapter 2.9)	1	
		Pyrophoric solids (chapter 2.10)	1	
		Self-heating substances and mixtures (chapter 2.11)	1, 2	
Substances and mixtures which, in contact with water, emit flammable gases (chapter 2.12)	1, 2, 3			
P280 (cont'd)	Wear protective gloves/protective clothing/eye protection/face protection.	Oxidizing liquids (chapter 2.13)	1, 2, 3	Manufacturer/supplier or the competent authority to specify the appropriate type of equipment.
		Oxidizing solids (chapter 2.14)	1, 2, 3	
		Organic peroxides (chapter 2.15)	Types A, B, C, D, E, F	
		Acute toxicity – dermal (chapter 3.1)	1, 2, 3, 4	– Specify protective gloves/clothing. Manufacturer/supplier or the competent authority may further specify type of equipment where appropriate.

Code (1)	Prevention precautionary statements (2)	Hazard class (3)	Hazard category (4)	Conditions for use (5)
		Skin corrosion (chapter 3.2)	1A, 1B, 1C	– <i>Specify protective gloves/clothing and eye/face protection.</i> Manufacturer/supplier or the competent authority may further specify type of equipment where appropriate.
		Skin irritation (chapter 3.2)	2	– <i>Specify protective gloves.</i>
		Skin sensitization (chapter 3.4)	1, 1A, 1B	Manufacturer/supplier or the competent authority may further specify type of equipment where appropriate.
		Severe eye damage (chapter 3.3)	1	– <i>Specify eye/face protection.</i>
		Eye irritation (chapter 3.3)	2A	Manufacturer/supplier or the competent authority may further specify type of equipment where appropriate.
		Germ cell mutagenicity (chapter 3.5)	1A, 1B, 2	Manufacturer/supplier or the competent authority to specify the appropriate type of equipment.
		Carcinogenicity (chapter 3.6)	1A, 1B, 2	
		Reproductive toxicity (chapter 3.7)	1A, 1B, 2	

Table A3.2.3: Codification of response precautionary statements

Code (1)	Response precautionary statements (2)	Hazard class (3)	Hazard category (4)	Conditions for use (5)
P370	In case of fire:	Explosives (chapter 2.1)	Unstable explosives and divisions 1.1, 1.2, 1.3, 1.4, 1.5	
		Flammable gases and pyrophoric gases (chapter 2.2)	Pyrophoric gas	
		Oxidizing gases (chapter 2.4)	1	
		Flammable liquids (chapter 2.6)	1, 2, 3, 4	
		Flammable solids (chapter 2.7)	1, 2	
		Self-reactive substances and mixtures (chapter 2.8)	Types A, B, C, D, E, F	
		Pyrophoric liquids (chapter 2.9)	1	
		Pyrophoric solids (chapter 2.10)	1	
		Substances and mixtures which, in contact with water, emit flammable gases (chapter 2.12)	1, 2, 3	
		Oxidizing liquids (chapter 2.13)	1, 2, 3	
		Oxidizing solids (chapter 2.14)	1, 2, 3	
		Organic peroxides (chapter 2.15)	Types A, B, C, D, E, F	
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.	Flammable gases (chapter 2.2)	1, 2	
P378	Use ... to extinguish.	Flammable gases and pyrophoric gases (chapter 2.2)	Pyrophoric gas	– if water increases risk. ... Manufacturer/supplier or the competent authority to specify appropriate media.
		Flammable liquids (chapter 2.6)	1, 2, 3, 4	
		Flammable solids (chapter 2.7)	1, 2	
		Self-reactive substances and mixtures (chapter 2.8)	Types B, C, D, E, F	
		Pyrophoric liquids (chapter 2.9)	1	
		Pyrophoric solids (chapter 2.10)	1	
		Substances and mixtures which, in contact with water, emit flammable gases (chapter 2.12)	1, 2, 3	
		Oxidizing liquids (chapter 2.13)	1, 2, 3	

Code (1)	Response precautionary statements (2)	Hazard class (3)	Hazard category (4)	Conditions for use (5)
		Oxidizing solids (chapter 2.14)	1, 2, 3	
		Organic peroxides (chapter 2.15)	Types B, C, D, E, F	
P381	In case of leakage, eliminate all ignition sources.	Flammable gases (chapter 2.2)	1, 2	
P370 + P378	In case of fire: Use ... to extinguish.	Flammable gases and pyrophoric gases (chapter 2.2)	Pyrophoric gas	– if water increases risk. ... Manufacturer/supplier or the competent authority to specify appropriate media.
		Flammable liquids (chapter 2.6)	1, 2, 3, 4	
		Flammable solids (chapter 2.7)	1, 2	
		Self-reactive substances and mixtures (chapter 2.8)	Types C, D, E, F	
		Pyrophoric liquids (chapter 2.9)	1	
		Pyrophoric solids (chapter 2.10)	1	
		Substances and mixtures which, in contact with water, emit flammable gases (chapter 2.12)	1, 2, 3	
		Oxidizing liquids (chapter 2.13)	1, 2, 3	
		Oxidizing solids (chapter 2.14)	1, 2, 3	
		Organic peroxides (chapter 2.15)	Types C, D, E, F	

Table A3.2.4: Codification of storage precautionary statements

Code (1)	Storage precautionary statements (2)	Hazard class (3)	Hazard category (4)	Conditions for use (5)
P403	Store in a well-ventilated place.	Flammable gases (chapter 2.2)	1, 2	
		Oxidizing gases (chapter 2.4)	1	
		Gases under pressure (chapter 2.5)	Compressed gas Liquefied gas Refrigerated liquefied gas Dissolved gas	
		Flammable liquids (chapter 2.6)	1, 2, 3, 4	<i>– for flammable liquids Category 1 and other flammable liquids that are volatile and may generate an explosive atmosphere.</i>
		Self-reactive substances and mixtures (chapter 2.8)	Types A, B, C, D, E, F	<i>– except for temperature controlled self-reactive substances and mixtures or organic peroxides because condensation and consequent freezing may take place.</i>
		Organic peroxides (chapter 2.15)	Types A, B, C, D, E, F	
		Acute toxicity, inhalation (chapter 3.1)	1, 2, 3	<i>– if the chemical is volatile and may generate a hazardous atmosphere.</i>
		Specific target organ toxicity, single exposure; respiratory tract irritation (chapter 3.8)	3	
		Specific target organ toxicity, single exposure; narcotic effects (chapter 3.8)	3	

A3.3.4.6 Where a substance or mixture is classified for a number of health hazards, generally the most stringent set of precautionary statements should be selected. This applies mainly for the preventive measures. With respect to phrases concerning “Response”, rapid action may be crucial. For example, if a chemical is carcinogenic and acutely toxic then the first aid measures for acute toxicity will take precedence over those for longer term effects. In addition, medical attention to delayed health effects may be required in cases of incidental exposure, even if not associated with immediate symptoms of intoxication.

A3.3.4.7 To protect people with different reading abilities, it might be useful to include both precautionary pictograms and precautionary statements in order to convey information in more than one way (see 1.4.4.1 (a)). It should be noted, however, that the protective effect of pictograms is limited and the examples in this annex do not cover all precautionary aspects to be addressed. While pictograms can be useful, they can be misinterpreted and are not a substitute for training.

A3.3.5 Matrix of precautionary statements by hazard class/category

A3.3.5.1 This matrix lists the recommended precautionary statements for each hazard class and hazard category of the GHS by type of precautionary statement (see A3.2.2.1) except for general precautionary statements. In each case the precautionary statement has the applicable code on the line immediately above.

FLAMMABLE GASES (INCLUDING CHEMICALLY UNSTABLE GASES) and PYROPHORIC Gases
(Chapter 2.2)
(Flammable gases)

Symbol Flame

Hazard category	Signal word	Hazard statement
1	Danger	H220 Extremely flammable gas



Precautionary statements			
Prevention	Response	Storage	Disposal
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.	P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381 In case of leakage, eliminate all ignition sources.	P403 Store in a well-ventilated place.	

FLAMMABLE GASES (INCLUDING CHEMICALLY UNSTABLE GASES) and PYROPHORIC Gases

(Chapter 2.2)

(Flammable gases)

Symbol <i>No symbol</i>

Hazard category	Signal word	Hazard statement
2	Warning	H221 Flammable gas

Precautionary statements			
Prevention	Response	Storage	Disposal
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.	P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381 In case of leakage, eliminate all ignition sources.	P403 Store in a well-ventilated place.	

FLAMMABLE GASES (INCLUDING CHEMICALLY UNSTABLE GASES) and PYROPHORIC Gases

(Chapter 2.2)

(Chemically unstable gases)

Symbol <i>No additional symbol</i>

Hazard category	Signal word	Hazard statement
A	<i>No additional signal word</i>	H230 May react explosively even in the absence of air
B	<i>No additional signal word</i>	H231 May react explosively even in the absence of air at elevated pressure and/or temperature

Precautionary statements			
Prevention	Response	Storage	Disposal
P202 Do not handle until all safety precautions have been read and understood.			

4.3.

4. *Note: This table lists only the precautionary statement that is assigned due to the chemical instability of the gas. For the other precautionary statements that are assigned based on the flammability see the respective tables for flammable gases.*

FLAMMABLE GASES (INCLUDING CHEMICALLY UNSTABLE GASES) and PYROPHORIC Gases

(Chapter 2.2)

(Pyrophoric gases)

Symbol
Flame

Hazard category

Pyrophoric gas

Signal word

Danger

Hazard statement

H250 Catches fire spontaneously if exposed to air



<u>Precautionary statements</u>			
<u>Prevention</u>	<u>Response</u>	<u>Storage</u>	<u>Disposal</u>
<p><u>P210</u> <u>Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.</u></p> <p><u>P222</u> <u>Do not allow contact with air.</u> <i><u>– if emphasis of the hazard statement is deemed necessary.</u></i></p> <p><u>P233</u> <u>Keep container tightly closed.</u></p> <p><u>P280</u> <u>Wear protective gloves/protective clothing/eye protection/face protection.</u> <u>Manufacturer/supplier or the competent authority to specify the appropriate type of equipment.</u></p>	<p><u>P370 + P378</u> <u>In case of fire: Use ... to extinguish</u> <i><u>– if water increases risk.</u></i> <u>...Manufacturer/supplier or the competent authority to specify appropriate media.</u></p>		

