UNITED NATIONS

ST

Secretariat

Distr.
GENERAL

ST/SG/AC.10/32/Add.3
9 March 2005

ENGLISH
Original: ENGLISH AND FRENCH

COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

REPORT OF THE COMMITTEE OF EXPERTS ON ITS SECOND SESSION

(Geneva, 10 December 2005)

Addendum 3

Annex 3

Amendments to the Globally Harmonized System of classification and labelling of chemicals (GHS)

This annex contains the amendments to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) (ST/SG/AC.10/30) adopted by the Committee of Experts at its second session.

AMENDMENTS TO THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS) (ST/SG/AC.10/30)

PART 1

Chapter 1.2

Delete the definition of "aerosols".

Add the following definitions in alphabetical order:

"Aspiration means the entry of a liquid or solid chemical product into the trachea and lower respiratory system directly through the oral or nasal cavity, or indirectly from vomiting;

Dust means solid particles of a substance or mixture suspended in a gas (usually air);

Mist means liquid droplets of a substance or mixture suspended in a gas (usually air);

Vapour means the gaseous form of a substance or mixture released from its liquid or solid state;".

Chapter 1.4

1.4.6.2 Replace the last two sentences with the following text:

"Although precautionary statements have not been fully harmonized in the current GHS, Annex 3 of this document provides guidance to aid in the selection of appropriate statements. Additional work to achieve greater standardization in this area may be undertaken in the future, once countries have gained experience with the system.".

Chapter 1.5

1.5.3.3.4 Add the following new paragraph:

"1.5.3.3.4 Guidance on the preparation of SDS under the requirements of the GHS can be found in Annex 4.".

Table 1.5.2 In row 3, third column, third bullet, replace "EC number" with "and other unique identifiers".

PART 2

Chapter 2.1

2.1.2.1 In the first sentence, after “articles of this class” insert “, which are not classified as an unstable explosive,”;
In (a) replace “load” with “quantity present”;

2.1.2.2 Insert “, which are not classified as an unstable explosive,” after “Explosives”;

In note "a" to Table 2.1.1 insert “, transport” after “handling”;

2.1.3 In Table 2.1.2:

- Insert a new column before the current column for Division 1.1, as follows:

  Heading: “Unstable Explosive”
  Symbol: "Exploding bomb"
  Signal word: “Danger” and
  Hazard statement: “Unstable Explosive”;

- In the column for Division 1.4, amend the text for "Symbol" to read as follows: “Exploding bomb; ***or*** 1.4 on orange background”;

- In the column for Division 1.5, replace "Warning" with "Danger" in the row for "Signal word" and in the row for "Hazard statement" replace "May explode" with "May mass explode".

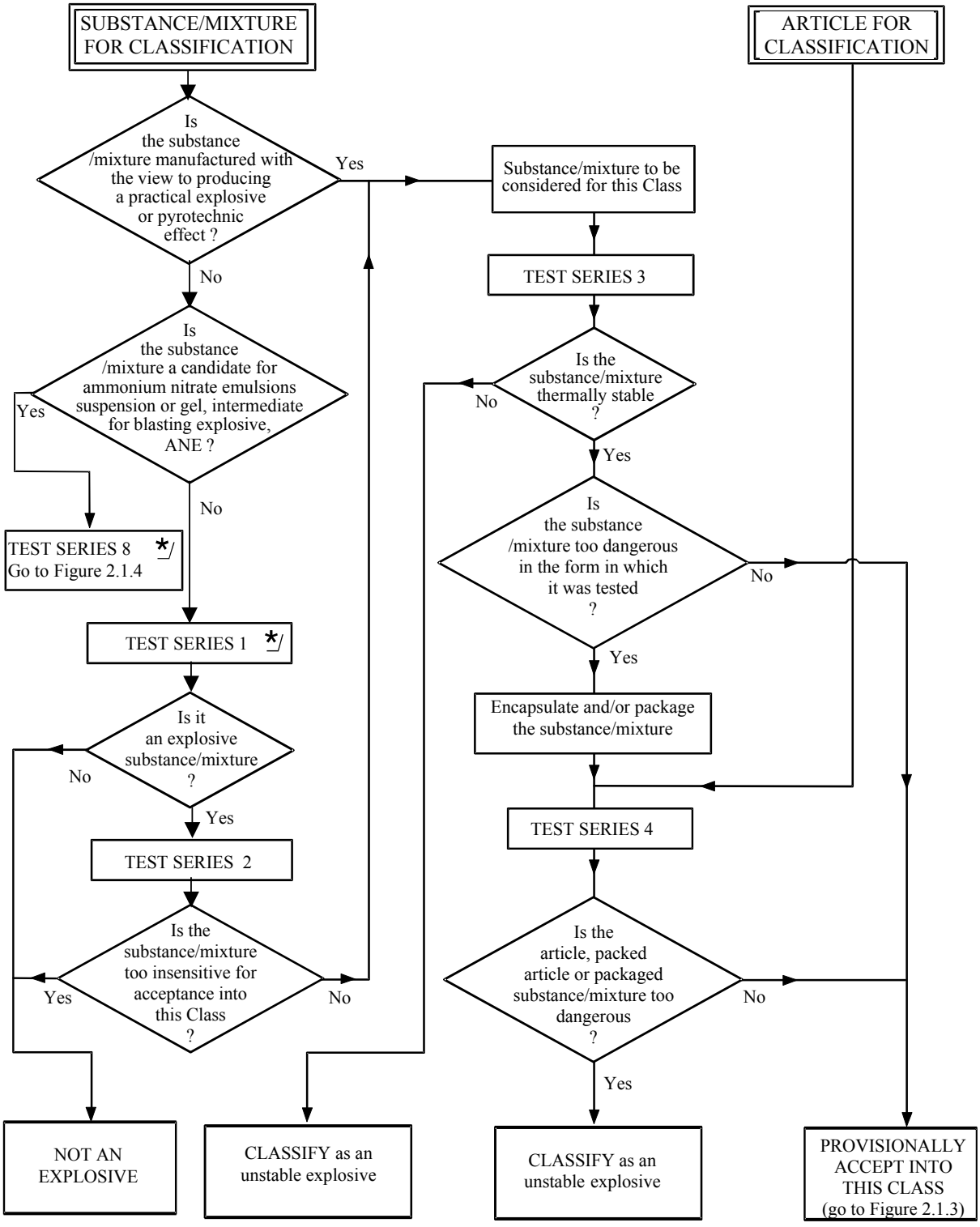
2.1.4.1 In the last but one sentence, replace “in Division 5.1” with “as an oxidizing liquid (Chapter 2.13) or an oxidizing solid (Chapter 2.14)” and in the last sentence replace "2.1.3" with "2.1.4";

In Figure 2.1.1, in the title, after “class 1” insert “for transport”; replace the box “REJECT unstable explosive” with “classify as an unstable explosive”; and replace the box “ACCEPT into Class 1” with “Classify as an explosive”;

In Figure 2.1.3, in the title, after “Class 1” insert “for transport”;

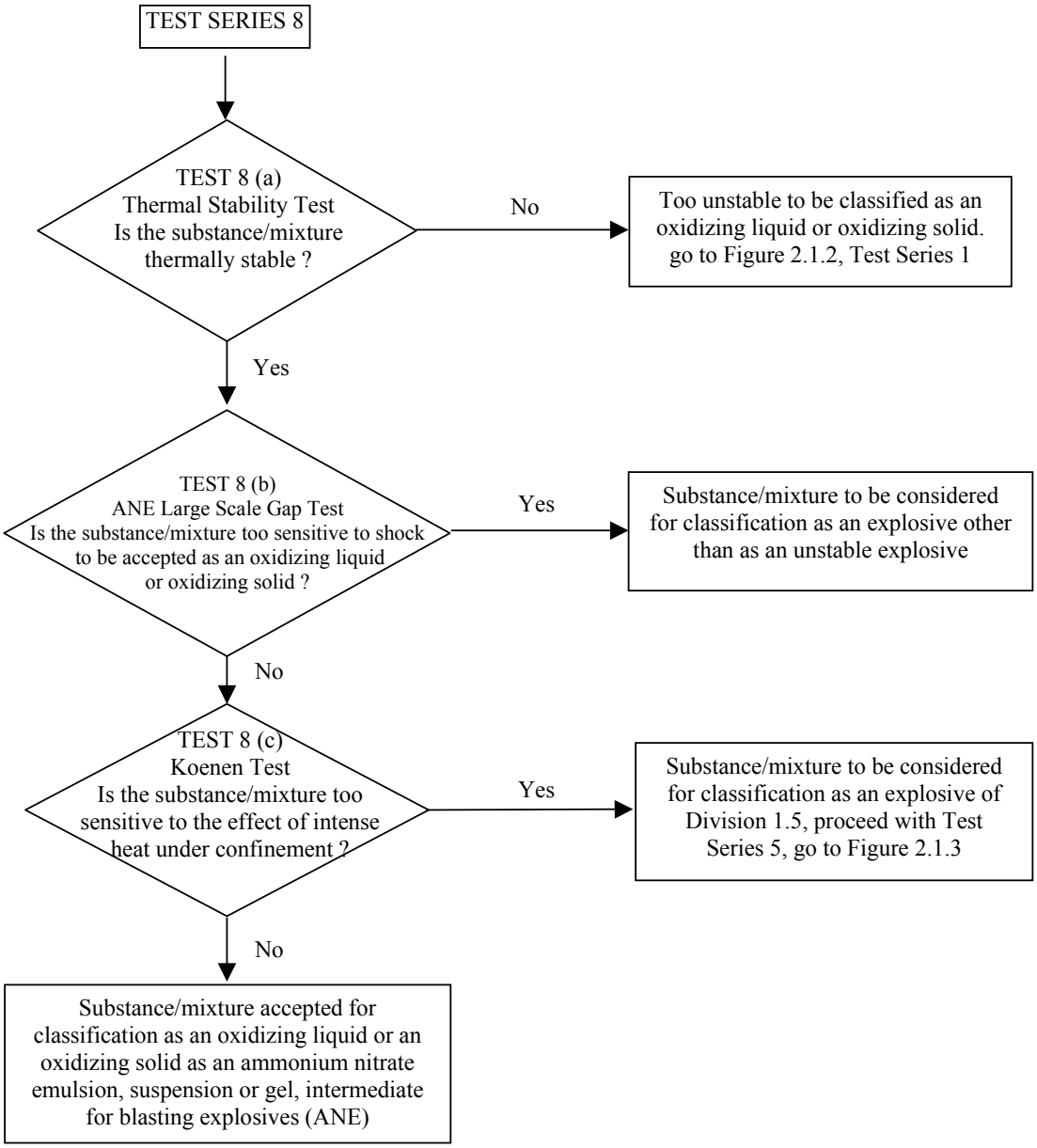
Replace Figures 2.1.2 and 2.1.4, respectively with the following ones:

Figure 2.1.2: Procedure for provisional acceptance of a substance, mixture or article in the class of explosives (Class 1 for transport)



*/ *For classification purposes, start with test series 2.*

Figure 2.1.4: Procedure for provisional acceptance of a substance or mixture in oxidizing liquids or solids as ANE



Chapter 2.8

In the title, insert "AND MIXTURES" after "SUBSTANCES".

2.8.2.1 (b) Amend to read as follows:

"(b) They are oxidizing liquids or solids, according to the criteria of chapters 2.13 or 2.14, except that mixtures of oxidizing substances which contain 5% or more of combustible organic substances shall be classified as self-reactive substances according to the procedure defined in ***NOTE 1***;"

2.8.2.2 Amend Note1 to read as follows:

"***NOTE 1:*** *Mixtures of oxidizing substances, meeting the criteria for classification as oxidizing substances, which contain 5.0% or more of combustible organic substances and which do not meet the criteria mentioned in (a), (c), (d) or (e) above, shall be subjected to the self-reactive substances classification procedure;".*

A mixture showing the properties of a self-reactive substance type B to F shall be classified as a self-reactive substance.".

2.8.2.3 Add a new paragraph to read as follows:

"2.8.2.3 *Criteria for temperature control*

Self-reactive substances need to be subjected to temperature control if their self-accelerating decomposition temperature (SADT) is less than or equal to 55 °C. Test methods for determining the SADT as well as the derivation of control and emergency temperatures are given in the *UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*, Part II, section 28. The test selected shall be conducted in a manner which is representative, both in size and material, of the package.".

Chapters 2.11 and 2.12

In the title, insert "AND MIXTURES" after "SUBSTANCES".

Chapter 2.15

2.15.2.3 Insert the following new paragraph:

"2.15.2.3 *Criteria for temperature control*

The following organic peroxides need to be subjected to temperature control:

(a) Organic peroxide types B and C with an SADT ≤ 50 °C;

(b) Organic peroxide type D showing a medium effect when heated under confinement[1] with an SADT ≤ 50 °C or showing a low or no effect when heated under confinement with an SADT ≤ 45 °C; and

(c) Organic peroxide types E and F with an SADT ≤ 45 °C.

Test methods for determining the SADT as well as the derivation of control and emergency temperatures are given in the *UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*, Part II, section 28. The test selected shall be conducted in a manner which is representative, both in size and material, of the package.".

2.15.3 In Table 2.15.1, under the headings "Type B", "Type C and D" and "Type E and F", replace "flame over circle" with "flame".

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[1] *As determined by test series E as prescribed in the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Part II.*

PART 3

Amend the title to read as follows: "HEALTH HAZARDS".

Chapter 3.1

3.1.2.1 Amend the first paragraph to read as follows:
"Chemicals can be allocated to one of five toxicity categories based on acute toxicity by the oral, dermal or inhalation route according to the numeric cut-off criteria as shown in the table below. Acute toxicity values are expressed as (approximate) LD_{50} (oral, dermal) or LC_{50} (inhalation) values or as acute toxicity estimates (ATE). Explanatory notes are shown following table 3.1.1.".

In Table 3.1.1:

In the title of the table, replace: " (approximate) LD_{50}/LC_{50}" with "acute toxicity estimates (ATE)".

In the left column, under "Exposure Route":
- Add "Note (a)" in the cell for "Oral" and "Dermal" exposure after the existing text;
- Add "Note (b)" in the cell for "Gases" after the existing text;
- Add "Note (d)" in the cell for "Vapours" after the existing text;
- Insert "Note (b)" and replace "Note (d)" with "Note (e)" in the cell for "Dusts and Mists";

In the last column, under "Category 5", replace "*Note (e)*" with "*Note (f)*"

Notes to Table 3.1.1:

Insert a new Note (a) to read as follows:

"*(a) the acute toxicity estimate (ATE) for the classification of a substance or ingredient in a mixture is derived using:*
- *the LD_{50}/LC_{50} where available,*
- *the appropriate conversion value from Table 3.1.2 that relates to the results of a range test, or*
- *the appropriate conversion value from Table 3.1.2 that relates to a classification category*."

Rename current notes (a) to (e) as (b) to (f).

In the new Note (d) (former (c)), replace the last sentence with the following text:

"*The terms "dust", "mist" and "vapour" are defined as follows:*

- *Dust : solid particles of a substance or mixture suspended in a gas (usually air);*
- *Mist: liquid droplets of a substance or mixture suspended in a gas (usually air);*
- *Vapour: the gaseous form of a substance or mixture released from its liquid or solid state.*

Dust is generally formed by mechanical processes. Mist is generally formed by condensation of supersatured vapours or by physical shearing of liquids. Dusts and mists generally have sizes ranging from less than 1 to about 100 µm. ”.

3.1.2.5 In footnote 1, replace *"toxicity class"* with *"toxicity Category"* and “*Note (e)*” with “*Note (f)*”.

3.1.2.6.5 Insert a new paragraph to read as follows:

“3.1.2.6.5 In addition to classification for inhalation toxicity, if data are available that indicates that the mechanism of toxicity was corrosivity of the substance or mixture, certain authorities may also choose to label it as *corrosive to the respiratory tract.* Corrosion of the respiratory tract is defined by destruction of the respiratory tract tissue after a single, limited period of exposure analogous to skin corrosion; this includes destruction of the mucosa. The corrosivity evaluation could be based on expert judgment using such evidence as: human and animal experience, existing (*in vitro)* data, pH values, information from similar substances or any other pertinent data.”.

3.1.3.3 (b) Delete. Current sub-paragraph (c) becomes new (b).

Table 3.1.2 In the title, insert “for classification” after “toxicity point estimates”.

In NOTE 2 under the table, insert “classification of” after “of the ATE for”, in the first sentence.

3.1.4 In the first column of Table 3.1.3, insert “Note 1” after the current text in the cell for “Inhalation”.

Insert the following note under the table:

“***NOTE 1:*** *If a substance/mixture is also determined to be corrosive (based on data such as skin or eye data), corrosivity hazard may also be communicated by some authorities as symbol and/or hazard statement. That is, in addition to an appropriate acute toxicity symbol, a corrosivity symbol (used for skin and eye corrosivity) may be added along with a corrosivity hazard statement such as “corrosive” or “corrosive to the respiratory tract.”.*

3.1.5 In the decision logic 3.1.1, on the last box on the left, replace “Class 4” with “Category 4” on the second and third bullets.

Chapter 3.2

3.2.2.2 Insert the following new second sentence:
“Solid substances (powders) may become corrosive or irritant when moistened or in contact with moist skin or mucous membranes.”.

Chapter 3.3

3.3.3.2.4 In the title, replace “class” with “category”.

Chapter 3.7

3.7.1.1 At the beginning of the second sentence replace “at the IPCS/OECD Workshop for the Harmonization of Risk Assessment for Reproductive and Developmental Toxicity, Carshalton, UK, 17-21 October, 1994” with “as working definitions in IPCS/EHC Document N° 225, Principles for evaluating health risks to reproduction associated with exposure to chemicals” and delete footnote 1.

In the first bullet, replace “reproductive ability or capacity” with “sexual function and fertility”.

Insert the following new paragraph after the bullets:
“Some reproductive toxic effects cannot be clearly assigned to either impairment of sexual function and fertility or to developmental toxicity. Nonetheless, chemicals with these effects would be classified as reproductive toxicants with a general hazard statement.”.

3.7.1.2 In the title and in the first sentence, replace “reproductive ability or capacity” with “sexual function and fertility”.

In the second sentence, insert “pregnancy outcomes,” after “parturition,”.

3.7.2.1 In the second sentence, replace “reproductive ability and capacity” with “sexual function and fertility” and delete “as separate issues”.

In Figure 3.7.1 (a):

- For **"CATEGORY 1"**: In the title, delete “or developmental” and in the first sentence of the paragraph replace “reproductive ability or capacity” with “sexual function and fertility”.
- For **"CATEGORY 1A"**: Amend the title to read as follows: “Known human reproductive toxicant”.
- For **"CATEGORY 1B"**: Amend the title to read as follows: “Presumed human reproductive toxicant”.

  In the second sentence of the paragraph, replace “specific reproductive toxicity” with “an adverse effect on sexual function and fertility or on development”.
- For **"CATEGORY 2"**: In the title, delete “or developmental”.
  In the first sentence of the paragraph, replace “reproductive ability or capacity” with “sexual function and fertility”.

3.7.2.2.1 In the second sentence, delete “or developmental” after “reproductive” and “or development” after "reproduction".

3.7.2.5.3 Replace “ability and capacity” with “function”;

3.7.3.3 Insert the following new second paragraph:

“The mixture will be classified for effects on or via lactation when at least one ingredient has been classified for effects on or via lactation and is present at or above the appropriate

cut-off value/concentration limit as shown in Table 3.7.1 for the additional category for effects on or via lactation.".

Table 3.7.1 Replace current table with the following:

"Table 3.7.1: Cut-off values/concentration limits of ingredients of a mixture classified as reproductive toxicants or for effects on or via lactation that would trigger classification of the mixtures[2]"

Ingredients classified as:	Cut-off/concentration limits triggering classification of a mixture as:		
	Category 1 reproductive toxicant	**Category 2 reproductive toxicant**	**Additional Category for effects on or via lactation**
Category 1 reproductive toxicant	≥ 0.1% (note 1)		
	≥ 0.3% (note 2)		
Category 2 reproductive toxicant		≥ 0.1 % (note 3)	
		≥ 3.0% (note 4)	
Additional category for effects on or via lactation			≥ 0.1 % (note 1)
			≥ 0.3% (note 2)

In NOTES 1 and 2 under Table 3.7.1, insert the following phrase after "toxicant", in the first sentence: "or substance classified in the additional category for effects on or via lactation".

3.7.3.4 Delete this paragraph and its related footnote.

3.7.4 In table 3.7.2, for the hazard statements of categories 1A, 1B and 2, delete "or" between the sentences in brackets and insert "state" before "route".

3.7.5 Amend the title to read as follows: "**Decision logics for classification**";

3.7.5.1 Insert a new title before current paragraph under 3.7.5 to read as follows:

"3.7.5.1 ***Decision logic for reproductive toxicity***";

Current 3.7.5.1 becomes new 3.7.5.1.1.

In the second box on the left, amend the text in the two bullets to read as follows:
- "a **known** human reproductive toxicant, **or**"
- "a **presumed** human reproductive toxicant?".

In the third box on the left, replace "suspected to produce an adverse effect on reproductive ability or capacity, or on development, in humans?" with "a suspected human reproductive toxicant?".

3.7.5.2 Renumber as 3.7.5.1.2.

3.7.6 Renumber as 3.7.5.2 and in the title, delete "classification of".

Current title "**Decision logic 3.7.3**" becomes new 3.7.5.2.1, as follows:

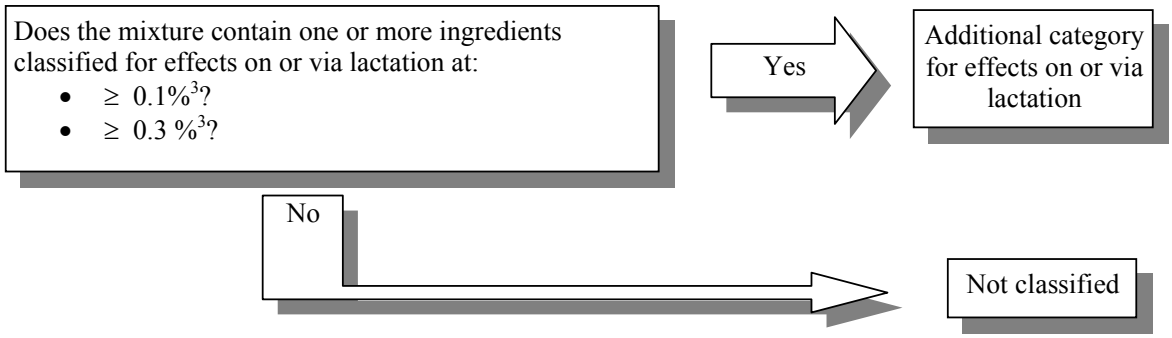
"**3.7.5.2.1** ***Decision logic 3.7.3 for substances***"

Insert the following new decision logic for mixtures:

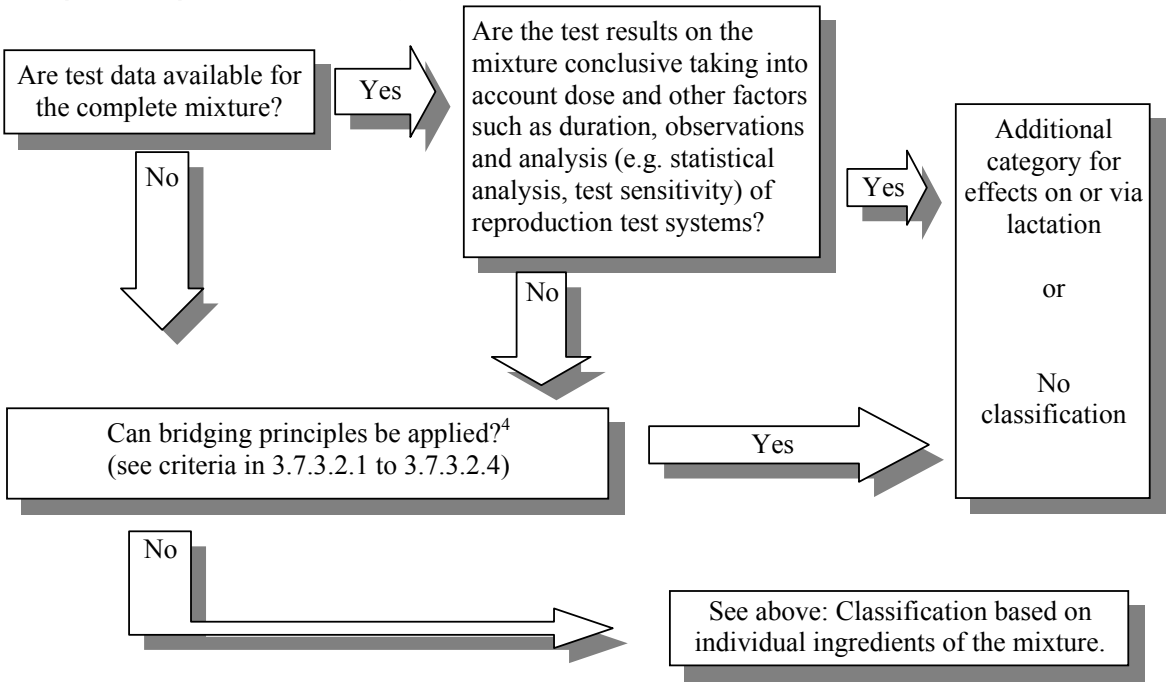
"**3.7.5.2.2** ***Decision logic 3.7.4 for mixtures***

Mixture: Classification of mixtures will be based on the available test data for the **individual ingredients** of the mixture, using cut-off values/concentration limits for those ingredients. The classification may be **modified on a case-by-case basis** based on the available test data for the mixture as a whole or based on bridging principles. See modified classification on a case-by-case basis below. For further details see criteria (See 3.7.3.1, 3.7.3.2 and 3.7.3.3).

Classification based on individual ingredients of the mixture



Modified classification on a case-by-case basis



[3] *For specific concentration limits, see "The use of Cut-off Values/Concentration Limits" in Chapter 1.3, para. 1.3.3.2, and in Table 3.7.1 of this Chapter.*

[4] *If data on another mixture are used in the application of bridging principles, the data on that mixture must be conclusive in accordance with paragraph 3.7.3.2.*

Chapter 3.8

3.8.1.1 Amend the end of the paragraph to read as follows: "…and/or delayed and not specifically addressed in chapters 3.1 to 3.7 are included (see also 3.8.1.6).".

3.8.1.6 In the first sentence, replace "*Target Organ*" with "*Specific Target Organ*" and amend the last sentence to read as follows:

"Other specific toxic effects listed below are assessed separately in the GHS and consequently are not included here:

(a) acute lethality/toxicity (Chapter 3.1);
(b) skin corrosivity/irritation (Chapter 3.2);
(c) serious damage to eyes/irritation (Chapter 3.3);
(d) skin and respiratory sensitization (Chapter 3.4);
(e) mutagenicity (Chapter 3.5);
(f) carcinogenicity (Chapter 3.6); and
(g) reproductive toxicity (Chapter 3.7).".

3.8.1.7 Insert a new paragraph to read as follows:

"3.8.1.7 The classification criteria in this chapter are organized as criteria for substances Categories 1 and 2 (see 3.8.2.1), criteria for substances Category 3 (see 3.8.2.2) and criteria for mixtures (see 3.8.3). See Figure 3.8.1.".

3.8.2.1 Insert a new title to read as follows:

"**3.8.2.1** ***Substances of Category 1 and Category 2***"

Renumber current paragraphs 3.8.2.1 to 3.8.2.10 as 3.8.2.1.1 to 3.8.2.1.10. Renumber subsequent sub-paragraphs and references thereto accordingly.

3.8.2.1.1 (former 3.8.2.1) In the last sentence, replace "one of two categories" with "Category 1 or 2" and add "(Figure 3.8.1)" at the end of the sentence.

Figure 3.8.1 Insert a new Category 3 before the existing Note at the end of the box, as follows:

"<u>CATEGORY 3</u>: Transient Target Organ effects

There are target organ effects for which a substance/mixture may not meet the criteria to be classified in Categories 1 or 2 indicated above. These are effects which adversely alter human function for a short duration after exposure and from which humans may recover in a reasonable period without leaving significant alteration of structure or function. This category only includes narcotic effects and respiratory tract irritation. Substances/mixtures may be classified specifically for these effects as discussed in 3.8.2.2."

In the ***NOTE***, replace, at the beginning, "both categories" with "these categories".

3.8.2.1.7 (former 3.8.2.7) In the title, insert "for Category 1 and 2" after "classification".

3.8.2.1.7.3 (former 3.8.2.7.3) In the second bullet, replace “in the”, at the beginning, with “, more than transient in nature, in the respiratory system,” and insert ", other organs” after " peripheral nervous systems".

3.8.2.1.8 (former 3.8.2.8) In the title, insert “for Category 1 and 2” after “classification”;

Delete the last bullet.

3.8.2.1.9 (former 3.8.2.9) In the title, insert “for Category 1 and 2” after “animals”.

Table 3.8.1:

Insert “[a]” in the title of the table after "exposures" and amend the table as follows:

Insert a new column under "Guidance value ranges for" for Category 3 with a unique cell applying to all routes of exposure with the text: "Guidance values do not apply [b]".

Current columns "Route of exposure", "Units", "Category 1" and "Category 2" remain unchanged.

Current paragraph under Table 3.8.1 becomes “[a]”.

Insert a new note “[b]” to read as follows:

"[b] Guidance values are not provided since this classification is primarily based on human data. Animal data may be included in the weight of evidence evaluation.".

3.8.2.2 Insert a new sub-section to read as follows:

“**3.8.2.2 *Substances of Category 3***

3.8.2.2.1 *Criteria for respiratory tract irritation*

The criteria for respiratory tract irritation as Category 3 are:

(a) Respiratory irritant effects (characterized by localized redness, edema, pruritis and/or pain) that impair function with symptoms such as cough, pain, choking, and breathing difficulties are included. It is recognized that this evaluation is based primarily on human data;

(b) Subjective human observations could be supported by objective measurements of clear respiratory tract irritation (RTI) (eg. electrophysiological responses, biomarkers of inflammation in nasal or bronchoalveolar lavage fluids);

(c) The symptoms observed in humans should also be typical of those that would be produced in the exposed population rather than being an isolated idiosyncratic reaction or response triggered only in individuals with hypersensitive airways. Ambiguous reports simply of “irritation” should be excluded as this term is commonly used to describe a wide range of sensations including those such as smell, unpleasant taste, a tickling sensation, and dryness, which are outside the scope of this classification endpoint;

(d) There are currently no validated animal tests that deal specifically with RTI, however, useful information may be obtained from the single and repeated inhalation toxicity tests. For example, animal studies may provide useful information in terms of clinical signs of toxicity (dyspnoea, rhinitis etc) and histopathology (e.g. hyperemia, edema, minimal inflammation, thickened mucous layer) which are reversible and may be reflective of the characteristic clinical symptoms described above. Such animal studies can be used as part of weight of evidence evaluation;

(e) This special classification would occur only when more severe organ/systemic effects including in the respiratory system are not observed.

3.8.2.2.2 ***Criteria for narcotic effects***

The criteria for narcotic effects as Category 3 are:

(a) Central nervous system depression including narcotic effects in humans such as drowsiness, narcosis, reduced alertness, loss of reflexes, lack of coordination, and vertigo are included. These effects can also be manifested as severe headache or nausea, and can lead to reduced judgment, dizziness, irritability, fatigue, impaired memory function, deficits in perception and coordination, reaction time, or sleepiness;

(b) Narcotic effects observed in animal studies may include lethargy, lack of coordination righting reflex, narcosis, and ataxia. If these effects are not transient in nature, than they should be considered for classification as Category 1 or 2.".

3.8.3.4.1 In the title of Table 3.8.2, add "as Category 1 or 2" at the end.

3.8.3.4.5 Insert a new paragraph to read as follows:

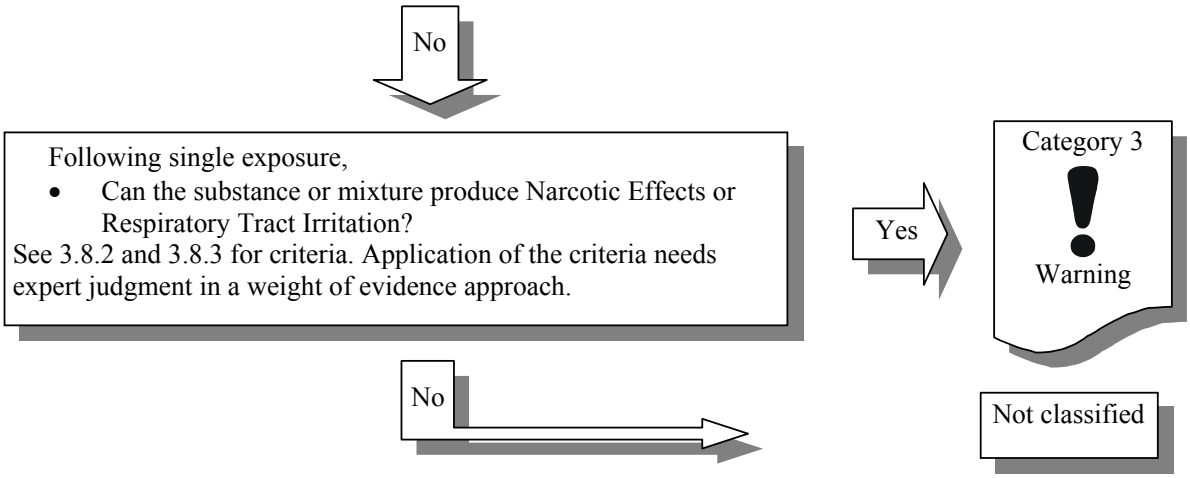
"3.8.3.4.5 Care should be exercised when extrapolating toxicity of a mixture that contains Category 3 ingredient(s). A cut-off value/concentration limit of 20% has been suggested; however, it should be recognized that this cut-off value/concentration limit may be higher or less depending on the Category 3 ingredient(s) and that some effects such as respiratory tract irritation may not occur below a certain concentration while other effects such as narcotic effects may occur below this 20% value. Expert judgment should be exercised.".

3.8.4 Amend Table 3.8.3 to read as follows:

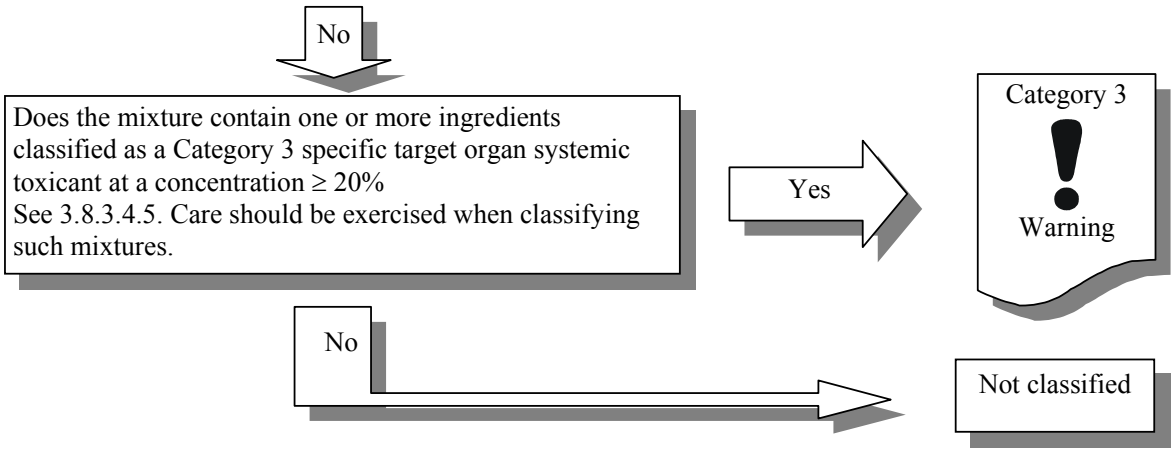
Table 3.8.3: Label elements for specific target organ systemic toxicity after single exposure

	Category 1	**Category 2**	**Category 3**
Symbol	Health hazard	Health hazard	Exclamation mark
Signal word	Danger	Warning	Warning
Hazard Statement	Causes damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	May cause damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	May cause respiratory irritation **or** May cause drowsiness and dizziness

3.8.5 In the Decision logic 3.8.1, amend the ending, after the second box starting with "Following single exposure…", to read as follows:



Amend the ending of the Decision logic 3.8.2, after the last box starting with "Does the mixture contain…", to read as follows:



Chapter 3.10

Insert a new Chapter 3.10 to read as follows:

"

CHAPTER 3.10

ASPIRATION HAZARDS

3.10.1 Definitions and general and specific considerations

3.10.1.1 The purpose of this chapter is to provide a means of classifying substances or mixtures that may pose an aspiration toxicity hazard to humans.

3.10.1.2 “Aspiration" means the entry of a liquid or solid chemical product directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea and lower respiratory system.

3.10.1.3 Aspiration toxicity includes severe acute effects such as chemical pneumonia, varying degrees of pulmonary injury or death following aspiration.

3.10.1.4 Aspiration is initiated at the moment of inspiration, in the time required to take one breath, as the causative material lodges at the crossroad of the upper respiratory and digestive tracts in the laryngopharyngeal region.

3.10.1.5 Aspiration of a substance or mixture can occur as it is vomited following ingestion. This may have consequences for labelling, particularly where, due to acute toxicity, a recommendation may be considered to induce vomiting after ingestion. However, if the substance/mixture also presents an aspiration toxicity hazard, the recommendation to induce vomiting may need to be modified.

3.10.1.6 Specific considerations

3.10.1.6.1 A review of the medical literature on chemical aspiration revealed that some hydrocarbons (petroleum distillates) and certain chlorinated hydrocarbons have been shown to pose an aspiration hazard in humans. Primary alcohols, and ketones have been shown to pose an aspiration hazard only in animal studies.

3.10.1.6.2 While a methodology for determination of aspiration hazard in animals has been utilized, it has not been standardized. Positive experimental evidence with animals can only serve as a guide to possible aspiration toxicity in humans. Particular care must be taken in evaluating animal data for aspiration hazards.

3.10.1.6.3 The classification criteria refer to kinematic viscosity. The following provides the conversion between dynamic and kinematic viscosity:

$$\frac{\text{Dynamic viscosity (mPa·s)}}{\text{Density (g/cm}^3\text{)}} = \text{Kinematic viscosity (mm}^2\text{/s)}$$

3.10.1.6.4 Classification of aerosol/mist products: Aerosol and mist products are usually dispensed in containers such as self-pressurized containers, trigger and pump sprayers. The key to classifying these products is whether a pool of product is formed in the mouth, which then may be aspirated. If the mist or aerosol from a pressurized container is fine, a pool may not be formed. On the other hand, if a pressurized container dispenses product in a stream, a pool may be formed that may then be aspirated. Usually, the mist produced by trigger and pump sprayers is coarse and therefore, a pool may be formed that then may be aspirated. When the pump mechanism may be removed and contents are available to be swallowed, then the classification of the products should be considered.

3.10.2 Classification criteria for substances

Table 3.10.1: Hazard categories for aspiration toxicity

Categories	Criteria
Category 1: Chemicals known to cause human aspiration toxicity hazards or to be regarded as if they cause human aspiration toxicity hazard	A substance is classified in Category 1: (a) Based on reliable and good quality human evidence (See note 1); or (b) If it is a hydrocarbon and has a kinematic viscosity of 20.5 mm^2/s or less, measured at 40° C.
Category 2: Chemicals which cause concern owing to the presumption that they cause human aspiration toxicity hazard	On the basis of existing animal studies and expert judgment that takes into account surface tension, water solubility, boiling point, and volatility, substances, other than those classified in Category 1, which have a kinematic viscosity of 14 mm^2/s or less, measured at 40º C. (See note 2).

NOTE 1: *Examples of substances included in Category 1 are certain hydrocarbons, turpentine and pine oil.*

NOTE 2: *Taking this into account, some authorities would consider the following to be included in this Category: n-primary alcohols with a composition of at least 3 carbon atoms but not more than 13; isobutyl alcohol, and ketones with a composition of no more than 13 carbon atoms.*

3.10.3 Classification criteria for mixtures

3.10.3.1 *Classification when data are available for the complete mixture*

A mixture is classified in Category 1 based on reliable and good quality human evidence.

3.10.3.2 *Classification of mixtures when data are not available for the complete mixture: Bridging Principles*

3.10.3.2.1 Where the mixture itself has not been tested to determine its aspiration toxicity, but there are sufficient data on the individual ingredients and similar tested mixtures to adequately characterize the hazard of the mixture, these data can be used in accordance with the following bridging principles. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture without the necessity of additional testing in animals.

3.10.3.2.2 *Dilution*

If a mixture is diluted with a substance that does not pose an aspiration toxicity hazard, and which is not expected to affect the aspiration toxicity of other ingredients or the mixture, then the new mixture may be classified as equivalent to the original mixture. However, the concentration of aspiration toxicant(s) should not drop below 10%.

3.10.3.2.3 *Batching*

The aspiration toxicity of one production batch of a complex mixture can be assumed to be substantially equivalent to that of another production batch of the same commercial product, and produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the aspiration toxicity, reflected by viscosity or concentration, of the batch has changed. If the latter occurs, new classification is necessary.

3.10.3.2.4 *Concentration of Category 1 mixtures*

If a mixture is classified in Category 1, and the concentration of the ingredients of the mixture that are in Category 1 is increased, the new mixture should be classified in Category 1 without additional testing.

3.10.3.2.5 *Interpolation within one toxicity category*

For three mixtures with identical ingredients, where A and B are in the same toxicity category and mixture C has the same toxicologically active ingredients with concentrations intermediate to the concentrations of those ingredients in mixtures A and B, then mixture C is assumed to be in the same toxicity category as A and B.

3.10.3.2.6 *Substantially similar mixtures*

Given the following:

(a) Two mixtures: (i) A + B
(ii) C + B;

(b) The concentration of ingredient B is essentially the same in both mixtures;

(c) The concentration of ingredient A in mixture (i) equals that of ingredient C in mixture (ii);

(d) Aspiration toxicity for A and C is substantially equivalent, i.e. they are in the same hazard category and are not expected to affect the aspiration toxicity of B.

If mixture (i) is already classified based on the criteria in table 3.10.1, then mixture (ii) can be assigned the same hazard category.

3.10.3.3 *Classification of mixtures when data are available for all components or only some components of the mixture*

3.10.3.3.1 *Category 1*

3.10.3.3.1.1 A mixture which contains a total of 10% or more of a substance or substances classified in Category 1, and has a kinematic viscosity of 20.5 mm^2/s or less, measured at 40 °C, will be classified in Category 1.

3.10.3.3.1.2 In the case of a mixture which separates into two or more distinct layers, one of which contains 10 % or more of a substance or substances classified in Category 1 and has a kinematic viscosity of 20.5 mm^2/s or less, measured at 40 °C, then the entire mixture is classified in Category 1.

3.10.3.3.2 *Category 2*

3.10.3.3.2.1 A mixture which contains a total of 10% or more of a substance or substances classified in Category 2, and has a kinematic viscosity of 14 mm^2/s or less, measured at 40 °C, will be classified in Category 2.

3.10.3.3.2.2 In classifying mixtures in this category, the use of expert judgment that considers surface tension, water solubility, boiling point, volatility is critical and especially when Category 2 substances are mixed with water.

3.10.3.3.2.3 In the case of classifying a mixture which separates into two or more distinct layers, one of which contains 10 % or more of a substance or substances classified in Category 2 and has a kinematic viscosity of 14 mm^2/s or less, measured at 40 °C, then the entire mixture is classified in Category 2.

3.10.4 Hazard communication

3.10.4.1 General and specific considerations concerning labelling requirements are provided in Hazard Communication: Labelling (Chapter 1.4). Annex 2 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. The table below presents specific label elements for substances and mixtures which are classified as posing an aspiration toxicity hazard, Categories 1 and 2 based on the criteria set forth in this chapter.

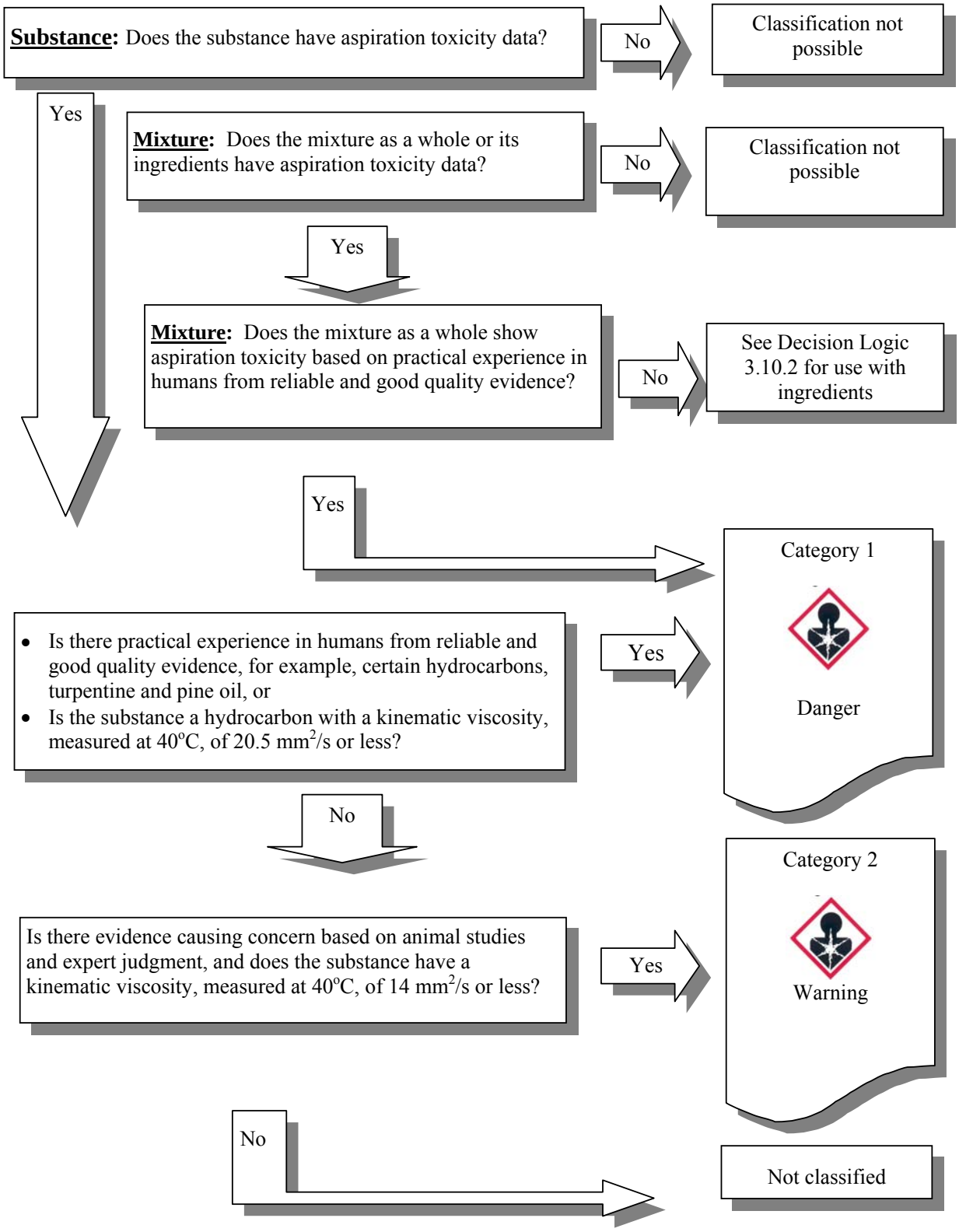
Table 3.10.2: Aspiration toxicity label elements

	Category 1	**Category 2**
Symbol	Health hazard	Health hazard
Signal word	Danger	Warning
Hazard statement	May be fatal if swallowed and enters airways	May be harmful if swallowed and enters airways

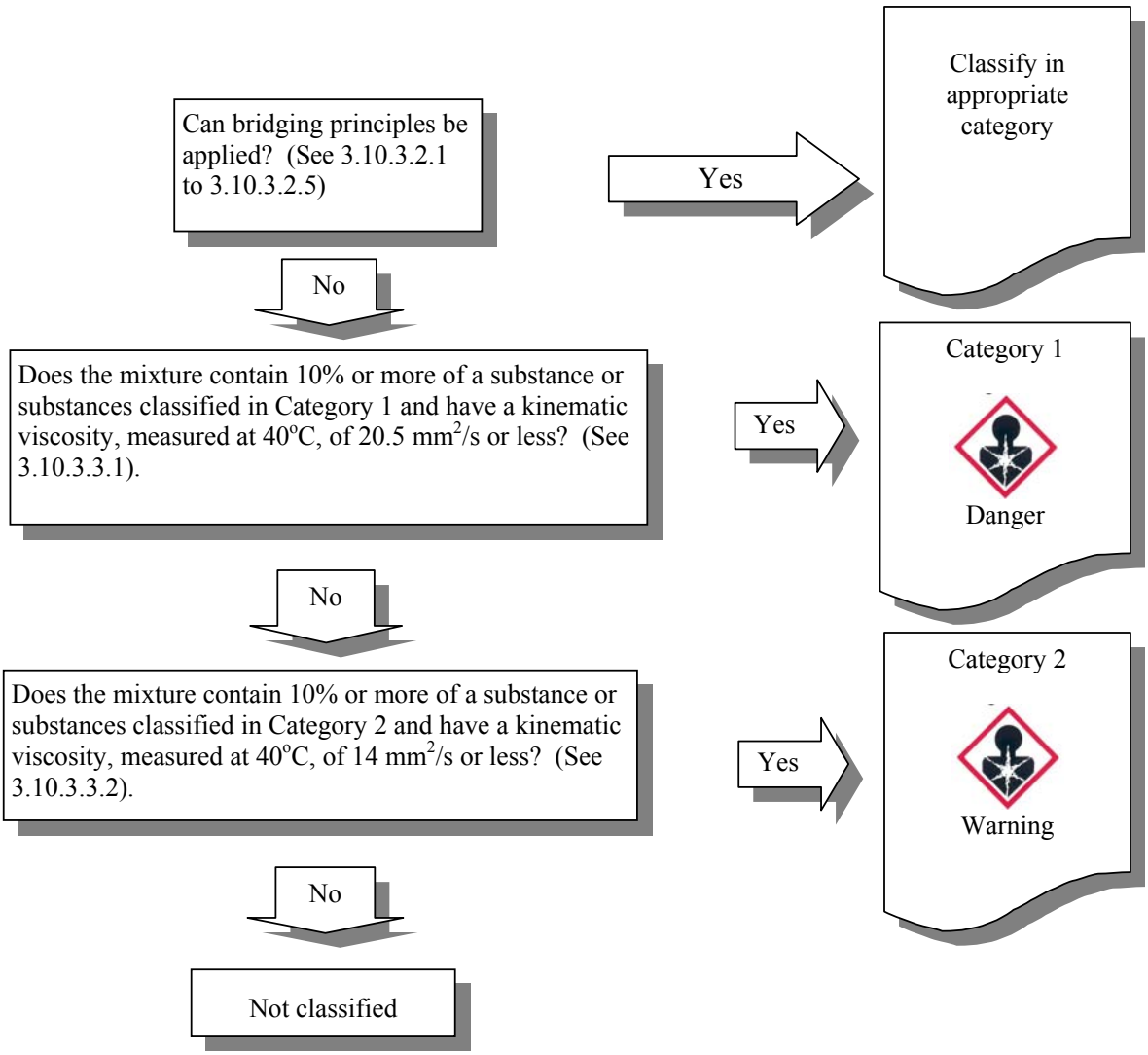
3.10.5 Decision logic for aspiration toxicity

The decision logic that follows is not part of the harmonized classification system but is provided here as additional guidance. It is strongly recommended that the person responsible for classification study the criteria before and during use of the decision logic.

Decision logic 3.10.1 for aspiration toxicity



Decision logic 3.10.2 for aspiration toxicity



PART 4

Insert a new Part 4 entitled "Environmental Hazards".

Chapter 4.1

Former Chapter 3.10 on Aquatic toxicity, becomes new chapter 4.1. Renumber all the paragraphs of this chapter and amend the references thereto through the whole text of the GHS, accordingly.

4.1.5 (Former 3.10.5) Replace "3.10.5 Decision logic" with: "4.1.5 Decision logic for hazardous to the aquatic environment".

Replace the title before the former decision logic 3.10.1 ("3.10.5 Decision logic 3.10.1 for hazardous to the aquatic environment") with the following one: "Decision logic 4.1.1".
In the 4th box on the left, starting with "**Chronic**", replace, at the end of the second bullet, "**and/or**" with "**and**".

ANNEX 1

In the table for **Explosives**:

- For Division 1.4: replace "1.4*" with:

- For Division 1.5, replace "1.5*" with "1.5", "Warning" with "Danger" and "May explode in fire" with "May mass explode in fire".

- For Division 1.6, replace "1.6*" with "1.6".

- Delete the shaded explanatory text under the columns for Divisions 1.4, 1.5 and 1.6;

- Add a new note 3 under "Notes on colours of *UN Recommendations*…."to read as follows:

-

"(3) ** Place for division- to be left blank if explosive is the subsidiary risk.
* Place for compatibility group- to be left blank if explosive is the subsidiary risk.".

In the tables for **Self-reactive substances and mixtures** and **organic peroxides**, under Type B:

Replace:

with:

In the table for **Organic peroxides**:

Replace *(3 times)*:

with:

and

with:

Amend note (2) to read as follows:

"(2) UN Model Regulations pictogram colours:
Organic peroxide pictogram: Symbol (flame): black or white; Background: upper half: red, lower half: yellow; Figure "5.2" in the bottom corner: black;
Explosives pictogram: Symbol (exploding bomb): black; Background: orange".

Add a new note (3) to read:

"(3) The label conforming to the colouring scheme in the table for oxidizing liquids may be used until 1 January 2011.".

In the table for **Specific target organ systemic toxicity (single exposure):**

Amend the text for the hazard statements to read as follows:

- For Category 1:

"Danger
Causes damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)".

- For Category 2:

"Warning
May cause damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)".

Insert a new column for Category 3 as follows:

Category 3

Warning (respiratory tract irritation) **May cause respiratory irritation** ***or*** (Narcotic effects) **May cause drowsiness and dizziness**

In the table for **Specific target organ systemic toxicity (repeated exposure):**

Amend the text for the hazard statements to read as follows:

- For Category 1:

  "Danger
  Causes damage to organs *(or state all organs affected, if known)* through prolonged or repeated exposure *(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)*".

- For Category 2:

  "Warning
  May cause damage to organs *(or state all organs affected, if known)* through prolonged or repeated exposure *(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)*".

Insert the following new table for **Aspiration hazard** after current table for "Specific target organ systemic toxicity (repeated exposure)":

ASPIRATION HAZARD				
Category 1	**Category 2**	**-**	**-**	**-**
 **Danger** **May be fatal if swallowed and enters airways**	 **Warning** **May be harmful if swallowed and enters airways**			
Not required under the *UN Recommendations on the Transport of Dangerous Goods, Model Regulations.*				

ANNEX 2

A2.1 Insert the following new row for Unstable explosives before the current row for "Division 1.1" explosives:

Unstable explosives	According to the results of the test in Part I of the *Manual of Tests and Criteria, UN Recommendations on the Transport of Dangerous Goods.*	**Symbol**	
		Signal word	Danger
		Hazard statement	Unstable explosive

- For Division 1.4, replace "1.4" with: 

- For Division 1.5: Replace "Warning" with "Danger" and "May explode in fire" with "May mass explode in fire".

A2.7 Under "Criteria" insert "and mixtures" after "substances" (twice).

A2.15 Replace *(3 times)*  with 

A2.22 In the title, replace "Mutagenicity" with "**Germ cell mutagenicity**".

A2.24 b) Under "Hazard category", replace "Special category" with "Additional category for effects on or via lactation" and, under "Criteria", add the following sentence after the current text: " ***or***, mixtures containing ≥ 0.1% or ≥ 0.3 % of such a substance (see notes 1 and 2 of Table 3.7.1, Chapter 3.7).".

A2.25 In the title, insert "Specific" before "Target".
Amend the text for the hazard statement to read as follows:

- For Category 1:
"Danger
Causes damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)".

- For Category 2:
"Warning
May cause damage to organs (or state all organs affected, if known)(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)".

Add a new row for Category 3 as follows:

Hazard category	Criteria	Hazard communication elements	
3	(a) (Respiratory tract irritation) Evidence on the substance or mixture of transient irritant effects on respiratory tract in humans ; ***or*** (b) (Narcotic effects) Evidence on the substance or mixture of transient narcotic effects from animal studies and in humans.	Symbol	
		Signal word	Warning
		Hazard statement	(Respiratory tract irritation) May cause respiratory irritation or (Narcotic effects) May cause drowsiness or dizziness

A2.26 In the title, insert "Specific" before "Target".

A2.27 Insert a new sub-section for Aspiration hazards, to read as follows:

"**A2.27 Aspiration hazard** (See chapter 3.10 for details)

Hazard category	Criteria	Hazard communication elements	
1	1. For substances and tested mixtures • Practical experience from reliable and good quality human evidence showing human aspiration toxicity including chemical pneumonia, varying degree of pulmonary injury or death following aspiration ; • Hydrocarbons with a kinematic viscosity of 20.5mm2/s or less, measured at 40 °C; 2. If data for a mixture are not available, use bridging principles in 3.10.3.2. 3. If bridging principles do not apply, classify under Aspiration Hazard Category 1 : • Mixtures containing 10% or more of a substance or substances classified in Category 1 and having a kinematic viscosity of 20.5mm2/s or less when measured at 40 °C; Mixtures which separate into two or more distinct layers, one of which contains 10 % or more of a substance or substances classified in Category 1 aspiration toxicity hazard and has a kinematic viscosity of 20.5 mm^2/s or less, measured at 40 °C.	Symbol	
		Signal word	Danger
		Hazard statement	May be fatal if swallowed and enters airways

<table>
<tr><th>Hazard category</th><th>Criteria</th><th colspan="2">Hazard communication elements</th></tr>
<tr><td rowspan="3">2</td><td rowspan="3">1. Substances other than those classified in Category 1 which, on the basis of animal studies and expert judgment are presumed to cause human aspiration toxicity and have a kinematic viscosity of 14 mm^2/s or less when measured at 40 °C.
2. If data for a mixture are not available, use bridging principles in 3.10.3.2.
3. If bridging principles do not apply, classify under Aspiration Hazard Category 2:
• Mixtures containing 10% or more of a substance or substances classified in Category 2 and having a kinematic viscosity of 14 mm^2/s or less when measured at 40 °C;
• Mixtures which separate into two or more distinct layers, one of which contains 10% or more of a substance or substances classified in Category 2 aspiration toxicity hazard and has a kinematic viscosity of 14 mm^2/s or less, measured at 40 °C.</td><td>Symbol</td><td>  </td></tr>
<tr><td>Signal word</td><td>Warning</td></tr>
<tr><td>Hazard statement</td><td>May be harmful if swallowed and enters airways</td></tr>
</table>

Current sub-section A2.27 becomes new A2.28 (a).
Current A2.28 becomes new A2.29 (b). For hazard category 4, in paragraph 1, replace “and/or” with “and” on the second bullet.

ANNEX 3

Amend the title to read as follows: "**PRECAUTIONARY STATEMENTS AND PRECAUTIONARY PICTOGRAMS**

Replace current text with the following:

"Annex 3

PRECAUTIONARY STATEMENTS AND PRECAUTIONARY PICTOGRAMS

A3.1 Introduction

A3.1.1 This annex provides guidance on the use of precautionary statements consistent with the GHS, including advice on the selection of appropriate statements for each GHS hazard class and category. Precautionary statements should appear on GHS-consistent labels along with the GHS-harmonized hazard communication elements (pictograms, signal words and hazard statements). Additional supplemental information, such as directions for use, may also be provided at the discretion of the manufacturer/supplier and/or competent authority (see Chapter 1.2 and Chapter 1.4, sub-section 1.4.6.3).

A3.1.2 A **Precautionary statement** is a phrase (and/or pictogram) which describes recommended measures which should be taken to minimize or prevent adverse effects resulting from exposures to a hazardous product, or improper storage or handling of a hazardous product (para 1.4.10.5.2 (c)).

A3.1.3 Existing precautionary statements have been used to the maximum extent as the basis for the development of this annex. These existing systems have included the IPCS International Chemical Safety Card (ICSC) Compilers Guide, the American National Standards (ANSI Z129.1), the EU classification and labelling directives, the Emergency Response Guidebook (ERG 2004), and U.S. Environmental Protection Agency Pesticide Label Review Manual.

A3.1.4 This annex includes four types of precautionary statements covering: **prevention**, **response** in cases of accidental spillage or exposure, **storage**, and **disposal.** The development of the set of precautionary statements has been linked as far as possible to each GHS hazard statement and type of hazard.

A3.1.5 The goal of this annex is to promote a more consistent use of precautionary statements as shown in the attached matrix. By linking these statements to the hazard statements of the GHS, an improved understanding about appropriate precautionary behaviour is also made possible. Use of the matrix given in the annex enables the key concepts and approaches to be emphasized in training and education activities.

A3.1.6 The guidance for assigning the phrases in the annex has been developed to provide the essential minimum phrases linking precautionary statements with relevant GHS hazard classification criteria and type of hazard. As much redundancy as possible has been removed in the wording of existing phrases in order to simplify them as much as possible.

A3.1.7 This annex should be seen as a living document and therefore subject to further refinement and development over time. The basic concepts of the matrix and the philosophy given below will remain.

A3.2 Scope of application

A3.2.1 Hazard communication is the key means of enabling appropriate precautionary behaviour in users/consumers when handling hazardous substances and mixtures. Recognition and definition of the hazards are the first steps in ensuring safe use, storage and disposal of chemicals. Safety actions are necessarily linked to the type of hazard which exists, e.g., flammable liquids should be stored away from ignition sources. By making this link as explicit as possible, the introduction of precautionary statements into the GHS will reinforce safe handling procedures. Clear plain language is necessary to convey instructions and enable their translation into other languages.

A3.2.2 The starting point for assigning precautionary statements is the hazard classification of the chemical product. The system of classifying hazards in the GHS is based on the intrinsic properties of the chemicals involved (paragraph 1.3.2.2.1). In some systems, however, labelling may not be required for chronic hazards on consumer product labels, if information shows that the respective risks can be excluded under conditions of normal handling, normal use or foreseeable misuse (see Annex 5). If certain hazard statements are not required then the corresponding precautionary statements are also not necessary (paragraph A5.1.1).

A3.2.3 The precautionary statements included in the following matrix cover general emergency response and first-aid. For some specific chemicals, supplementary first aid, treatment measures or specific antidotes or cleansing materials may be required. Poisons Centres and/or medical practitioners or specialist advice should be sought in such situations and included on labels.

A3.3 Allocation of precautionary statements

A3.3.1 This annex sets out a matrix which guides the selection of appropriate precautionary statements. It includes elements for all categories of precautionary action. All specific elements relating to particular hazard classes should be used. General elements not linked in particular to a certain hazard class or category should also be used.

A3.3.2 To provide flexibility in the application of precautionary phrases, a combination of statements is encouraged to save label space and improve the readability of phrases. Combination of phrases can also be useful for different types of hazard where the precautionary behaviour is similar, e.g. **"Keep away from heat, sparks, and open flame and store in a cool well ventilated place".**

A3.4 General precautionary measures

A3.4.1 General precautionary measures should be adopted for all substances and mixtures which are classified as hazardous to human health or the environment. To this end, the needs of and the information sources available to three groups of users or applicators should be taken into account: the general public, the commercial user, and the industrial worker.

A3.4.2 The presumed observation of precautionary label information, specific safety guidelines, and the safety data sheet for each product before use are part of the labelling requirements and occupational health and safety procedures.

A3.4.3 In order to correctly implement precautionary measures concerning prevention, response, storage and disposal, it is also necessary to have information on the composition of products at hand, so

that information shown on the container, label and safety data sheet can be taken into account when asking for further specialist advice.

A3.4.4 The following general precautionary statements on the GHS label are appropriate under the given conditions:

General public	GHS Label, Supplemental Label Information	**Keep out of reach of children.** **Read label before use.** **If medical advice is needed: Have product container or label at hand**
Industrial worker	GHS Label, Supplemental Label Information, Safety Data Sheet, Workplace Instructions	*none of the above*

A3.5 Structure of the precautionary statements matrix

A3.5.1 Clear plain language is essential to convey information on precautionary behaviour. However, it is not necessary to insist on identical sets of words in all situations.

A3.5.2 The tables making up the matrix show the **core part of the precautionary statements in bold print.** Derogations from the recommended labelling statements are at the discretion of competent authorities. In circumstances where flexibility and variation are appropriate, this is denoted by use of a backslash or diagonal mark [/], the insert *such as* or the use of *italics.* Anything in italics that starts with "- *if*" is intended to be an explanatory note for the application of the Precautionary Statements and is not intended to appear on the label.

A3.5.3 The inclusion of a backslash or diagonal mark indicates that a choice needs to be made between the words they separate, e.g. **"... in accordance with local/regional/national/international regulation"** could read **"... in accordance with** <regulations to comply with>.**"**. In these cases, the manufacturer or supplier can choose or competent authorities may prescribe the most appropriate phrase.

A3.5.4 Where conditions given in *italics* are combined with "*such as*" they denote the situations which should be specifically mentioned, e.g. **"Keep away from** *ignition sources such as* **heat/sparks/open flame"** could read **"Keep away from heat, sparks, and open flame"**. Other ignition sources may be mentioned. In such cases, care should be used and consideration given to the form and type of the substance or mixture. Appropriate guidance should be used which is relevant to the conditions highlighted, e.g. physico-chemical properties, type of formulation, or specific applications and which may give rise to the particular hazard, e.g. flammability.

A3.5.5 During the development of the matrix, some assumptions have been made in order to rationalize the application of the relevant precautionary statement.

A3.5.6 In the majority of cases, the recommended precautionary statements are independent, e.g. the phrases for explosive hazard do not modify those related to certain health hazards and products that are classified for both hazard classes should bear appropriate precautionary statements for both.

A3.5.7 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.

A3.5.8 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 (paragraph 1.4.4.1 (a)). It should be noted, however, that the protective effect of pictograms is limited and the examples in Annex 3 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.

A3.6 Matrix of precautionary statements by hazard class/category

EXPLOSIVES
(CHAPTER 2.1)

Symbol
Exploding Bomb

Hazard Category	**Signal Word**	**Hazard Statement**
Unstable Explosive	Danger	Unstable Explosive

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Obtain special instructions before use. **Do not handle until all safety precautions have been read and understood.** **Use personal protective equipment as required.**	**DO NOT fight fire when fire reaches explosives.** **Explosion risk in case of fire.** **In case of fire, evacuate area.**	**Store ...** (in accordance with local/regional/national/ international regulation).	**Dispose of contents/container to ...** (in accordance with local/regional/national/ international regulation).

EXPLOSIVES
(CHAPTER 2.1)

Symbol
Exploding Bomb

Hazard Category	**Signal Word**	**Hazard Statement**
Division 1.1	Danger	Explosive; mass explosion hazard
Division 1.2	Danger	Explosive; severe projection hazard
Division 1.3	Danger	Explosive; fire, blast or projection hazard

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from *ignition sources such as* **heat/sparks/open flame. - No smoking.** **Do not subject to** *rough handling such as* **grinding/shock/friction.** **Wear face protection.** as specified by the manufacturer/supplier or the competent authority. **Keep wetted with...** appropriate material specified by the manufacturer/supplier or the competent authority - *if drying out increases explosion hazard, except as needed for manufacturing or operating processes.* *Example: nitrocellulose* **Ground/bond container and receiving equipment** - *if the explosive is electrostatically sensitive.*	**DO NOT fight fire when fire reaches explosives.** **In case of fire, evacuate area.** **Explosion risk in case of fire.**	**Store ...** (in accordance with local/regional/national/ international regulation).	**Dispose of contents/container to ...** (in accordance with local/regional/national/ international regulation).

EXPLOSIVES
(CHAPTER 2.1)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
Division 1.4	Warning	Fire or projection hazard

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from *ignition sources such as* **heat/sparks/open flame**. - **No smoking**. **Do not subject to** *rough handling such as* **grinding/shock/friction**. **Wear face protection** a*s specified by the manufacturer/supplier or competent authority*. **Ground/bond container and receiving equipment** - *if the explosive is electrostatically sensitive.*	**EXPLOSIVES (except as noted below)** **DO NOT fight fire when fire reaches explosives.** **Explosion risk in case of fire.** **In case of fire, evacuate area.** **1.4S AMMUNITION AND COMPONENTS THEREOF** **DO NOT fight fire when fire reaches explosives.** **In case of fire, evacuate area.** **Fight fire with normal precautions from a reasonable distance** *- if explosives are 1.4S AMMUNITION AND COMPONENTS THEREOF*.	**Store ...** (in accordance with local/regional/national/ international regulation).	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

EXPLOSIVES
(CHAPTER 2.1)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
Division 1.5	Warning	May explode in fire

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from *ignition sources such as* **heat/sparks/open flame**. - **No smoking**. **Do not subject to** *rough handling such as* **grinding/shock/friction**. **Wear face protection**. *As specified by the manufacturer/supplier or competent authority*. **Keep wetted with...** with appropriate material specified by the manufacturer/supplier or the competent authority - *if drying out increases explosion hazard, except as needed for manufacturing or operating processes.* *Example: nitrocellulose* **Ground/bond container and receiving equipment** - *if the explosive is electrostatically sensitive.*	**DO NOT fight fire when fire reaches explosives.** **Explosion risk in case of fire.** **In case of fire, evacuate area.**	**Store ...** (in accordance with local/regional/national/ international regulation).	**Dispose of contents/container to ...** (in accordance with local/regional/national/ international regulation).

FLAMMABLE GASES
(CHAPTER 2.2)

Symbol
Flame

Hazard Category	Signal Word	Hazard Statement
1	Danger	Extremely flammable gas

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from *ignition sources such as* **heat/sparks/open flames-No smoking.**	**Leaking gas fire: do not extinguish, unless leak can be stopped safely.** **Eliminate all ignition sources if safe to do so.**	**Store in well-ventilated place.**	

FLAMMABLE GASES
(CHAPTER 2.2)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
2	Warning	Flammable gas

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from *ignition sources such as* **heat/sparks/open flames-No smoking.**	**Leaking gas fire:** **Do not extinguish, unless leak can be stopped safely.** **Eliminate all ignition sources if safe to do so.**	**Store in well-ventilated place.**	

FLAMMABLE AEROSOLS
(CHAPTER 2.3)

Symbol
Flame

Hazard Category	Signal Word	Hazard Statement
1	Danger	Extremely flammable aerosol
2	Warning	Flammable aerosol

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Pressurized container: Do not pierce or burn, even after use. **Do not spray on an open flame or any white-hot material.** **Keep away** *from ignition sources such as* **heat/sparks/open flames-No smoking.**		**Protect from sunlight and do not expose to temperatures exceeding 50 ºC/122 ºF.**	

OXIDIZING GASES
(CHAPTER 2.4)

Symbol
Flame over circle

Hazard Category	Signal Word	Hazard Statement
1	Danger	May cause or intensify fire; oxidizer

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from combustible materials. **Keep reduction valves free from grease and oil.**	**In case of fire, stop leak if safe to do so.**	**Store in well-ventilated place.**	

GASES UNDER PRESSURE
(CHAPTER 2.5)

Symbol
Gas cylinder

Hazard Category	**Signal Word**	**Hazard Statement**
Compressed gas	Warning	Contains gas under pressure; may explode if heated
Liquefied gas	Warning	Contains gas under pressure; may explode if heated
Dissolved gas	Warning	Contains gas under pressure; may explode if heated

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
		Protect from sunlight and store in well-ventilated place.	

GASES UNDER PRESSURE
(CHAPTER 2.5)

Symbol
Gas cylinder

Hazard Category	**Signal Word**	**Hazard Statement**
Refrigerated liquefied gas	Warning	Contains refrigerated gas; may cause cryogenic burns or injury

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear cold insulating gloves/face shield/eye protection.	**Thaw frosted parts with lukewarm water.** **Do not rub affected area.** **Seek immediate medical attention/advice.**	**Store in well-ventilated place.**	

FLAMMABLE LIQUIDS
(CHAPTER 2.6)

Symbol
Flame

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Extremely flammable liquid and vapour
2	Danger	Highly flammable liquid and vapour
3	Warning	Flammable liquid and vapour

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep container tightly closed. **Keep away from** *ignition sources such as* **heat/sparks/open flame– No smoking.** **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority. **Ground/Bond container and receiving equipment** - *if electrostatically sensitive material is for reloading.* - *if product is as volatile as to generate hazardous atmosphere.* **Use explosion-proof electrical/ventilating/ lighting/equipment.** ... other specified by the manufacturer/supplier or the competent authority. **Take precautionary measures against static discharge.** **Use only non-sparking tools.**	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.* **IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.**	**Store in cool/well-ventilated place.**	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

FLAMMABLE LIQUIDS
(CHAPTER 2.6)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
4	Warning	Combustible liquid

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves and eye/face protection as specified by the manufacturer/supplier or the competent authority. **Keep away from flames and hot surfaces.**	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.*	**Store in cool/well-ventilated place.**	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

FLAMMABLE SOLIDS
(CHAPTER 2.7)

Symbol
Flame

Hazard Category	Signal Word	Hazard Statement
1	Danger	Flammable solid
2	Danger	Flammable solid

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves and eye/face protection as specified by the manufacturer/supplier or the competent authority. **Keep away from** *ignition sources such as* **heat/sparks/open flame. - No smoking.** **Use explosion-proof electrical/ventilating/lighting/... equipment.** ... other specified by the manufacturer/supplier or the competent authority. *- if dust clouds can occur.* **Ground/Bond container and receiving equipment** *- if electrostatically sensitive material is for reloading.*	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.*		

SELF-REACTIVE SUBSTANCES AND MIXTURES
(CHAPTER 2.8)

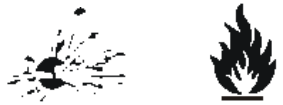
Symbol
Exploding bomb

Hazard Category	**Signal Word**	**Hazard Statement**
Type A	Danger	Heating may cause an explosion

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves and eye/face protection as specified by the manufacturer/supplier or the competent authority. **Keep away from** *ignition sources such as* **heat/sparks/open flame. - No smoking.** **Keep away from ...** incompatible materials specified by the manufacturer/supplier or the competent authority. **Keep only in original container.**	**In case of fire:** **Evacuate area and fight fire remotely due to the risk of explosion.** **In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.*	**Store in cool/well-ventilated place.** **Store at temperatures not exceeding …°C/…°F.** ... specified by the manufacturer/supplier or the competent authority **Store away from other materials.**	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

SELF-REACTIVE SUBSTANCES AND MIXTURES
(CHAPTER 2.8)

Symbol
Exploding bomb and flame



Hazard Category	**Signal Word**	**Hazard Statement**
Type B	Danger	Heating may cause a fire or explosion

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves and eye/face protection as specified by the manufacturer/supplier or the competent authority. **Keep away from** *ignition sources such as* **heat/sparks/open flame. - No smoking.** **Keep away from ...** ... incompatible materials specified by the manufacturer/supplier or the competent authority. **Keep only in original container.**	**In case of fire:** **evacuate area and fight fire remotely due to the risk of explosion.** **In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.*	**Store in cool/well-ventilated place.** **Store at temperatures not exceeding …°C/…°F.** ... specified by the manufacturer/supplier or the competent authority. **Store away from other materials.**	**Dispose of contents/container to**... (in accordance with local/regional/national/ international regulation).

SELF-REACTIVE SUBSTANCES AND MIXTURES
(CHAPTER 2.8)

Symbol
Flame

Hazard Category	**Signal Word**	**Hazard Statement**
Type C	Danger	Heating may cause a fire
Type D	Danger	Heating may cause a fire
Type E	Warning	Heating may cause a fire
Type F	Warning	Heating may cause a fire

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves and eye/face protection as specified by the manufacturer/supplier or the competent authority. **Keep away from** *ignition sources such as* **heat/sparks/open flame. - No smoking.** **Keep away from ...** ... incompatible materials specified by the manufacturer/supplier or the competent authority. **Keep only in original container.**	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.*	**Store in cool/well-ventilated place.** **Store at temperatures not exceeding …°C/…°F.** ... specified by the manufacturer/supplier or the competent authority. **Store away from other materials.**	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

PYROPHORIC LIQUIDS
(CHAPTER 2.9)

Symbol
Flame

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Catches fire spontaneously if exposed to air

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not allow contact with air. **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority. **Keep away from** ignition sources *such as* **heat/sparks/open flame. - No smoking.**	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.* **If on skin immerse in cool water/wrap with wet bandages.**	**Store contents under ...** ... appropriate liquid or inert gas specified by the manufacturer/supplier or the competent authority.	

PYROPHORIC SOLIDS
(CHAPTER 2.10)

Symbol
Flame

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Catches fire spontaneously if exposed to air

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not allow contact with air. **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority. **Keep away from** *ignition sources such as* **heat/sparks/open flame. - No smoking.**	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority. *- if water increases risk* **Brush off loose particles from skin and immerse in cool water/wrap in wet bandages.**	**Store contents under ...** appropriate liquid or inert gas specified by the manufacturer/supplier or the competent authority.	

SELF-HEATING SUBSTANCES AND MIXTURES
(CHAPTER 2.11)

Symbol
Flame

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Self-heating; may catch fire
2	Warning	Self-heating in large quantities; may catch fire

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep cool and protect from sunlight. **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority.		**Store away from other materials.** **Store bulk masses greater than … kg/…lbs at temperatures not exceeding …°C/…°F.** ... specified by the manufacturer/supplier or the competent authority. **Maintain air gap between stacks/pallets.**	

SUBSTANCES AND MIXTURES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES (CHAPTER 2.12)

Symbol
Flame

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	In contact with water releases flammable gases, which may ignite spontaneously
2	Danger	In contact with water releases flammable gas

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep from any possible contact with water, because of violent reaction and possible flash fire. **Handle under inert gas, protect from moisture.** **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority.	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.* **Brush off loose particles from skin and immerse in cool water/wrap in wet bandages**	**Store in a dry place and/or in closed container.**	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

SUBSTANCES AND MIXTURES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES (CHAPTER 2.12)

Symbol
Flame

Hazard Category	**Signal Word**	**Hazard Statement**
3	Warning	In contact with water releases flammable gas

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Handle under inert gas, protect from moisture. **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority.	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.*	**Store in a dry place and/or in closed container.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

OXIDIZING LIQUIDS
(CHAPTER 2.13)

Symbol
Flame over circle

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	May cause fire or explosion; strong oxidizer

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from heat. **Keep away from clothing and other combustible materials.** **Wear fire/flame resistant/retardant clothing.** **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority. **Take any precaution to avoid mixing with combustibles/...** ... other incompatible materials specified by the manufacturer/supplier or the competent authority.	In case of major fire and large quantities: evacuate area and fight fire remotely due to the risk of explosion. **In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.* **IF ON CLOTHING: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes.**	**Store away from combustibles/...** ... other incompatible materials specified by the manufacturer/supplier or the competent authority.	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

OXIDIZING LIQUIDS
(CHAPTER 2.13)

Symbol
Flame over circle

Hazard Category	**Signal Word**	**Hazard Statement**
2	Danger	May intensify fire; oxidizer
3	Warning	May intensify fire; oxidizer

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from heat. **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority. **Take any precaution to avoid mixing with combustibles/...** ... other incompatible materials specified by the manufacturer/supplier or the competent authority.	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.*	**Store away from combustibles/...** ... other incompatible materials specified by the manufacturer/supplier or the competent authority.	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

OXIDIZING SOLIDS
(CHAPTER 2.14)

Symbol
Flame over circle

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	May cause fire or explosion; strong oxidizer

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from heat. **Keep away from clothing and other combustible materials.** **Wear fire/flame resistant/retardant clothing.** **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority. **Take any precaution to avoid mixing with combustibles/...** ... other incompatible materials specified by the manufacturer/supplier or the competent authority.	**In case of major fire and large quantities:** **Evacuate area and fight fire remotely due to the risk of explosion.** **In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority *- if water increases risk.* **IF ON CLOTHING: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes.**	**Store away from combustibles/...** other incompatible materials specified by the manufacturer/supplier or the competent authority.	**Dispose of contents/container to...** (in accordance with local/regional/national/ international regulation).

OXIDIZING SOLIDS
(CHAPTER 2.14)

Symbol
Flame over circle

Hazard Category	Signal Word	Hazard Statement
2	Danger	May intensify fire; oxidizer
3	Warning	May intensify fire; oxidizer

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from heat. **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority. **Take any precaution to avoid mixing with combustibles/...** ... other incompatible materials specified by the manufacturer/supplier or the competent authority.	**In case of fire, use ... for extinction** ... appropriate media specified by the manufacturer/supplier or the competent authority - *if water increases risk.*	**Store away from combustibles/...** ... other incompatible materials specified by the manufacturer/supplier or the competent authority.	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ORGANIC PEROXIDES
(CHAPTER 2.15)

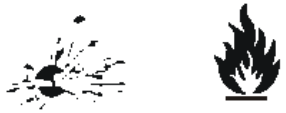
Symbol
Exploding bomb

Hazard Category	**Signal Word**	**Hazard Statement**
Type A	Danger	Heating may cause an explosion

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from *ignition sources such as* **heat/sparks/open flame. - No smoking.** **Keep away from...** ... incompatible materials specified by the manufacturer/supplier or the competent authority. **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority. **Keep only in original container.**		**Store away from other materials.** **Store in cool place at temperatures not exceeding …°C/…°F.** ... specified by the manufacturer/supplier or the competent authority. **Protect from sunlight.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ORGANIC PEROXIDES
(CHAPTER 2.15)

Symbol
Exploding bomb and flame



Hazard Category	**Signal Word**	**Hazard Statement**
Type B	Danger	Heating may cause a fire or explosion

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from *ignition sources such as* **heat/sparks/open flame. - No smoking.** **Keep away from ...** ... incompatible materials specified by the manufacturer/supplier or the competent authority. **Keep only in original container.** **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority.		**Store away from other materials.** **Store in cool place at temperatures not exceeding …°C/…°F.** ... specified by the manufacturer/supplier or the competent authority. **Protect from sunlight.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ORGANIC PEROXIDES
(CHAPTER 2.15)

Symbol
Flame

Hazard Category	**Signal Word**	**Hazard Statement**
Type C	Danger	Heating may cause a fire
Type D	Danger	Heating may cause a fire
Type E	Warning	Heating may cause a fire
Type F	Warning	Heating may cause a fire

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep away from *ignition sources such as* **heat/sparks/open flame. - No smoking.** **Keep away from ...** ... incompatible materials specified by the manufacturer/supplier or the competent authority. **Keep only in original container.** **Wear protective gloves and eye/face protection** as specified by the manufacturer/supplier or the competent authority.		**Store away from other materials.** **Store in cool place at temperatures not exceeding …°C/…°F.** ... specified by the manufacturer/supplier or the competent authority. **Protect from sunlight.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

CORROSIVE TO METALS
(CHAPTER 2.16)

Symbol
Corrosion

Hazard Category	**Signal Word**	**Hazard Statement**
1	Warning	May be corrosive to metals

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Keep only in original container.	**Absorb spillage to prevent material damage.**	**Store in corrosive resistant/... container with a resistant inliner.** ... other compatible materials specified by the manufacturer/supplier or the competent authority.	

ACUTE TOXICITY - ORAL
(CHAPTER 3.1)

Symbol
Skull and crossbones

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Fatal if swallowed
2	Danger	Fatal if swallowed

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not eat, drink or smoke when using this product. **Wash hands thoroughly after handling.**	**IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.** **Rinse mouth** **Specific treatment (see ... on this label)** ... reference to supplemental first aid instruction *- if immediate administration of antidote is required.*	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ACUTE TOXICITY - ORAL
(CHAPTER 3.1)

Symbol
Skull and crossbones

Hazard Category	**Signal Word**	**Hazard Statement**
3	Danger	Toxic if swallowed

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not eat, drink or smoke when using this product. **Wash hands thoroughly after handling.**	**IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.** **Rinse mouth** **Specific treatment (see ... on this label)** ... reference to supplemental first aid instruction *- if immediate administration of antidote is required.*	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ACUTE TOXICITY - ORAL
(CHAPTER 3.1)

Symbol
Exclamation mark

Hazard Category	**Signal Word**	**Hazard Statement**
4	Warning	Harmful if swallowed

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not eat, drink or smoke when using this product. **Wash hands thoroughly after handling.**	**IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.** **Rinse mouth.**		**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ACUTE TOXICITY - ORAL
(CHAPTER 3.1)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
5	Warning	May be harmful if swallowed

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
	Call a POISON CENTER/doctor/physician if you feel unwell.		

ACUTE TOXICITY - DERMAL
(CHAPTER 3.1)

Symbol
Skull and crossbones

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Fatal in contact with skin
2	Danger	Fatal in contact with skin

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not eat, drink or smoke when using this product. **Wash hands thoroughly after handling.** **Do not get in eyes, on skin, or on clothing.** **Wear protective gloves/clothing** as specified by the manufacturer/supplier or the competent authority.	**Remove/Take off immediately all contaminated clothing.** **IF ON SKIN: Gently wash with plenty of soap and water**. **Immediately call a POISON CENTRE or doctor/physician.** **Specific measures (see ... on this label)** ... reference to supplemental first aid instruction *- if immediate measures such as specific cleansing agent is advised*. **Wash/Decontaminate removed clothing before reuse.**	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ACUTE TOXICITY - DERMAL
(CHAPTER 3.1)

Symbol
Skull and crossbones

Hazard Category	**Signal Word**	**Hazard Statement**
3	Danger	Toxic in contact with skin

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves/clothing as specified by the manufacturer/supplier or the competent authority.	**Remove/Take off immediately all contaminated clothing.** **IF ON SKIN: Wash with plenty of soap and water.** **Call a POISON CENTRE or doctor/physician if you feel unwell.** **Specific measures (see ... on this label)** ... reference to supplemental first aid instruction *- if measures such as specific cleansing agent is advised.* **Wash/Decontaminate removed clothing before reuse.**	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ACUTE TOXICITY - DERMAL
(CHAPTER 3.1)

Symbol
Skull and crossbones

Hazard Category	**Signal Word**	**Hazard Statement**
4	Warning	Harmful in contact with skin

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves/clothing as specified by the manufacturer/supplier or the competent authority.	**IF ON SKIN: Wash with plenty of soap and water.** **Call a POISON CENTER or doctor/physician if you feel unwell.** **Specific measures (see ... on this label)** ... reference to supplemental first aid instruction. *- if measures such as specific cleansing agent is advised.* **Wash contaminated clothing before reuse.**		**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ACUTE TOXICITY - DERMAL
(CHAPTER 3.1)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
5	Warning	May be harmful in contact with skin

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
	Call a POISON CENTER or doctor/ physician if you feel unwell.		

ACUTE TOXICITY - INHALATION
(CHAPTER 3.1)

Symbol
Skull and crossbones

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Fatal if inhaled
2	Danger	Fatal if inhaled

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not breathe dust/fume/gas/mist/vapours/spray. **Use only outdoors or in a well-ventilated area.** **Wear respiratory protection.** as specified by the manufacturer/supplier or the competent authority.	**IF INHALED:** **Remove victim to fresh air and keep at rest in a position comfortable for breathing.** **Immediately call a POISON CENTER or doctor/physician.** **Specific treatment is urgent (see ... on this label)** ... reference to supplemental first aid instruction *- if immediate administration of antidote is required.*	**Store locked up.** **Store container tightly closed in well-ventilated place** *- if product is as volatile as to generate hazardous atmosphere.*	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ACUTE TOXICITY - INHALATION
(CHAPTER 3.1)

Symbol
Skull and crossbones

Hazard Category	**Signal Word**	**Hazard Statement**
3	Danger	Toxic if inhaled

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Use only outdoors or in a well-ventilated area. **Avoid breathing dust/fume/ gas/mist/vapours/spray.**	**IF INHALED:** **Remove to fresh air and keep at rest in a position comfortable for breathing.** **Call a POISON CENTER or doctor/physician.** **Specific treatment (see ... on this label)** ... reference to supplemental first aid instruction *- if immediate specific measures are required.*	**Store locked up.** **Store container tightly closed in well-ventilated place** *- if product is as volatile as to generate hazardous atmosphere.*	

ACUTE TOXICITY - INHALATION
(CHAPTER 3.1)

Symbol
Exclamation mark

Hazard Category	**Signal Word**	**Hazard Statement**
4	Warning	Harmful if inhaled

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Use only outdoors or in a well-ventilated area. **Avoid breathing dust/fume/gas/mist/vapours/spray.**	**IF INHALED:** **Remove to fresh air and keep at rest in a position comfortable for breathing.** **Call a POISON CENTER or doctor/physician if you feel unwell**		

ACUTE TOXICITY - INHALATION
(CHAPTER 3.1)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
5	Warning	May be harmful if inhaled

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
	IF INHALED: **Call a POISON CENTER or doctor/physician if you feel unwell**		

SKIN CORROSION/IRRITATION
(CHAPTER 3.2)

Symbol
Corrosion

Hazard Category	**Signal Word**	**Hazard Statement**
1A to 1C	Danger	Causes severe skin burns and eye damage

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves/clothing and eye/face protection as specified by the manufacturer/supplier or the competent authority. **Wash thoroughly after handling.** **Do not breathe dust or mist** *- if inhalable particles may occur during use.*	**IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.** **Wash contaminated clothing before reuse.** **IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.** **IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.** **IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.** **Immediately call a POISON CENTER or doctor/physician.** **Specific treatment (see ... on this label)** ... reference to supplemental first aid instruction *may include a cleansing agent specified by the manufacturer/supplier or the competent authority.*	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

SKIN CORROSION/IRRITATION
(CHAPTER 3.2)

Symbol
Exclamation mark

Hazard Category	**Signal Word**	**Hazard Statement**
2	Warning	Causes skin irritation

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves as specified by the manufacturer/supplier or the competent authority. **Wash thoroughly after handling.**	**IF ON SKIN: Wash with plenty of soap and water**. **Take of contaminated clothing and wash before re-use.** **If skin irritation occurs, seek medical advice/attention.** **Specific treatment (see ... on this label)** ... reference to supplemental first aid instruction *may include a cleansing agent specified by the manufacturer/supplier or the competent authority*.		

SKIN CORROSION/IRRITATION
(CHAPTER 3.2)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
3	Warning	Causes mild skin irritation

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
	If skin irritation occurs, get medical advice/attention.		

EYE DAMAGE/IRRITATION
(CHAPTER 3.3)

Symbol
Corrosion

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Causes serious eye damage

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear eye/face protection as specified by the manufacturer/supplier or the competent authority.	**IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.** **Immediately call a POISON CENTER or doctor/physician.**		

EYE DAMAGE/IRRITATION
(CHAPTER 3.3)

Symbol
Exclamation mark

Hazard Category	**Signal Word**	**Hazard Statement**
2A	Warning	Causes serious eye irritation

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear eye/face protection as specified by the manufacturer/supplier or the competent authority.	**IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.** **If eye irritation persists, get medical advice/attention.** **Wash hands after handling**		

EYE DAMAGE/IRRITATION
(CHAPTER 3.3)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
2B	Warning	Causes eye irritation

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. **If eye irritation persists, get medical advice/attention.** **Wash hands after handling**		

SENSITIZATION - RESPIRATORY
(CHAPTER 3.4)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	May cause allergy or asthma symptoms or breathing difficulties if inhaled

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Avoid breathing dust/fume/gas/mist/vapours/spray. **In case of inadequate ventilation wear respiratory protection** as specified by the manufacturer/supplier or the competent authority.	**IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing.** **If experiencing respiratory symptoms call a POISON CENTER or doctor/physician.**		**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

SENSITIZATION - SKIN
(CHAPTER 3.4)

Symbol
Exclamation mark

Hazard Category	**Signal Word**	**Hazard Statement**
1	Warning	May cause an allergic skin reaction

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Wear protective gloves as specified by the manufacturer/supplier or the competent authority. **Avoid breathing dust/fume/ gas/mist/vapours/spray.** **Contaminated work clothing should not be allowed out of the workplace.**	**IF ON SKIN: Wash with plenty of soap and water**. **If skin irritation or rash occurs, seek medical advice/attention.** **Specific treatment (see ... on this label)** ... reference to supplemental first aid instruction *may include a cleansing agent specified by the manufacturer/supplier or the competent authority.* **Wash contaminated clothing before reuse.**		**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

GERM CELL MUTAGENICITY
(CHAPTER 3.5)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	May cause genetic defects <...>
2	Warning	Suspected of causing genetic defects < >
		<...> *(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard.)*

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Obtain special instructions before use. **Do not handle until all safety precautions have been read and understood.** **Use personal protective equipment as required.**	**IF exposed or concerned: Get medical attention/advice.**	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

CARCINOGENICITY
(CHAPTER 3.6)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	May cause cancer <...>
2	Warning	Suspected of causing cancer < >
		<...> *(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).*

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Obtain special instructions before use. **Do not handle until all safety precautions have been read and understood.** **Use personal protective equipment as required.**	**IF exposed or concerned: Get medical attention/advice.**	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

TOXIC TO REPRODUCTION
(CHAPTER 3.7)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	May damage fertility or the unborn child <...> <<...>>
2	Warning	Suspected of damaging fertility or the unborn child <...> <<...>>
		<...> *(state specific effect if known)*
		<<...>> *(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)*

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Obtain special instructions before use. **Do not handle until all safety precautions have been read and understood.** **Use personal protective equipment as required.**	**IF exposed or concerned: Get medical attention/advice.**	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

TOXIC TO REPRODUCTION
(CHAPTER 3.7)
(Effects on or via lactation)

Symbol
None

Hazard Category	Signal Word	Hazard Statement
(additional)	*No signal word*	May cause harm to breast-fed children

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Obtain special instructions before use. **Avoid contact during pregnancy/while nursing.** **Do not eat, drink or smoke when using this product.** **Wash hands thoroughly after handling.** **Do not breathe dust or mist** *- if inhalable particles may occur during use*	**IF exposed or concerned: Get medical attention/advice.**		

SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (SINGLE EXPOSURE) (CHAPTER 3.8)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Causes damage to <...> if <<...>> <...> *(state all organs affected, or use a general statement where there is no definite evidence that other organs are not effected.)* <<...>> *(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)*

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not eat, drink or smoke when using this product. **Wash hands thoroughly after handling.** **Do not breathe dust/fume/gas/mist/vapours/spray.**	**IF exposed: Call a POISON CENTER or doctor/physician.** **Specific treatment (see ... on this label)** ... reference to supplemental first aid instruction *- if immediate measures are required.*	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (SINGLE EXPOSURE) (CHAPTER 3.8)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
2	Warning	May cause damage to <...> if <<...>>. <...> *(state all organs affected, or use a general statement where there is no definite evidence that other organs are not effected.)* <<...>> *(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)*

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not eat, drink or smoke when using this product. **Wash hands thoroughly after handling.** **Do not breathe dust/fume/gas/mist/vapours/spray.**	**Call a POISON CENTER or doctor/physician if exposed or you feel unwell.**	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (SINGLE EXPOSURE) (CHAPTER 3.8)

Symbol
Exclamation mark

Hazard Category	**Signal Word**	**Hazard Statement**
3	Warning	May cause respiratory irritation or May cause drowsiness and dizziness

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Use only outdoors or in well-ventilated area. **Avoid breathing dust/fume/ gas/mist/vapours/spray.**	**Call a POISON CENTER or doctor/physician if you feel unwell.** **IF INHALED:** **Remove to fresh air and keep at rest in a position comfortable for breathing.**	**Store locked up.** **Store container tightly closed in well-ventilated place** *- if product is as volatile as to generate hazardous atmosphere.*	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (REPEATED EXPOSURE) (CHAPTER 3.9)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	Causes <...> damage through prolonged or repeated exposure <<...>>. <...> (state all organs affected, or use a general statement where there is no definite evidence that other organs are not effected.) <<...>> (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard.)

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not eat, drink or smoke when using this product. **Wash hands thoroughly after handling.** **Do not breathe dust/fume/gas/mist/vapours/spray.**	**Get medical attention/advice if you feel unwell.**		**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (REPEATED EXPOSURE) (CHAPTER 3.9)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
2	Warning	May cause <...> damage through prolonged or repeated exposure <<...>>. <...> (state all organs affected, or use a general statement where there is no definite evidence that other organs are not effected.) <<...>> (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard.)

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Do not breathe dust/fume/gas/mist/vapours/spray.	**Get medical attention/advice if you feel unwell.**		**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

ASPIRATION TOXICITY
(CHAPTER 3.10)

Symbol
Health hazard

Hazard Category	**Signal Word**	**Hazard Statement**
1	Danger	May be fatal if swallowed and enters airways
2	Warning	May be harmful if swallowed and enters airways

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. **Do NOT induce vomiting.**	**Store locked up.**	**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

HAZARDOUS TO THE AQUATIC ENVIRONMENT - ACUTE HAZARD (CHAPTER 4.1)

Symbol
Environment

Hazard Category	**Signal Word**	**Hazard Statement**
1	Warning	Very toxic to aquatic life

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Avoid release to the environment *- if this is not the intended use.*	**Collect spillage.**		**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

HAZARDOUS TO THE AQUATIC ENVIRONMENT - ACUTE HAZARD (CHAPTER 4.1)

Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
2	*No signal word*	Toxic to aquatic life
3	*No signal word*	Harmful to aquatic life

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Avoid release to the environment - *if this is not the intended use.*			**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

HAZARDOUS TO THE AQUATIC ENVIRONMENT - CHRONIC HAZARD (CHAPTER 4.1)

Symbol
Environment

Hazard Category	**Signal Word**	**Hazard Statement**
1	Warning	Very toxic to aquatic life with long lasting effects
2	*No signal word*	Toxic to aquatic life with long lasting effects

Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Avoid release to the environment - *if this is not the intended use.*	**Collect spillage.**		**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

HAZARDOUS TO THE AQUATIC ENVIRONMENT - CHRONIC HAZARD (CHAPTER 4.1)

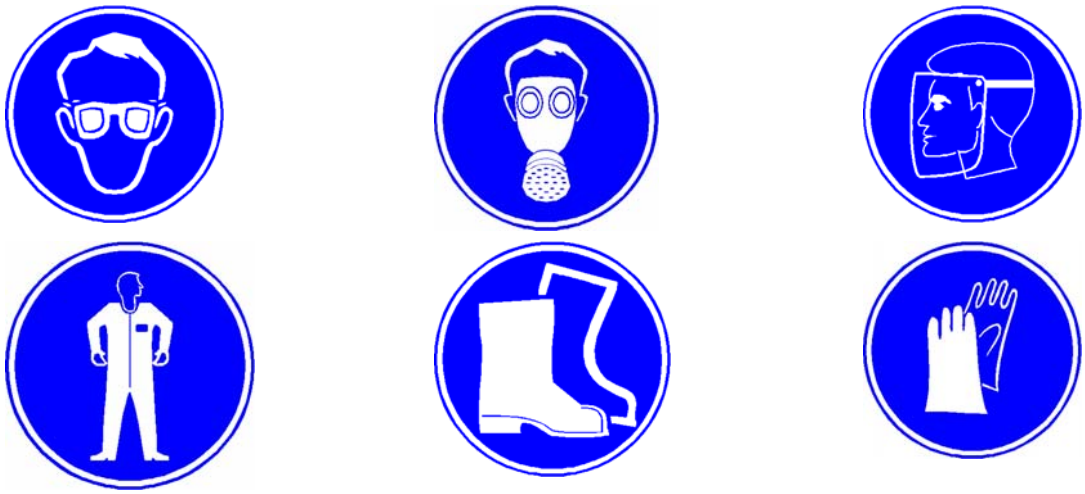
Symbol
None

Hazard Category	**Signal Word**	**Hazard Statement**
3	*No signal word*	Harmful to aquatic life with long lasting effects
4	*No signal word*	May cause long lasting harmful effects to aquatic life

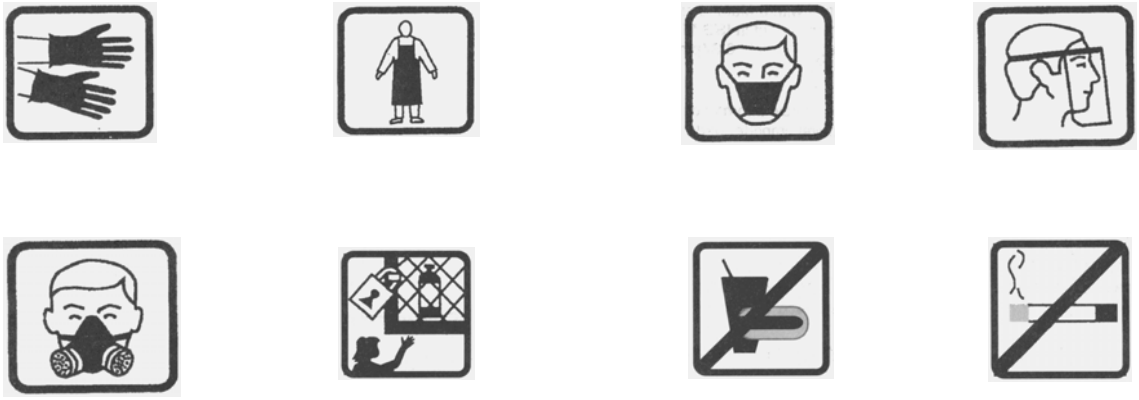
Precautionary Statements			
Prevention	**Response**	**Storage**	**Disposal**
Avoid release to the environment - *if this is not the intended use.*			**Dispose of contents/container to...** ... (in accordance with local/regional/national/ international regulation).

A3.7 Precautionary pictograms

From European Union (Council Directive 92/58/EEC of 24 June 1992)



From South African Bureau of Standards (SABS 0265:1999)



ANNEX 4

Insert a new Annex 4 to read as follows:

"**Annex 4**

GUIDANCE ON THE PREPARATION OF SAFETY DATA SHEETS (SDS)

A4.1 Introduction

A4.1.1 This annex provides guidance on the preparation of an SDS under the requirements of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). SDS's are an important element of hazard communication in the GHS, as explained in Chapter 1.5. Use of this guidance document should support compliance with competent authority (CA) requirements and should allow the SDS to be prepared in accordance with the GHS.

A4.1.2 The use of this guidance document is dependent on importing countries requirements for SDS. It is hoped that the application of the GHS worldwide will eventually lead to a fully harmonized situation.

A4.1.3 Unless otherwise stated, all chapters, sections and tables referred to in this annex can be found in the main text of the GHS.

A4.2 General guidance for compiling an SDS

A4.2.1 *Scope and application*

Safety Data Sheets (SDS) should be produced for all substances and mixtures which meet the harmonized criteria for physical, health or environmental hazards under the GHS and for all mixtures which contain substances that meet the criteria for carcinogenic, toxic to reproduction or target organ systemic toxicity in concentrations exceeding the cut-off limits for SDS specified by the criteria for mixtures (See table 1.5.1 in chapter 1.5). The competent authority (CA) may also require SDS for mixtures not meeting the criteria for classification as hazardous but which contain hazardous substances in certain concentrations (See chapter 3.2). The CA may also require SDS for substances or mixtures that meet the criteria for classification as hazardous for non-GHS classes/end-points. An SDS is a well-accepted and effective method for the provision of information, and may be used to convey information for substances or mixtures that do not meet or are not included in the GHS classification criteria.

A4.2.2 *General guidance*

A4.2.2.1 The writer of the SDS needs to keep in mind that an SDS must inform its audience of the hazards of a substance or a mixture and provide information on the safe storage, handling and disposal of the substance or a mixture. An SDS contains information on the potential health effects of exposure and how to work safely with the substance or mixture. It also contains hazard information derived from physicochemical properties or environmental effects, on the use, storage, handling and emergency response measures related to that substance or a mixture. The purpose of this guidance is to ensure consistency and accuracy in the content of each of the mandatory headings required under GHS, so that the resulting safety data sheets will enable users to take the necessary measures relating to protection of health and safety at the workplace, and the protection of the environment. The information in the SDS

shall be written in a clear and concise manner. The SDS shall be prepared by a competent person who shall take into account the specific needs of the user audience, as far as it is known. Persons placing substances and mixtures on the market shall ensure that refresher courses and training on the preparation of SDS be regularly attended by the competent persons.

A4.2.2.2 When writing the SDS, information should be presented in a consistent and complete form, with the workplace audience firmly in mind. However, it should be considered that all or part of the SDS can be used to inform workers, employers, health and safety professionals, emergency personnel, relevant government agencies, as well as members of the community.

A4.2.2.3 Language used in the SDS should be simple, clear and precise, avoiding jargon, acronyms and abbreviations. Vague and misleading expressions should not be used. Phrases such as “may be dangerous”, “no health effects”, “safe under most conditions of use”, or “harmless” are also not recommended. It may be that information on certain properties is of no significance or that it is technically impossible to provide; if so, the reasons for this must be clearly stated under each heading. If it is stated that a particular hazard does not exist, the safety data sheet should clearly differentiate between cases where no information is available to the classifier, and cases where negative test results are available.

A4.2.2.4 The date of issue of the SDS should be stated and be very apparent. The date of issue is the date the SDS version was made public. This generally occurs shortly after the SDS authoring and publishing process is completed. Revised SDS’s should clearly state the date of issue as well as a version number, revision number, supersedes date or some other indication of what version is replaced.

A4.2.3 *SDS format*

A4.2.3.1 The information in the SDS should be presented using the following 16 headings in the order given below (see also 1.5.3.2.1):

1. Identification
2. Hazard identification
3. Composition/information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information

A4.2.3.2 An SDS is not a fixed length document. The length of the SDS should be commensurate with the hazard of the material and the information available.

A4.2.3.3 All pages of an SDS should be numbered and some indication of the end of the SDS should be given. For example, "page 1 of 3". Alternatively, number each page and indicate whether there is a page following (e.g. "Continued on next page" or "End of SDS").

A4.2.4 *SDS content*

A4.2.4.1 General information on SDS content can be found in 1.5.3.3. More practical information is given below.

A4.2.4.2 The minimum information outlined in section A4.3 of this annex should be included on the SDS, where applicable and available[1], under the relevant headings. When information is not available or lacking this should be clearly stated. The SDS should not contain any blanks.

A4.2.4.3 In addition, the SDS should contain a brief summary/conclusion of the data given, making it easy even for non-experts in the field to identify all the hazards for the hazardous substance/mixture.

A4.2.4.4 Use of abbreviations is not recommended because they may lead to confusion or decreased understanding.

A4.2.5 *Other information requirements*

A4.2.5.1 There are information requirements for the preparation of an SDS. The minimum information requirements are outlined in A4.3.

A4.2.5.2 In addition to the minimum information requirements (see A4.2.4.2), the SDS may also contain "additional information". Where a material has additional relevant and available information about its nature and/or use, that information should be included in the SDS. See A4.3.16 for further advice on additional information requirements.

A4.2.6 *Units*

Numbers and quantities should be expressed in units appropriate to the region into which the product is being supplied. In general, the International System of Units (SI) should be used.

A4.3 Information requirements for the preparation of the SDS

This section describes the GHS information requirements for SDS's. Additional information may be required by competent authorities.

A4.3.1 SECTION 1 – Identification

Identify the substance or mixture and provide the name of the supplier, recommended uses and the contact detail information of the supplier including an emergency contact in this section.

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[1] *Where "applicable" means where the information is applicable to the specific product covered by the SDS. Where "available" means where the information is available to the supplier or other entity that is preparing the SDS.*

A4.3.1.1 ***GHS product identifier***

In addition, or as an alternative, to the GHS product identifier, the identity of the substance or mixture (GHS product identifier) should be exactly as found on the label. If one generic SDS is used to cover several minor variants of a substance or mixture, all names and variants should be listed on the SDS or the SDS should clearly delineate the range of substances included.

A4.3.1.2 ***Other means of identification***

The substance or mixture may be identified by alternative names, numbers, company product codes, or other unique identifiers. Provide other names or synonyms by which the substance or mixture is labelled or commonly known, if applicable.

A4.3.1.3 ***Recommended use of the chemical and restrictions on use***

Provide the recommended or intended use of the substance or mixture, including a brief description of what it actually does, e.g. flame retardant, anti-oxidant, etc. Restrictions on use should, as far as possible, be stated including non-statutory recommendations by the supplier.

A4.3.1.4 ***Supplier's details***

The name, full address and phone number(s) of the supplier should be included on the SDS.

A4.3.1.5 ***Emergency phone number***

References to emergency information services should be included in all SDS. If any restrictions apply, such as hours of operation (e.g. Monday - Friday, 8:00 a.m. - 6:00 p.m., or 24 hours) or limits on specific types of information (e.g., medical emergencies, or transportation emergencies), this should be clearly stated.

A4.3.2 SECTION 2 – Hazard identification

This section describes the hazards of the substance or mixture and the appropriate warning information (signal word, hazard statement(s) and precautionary statement(s)) associated with those hazards. The section should include a brief summary/conclusion of the data given as described in A4.2.4.3.

A4.3.2.1 ***Classification of the substance or mixture***

A4.3.2.1.1 This sub-section indicates the hazard classification of the substance or mixture.

A4.3.2.1.2 If the substance or mixture is classified in accordance with Parts 2, 3 and/or 4 of the GHS, provide the appropriate hazard class and category to indicate the hazard. For example, flammable liquid Category 1.

A4.3.2.2 ***GHS label elements, including precautionary statements***

A4.3.2.2.1 Based on the classification, provide the appropriate labelling elements: signal word(s), hazard statement(s) and precautionary statement(s).

A4.3.2.2.2 Pictograms (or hazard symbols) may be provided as a graphical reproduction of the symbols in black and white or the name of the symbol, e.g. flame, skull and crossbones.

A4.3.2.3 *Other hazards which do not result in classification*

Provide information on other hazards which do not result in classification but may contribute to the overall hazards of the material, for example, formation of air contaminants during hardening or processing, dust explosion hazards, suffocation, freezing or environmental effects such as hazards to soil-dwelling organisms.

A4.3.3 SECTION 3 – Composition/information on ingredients

Identify the ingredient(s) of the product in this section. This includes identifying impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance. This section may also be used to provide information on complex substances.

NOTE: *For information on ingredients, the competent authority rules for Confidential Business Information (CBI) take priority over the rules for product identification. When applicable, indicate that confidential information about the composition was omitted.*

A4.3.3.1 *Substances*

A4.3.3.1.1 *Chemical identity of the substance*

The identity of a substance is provided by its common chemical name. The chemical name can be identical to the GHS product identifier.

NOTE: *The "common chemical name" may, for example, be the CAS name or IUPAC name, as applicable.*

A4.3.3.1.2 *Common name(s), synonym(s) of the substance*

Common names and synonyms should be provided where appropriate.

A4.3.3.1.3 *CAS number and other unique identifiers for the substance*

The Chemical Abstract Service (CAS) Registry Number provides a unique chemical identification and should be provided when available. Other unique identifiers specific to a country or region, such as the European Community (EC) number could be added.

A4.3.3.1.4 *Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance*

Identify any impurities and/or stabilizing additives, which are themselves classified and which contribute to the classification of the substance.

A4.3.3.2 *Mixtures*

A4.3.3.2.1 For a mixture, provide the chemical identity, identification number (within the meaning of A4.3.3.1.3) and concentration or concentration ranges of all hazardous ingredients, which are

hazardous to health or the environment within the meaning of the GHS, and are present above their cut-off levels. Manufacturers or suppliers may choose to list all ingredients, including non-hazardous ingredients.

A4.3.3.2.2 The concentrations of the ingredients of a mixture should be described as:

(a) exact percentages in descending order by mass or volume; or

(b) ranges of percentages in descending order by mass or volume if such ranges are acceptable to the appropriate competent national authority.

A4.3.3.2.3 When using a proportion range, the health and environmental hazard effects should describe the effects of the highest concentration of each ingredient, provided that the effects of the mixture as a whole are not available.

NOTE: *The "proportion range" refers to the concentration or percentage range of the ingredient in the mixture.*

A4.3.4 SECTION 4 – First-aid measures

This section describes the initial care that can be given by an untrained responder without the use of sophisticated equipment and without a wide selection of medications available. If medical attention is required, the instructions should state this, including its urgency. It may be useful to provide information on the immediate effects, by route of exposure, and indicate the immediate treatment, followed by possible delayed effects with specific medical surveillance required.

A4.3.4.1 *Description of necessary first aid measures*

A4.3.4.1.1 Provide first-aid instructions by relevant routes of exposure. Use subheadings to indicate the procedure for each route (e.g. inhalation, skin, eye, and ingestion). Describe expected immediate and delayed symptoms.

A4.3.4.1.2 Provide advice whether:

(a) immediate medical attention is required and if delayed effects can be expected after exposure;

(b) movement of the exposed individual from the area to fresh air is recommended;

(c) removal and handling of clothing and shoes from the individual is recommended; and

(d) personal protective equipment (PPE) for first-aid responders is recommended.

A4.3.4.2 *Most important symptoms/effects, acute and delayed*

Provide information on the most important symptoms/effects, acute and delayed, from exposure.

A4.3.4.3 ***Indication of immediate medical attention and special treatment needed, if necessary***

Where appropriate, provide information on clinical testing and medical monitoring for delayed effects, specific details on antidotes (where they are known) and contraindications.

A4.3.5 SECTION 5 – Fire-fighting measures

This section covers the requirements for fighting a fire caused by the substance or mixture, or arising in its vicinity.

A4.3.5.1 ***Suitable extinguishing media***

Provide information on the appropriate type of extinguishers or fire-fighting agents. In addition, indicate whether any extinguishers are inappropriate for a particular situation involving the substance or mixture.

A4.3.5.2 ***Specific hazards arising from the chemical***

Provide advice on specific hazards that may arise from the chemical, such as hazardous combustion products that form when the substance or mixture burns. For example:

(a) "may produce toxic fumes of carbon monoxide if burning"; or

(b) "produces oxides of sulphur and nitrogen on combustion".

A4.3.5.3 ***Special protective equipment and precautions for fire fighters***

A4.3.5.3.1 Provide advice on any precaution to be taken during fire-fighting. For example, "keep containers cool with water spray".

A4.3.5.3.2 Provide advice on appropriate protective equipment for fire-fighters. For example, boots, overalls, gloves, eye and face protection and breathing apparatus.

A4.3.6 SECTION 6 – Accidental release measures

This section recommends the appropriate response to spills, leaks, or releases in order to prevent or minimize the adverse effects on persons, property and the environment in this section. Distinguish between responses for large and small spills where the spill volume has a significant impact on the hazard. The procedures for containment and recovery may indicate that different practices are required.

A4.3.6.1 ***Personal precautions, protective equipment and emergency procedures***

Provide advice related to accidental spills and release of the substance or mixture such as:

(a) the wearing of suitable protective equipment (including personal protective equipment, see section 8 of the SDS) to prevent any contamination of skin, eyes and personal clothing;

(b) removal of ignition sources and provision of sufficient ventilation; and

(c) emergency procedures such as the necessity to evacuate the danger area or to consult an expert.

A4.3.6.2 ***Environmental precautions***

Provide advice on any environmental precautions related to accidental spills and release of the substance or mixture, such as keeping away from drains, surface and ground water.

A4.3.6.3 ***Methods and materials for containment and cleaning up***

A4.3.6.3.1 Provide appropriate advice on how to contain and clean up a spill. Appropriate containment techniques may include:

(a) bunding[2], covering of drains; and

(b) capping procedures[3].

A4.3.6.3.2 Appropriate clean up procedures may include:

(a) neutralization techniques;

(b) decontamination techniques;

(c) adsorbent materials;

(d) cleaning techniques;

(e) vacuuming techniques; and

(f) equipment required for containment/clean up (include the use of non-sparking tools and equipment where applicable).

A4.3.6.3.3 Provide any other issues relating to spills and releases. For example, including advice on inappropriate containment or clean up techniques.

A4.3.7 **SECTION 7 – Handling and storage**

This section provides guidance on safe handling practices that minimize the potential hazards to people, property and the environment from the substance or mixture. Emphasize precautions that are appropriate to the intended use and to the unique properties of the substance or mixture.

A4.3.7.1 ***Precautions for safe handling***

A4.3.7.1.1 Provide advice that:

(a) allows safe handling of the substance or mixture;

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[2] *A **bund** is a provision of liquid collection facilities which, in the event of any leak or spillage from tanks or pipe work, will capture well in excess of the volume of liquids held, e.g. an embankment. Bunded areas should drain to a capture tank which should have facilities for water/oil separation.*

[3] *i.e. providing a cover or protection (e.g. to prevent damage or spillage).*

(b) prevents handling of incompatible substances or mixtures; and

(c) minimizes the release of the substance or mixture to the environment.

A4.3.7.1.2 It is good practice to provide advice on general hygiene. For example:

(a) "eating, drinking and smoking in work areas is prohibited";

(b) "wash hands after use"; and

(c) "remove contaminated clothing and protective equipment before entering eating areas".

A4.3.7.2 ***Conditions for safe storage, including any incompatibilities***

Ensure that the advice provided is consistent with the physical and chemical properties in Section 9 – *Physical and chemical properties* of the SDS. If relevant, provide advice on specific storage requirements including:

(a) How to avoid:

(i) explosive atmospheres;

(ii) corrosive conditions;

(iii) flammability hazards;

(iv) incompatible substances or mixtures;

(v) evaporative conditions; and

(vi) potential ignition sources (including electrical equipment).

(b) How to control the effects of:

(i) weather conditions;

(ii) ambient pressure;

(iii) temperature;

(iv) sunlight;

(v) humidity; and

(vi) vibration

(c) How to maintain the integrity of the substance or mixture by the use of:

(i) stabilizers; and

(ii) anti-oxidants.

(d) Other advice including:

(i) ventilation requirements;

(ii) specific designs for storage rooms/vessels;

(iii) quantity limits under storage conditions (if relevant); and

(iv) packaging compatibilities.

A4.3.8 SECTION 8 – Exposure controls/personal protection

Within this guidance the term "occupational exposure limit(s)"refers to limits in the air of the workplace or biological limit values. In addition, for the purposes of this document "exposure control" means the full range of specific protection and prevention measures to be taken during use in order to minimize worker and environmental exposure. Engineering control measures that are needed to minimize exposure to, and risks associated with the hazards of, the substance or mixture should be included in this section.

A4.3.8.1 *Control parameters*

A4.3.8.1.1 Where available, list the occupational exposure limits (limits in the air of the workplace or biological limit values), including notations, for a substance and for each of the ingredients of a mixture. If air contaminants are formed when using the substance or mixture as intended available occupational exposure limits for these should also be listed. If an occupational exposure limit exists for the country or region in which the SDS is being supplied, this should be listed. The source of the occupational exposure limit should be stated on the SDS. When listing occupational exposure limits, use the chemical identity as specified in Section 3 – *Composition/Information on ingredients* of the SDS.

A4.3.8.1.2 Where available, list the biological limit values, including notations, for a substance and for each of the ingredients of a mixture. Where possible, the biological limit value should be relevant to the countries or regions in which the SDS is being supplied. The source of the biological limit value should be stated on the SDS. When listing biological limit values, use the chemical identity as specified in Section 3 of the SDS.

A4.3.8.1.3 Where a control banding approach is recommended for providing protection in relation to specific uses then sufficient detail should be given to enable effective management of the risk. The context and limitations of the specific control banding recommendation should be made clear.

A4.3.8.2 *Appropriate engineering controls*

The description of appropriate exposure control measures should relate to the intended modes of use of the substance or mixture. Sufficient information should be provided to enable a proper risk assessment to be carried out. Indicate when special engineering controls are necessary, and specify which type. Examples include:

(a) "maintain air concentrations below occupational exposure standards", using engineering controls if necessary;

(b) "use local exhaust ventilation when…";

(c) "use only in an enclosed system";

(d) "use only in spray paint booth or enclosure";

(e) "use mechanical handling to reduce human contact with materials"; or

(f) "use explosive dust handling controls".

The information provided here should complement that provided under Section 7– *Handling and storage* of the SDS.

A4.3.8.3 *Individual protection measures, such as personal protective equipment (PPE)*

A4.3.8.3.1 Consistent with good occupational hygiene practices, personal protective equipment (PPE) should be used in conjunction with other control measures, including engineering controls, ventilation, and isolation. See also Section 5 – *Fire-fighting measures* of the SDS for specific fire/chemical PPE advice.

A4.3.8.3.2 Identify the PPE needed to minimise the potential for illness or injury due to exposure from the substance or mixture, including:

(a) Eye/face protection - specify the type of eye protection and/or face shield required, based on the hazard of the substance or mixture and potential for contact;

(b) Skin protection - specify the protective equipment to be worn (e.g. type of gloves, boots, bodysuit) based on the hazards associated with the substance or mixture and the potential for contact;

(c) Respiratory protection – specify appropriate types of respiratory protection based on the hazard and potential for exposure, including air-purifying respirators and the proper purifying element (cartridge or canister) or breathing apparatus; and

(d) Thermal hazards - when specifying protective equipment to be worn for materials that represent a thermal hazard, special consideration should be given to the construction of the PPE.

A4.3.8.3.3 Special requirements may exist for gloves or other protective clothing to prevent skin, eye or lung exposure. Where relevant, this type of PPE should be clearly stated. For example, "PVC gloves" or "nitrile rubber gloves", and thickness and breakthrough time of the glove material. Special requirements may exist for respirators.

A4.3.9 SECTION 9 – Physical and chemical properties

A4.3.9.1 Describe the empirical data of the substance or mixture (if possible) in this section.

A4.3.9.2 In the case of a mixture, the entries should clearly indicate to which ingredient the data apply, unless it is valid for the whole mixture. The data included in this subsection should apply to the substance or mixture.

A4.3.9.3 Clearly identify the following properties and specify appropriate units of measure and/or reference conditions where appropriate. If relevant for the interpretation of the numeric value, the method of determination should also be provided (e.g. for flash point, open-cup/closed-cup):

(a) Appearance (physical state, colour etc);
(b) Odour;
(c) Odour threshold;
(d) pH;
(e) Melting point/freezing point;
(f) Initial boiling point and boiling range;
(g) Flash point;
(h) Evaporation rate;
(i) Flammability (solid, gas);
(j) Upper/lower flammability or explosive limits;
(k) Vapour pressure;
(l) Vapour density;
(m) Relative density;
(n) Solubility(ies);
(o) Partition coefficient: n-octanol/water;
(p) Auto-ignition temperature;
(q) Decomposition temperature;
(r) Viscosity.

If specific characteristics do not apply or are not available, they should still be listed on the SDS with a statement that they do not apply or not available.

Other physical or chemical parameters in addition to those listed above may also be included in this section of the SDS.

A4.3.10 SECTION 10 – Stability and reactivity

A4.3.10.1 *Reactivity*

A4.3.10.1.1 Describe the reactivity hazards of the substance or mixture in this section. Provide specific test data for the substance or mixture as a whole, where available. However, the information may also be based on general data for the class or family of chemical if such data adequately represent the anticipated hazard of the substance or mixture.

A4.3.10.1.2 If data for mixtures are not available, ingredient data should be provided. In determining incompatibility, consider the substances, containers, and contaminants that the substance or mixture might be exposed to during transportation, storage and use.

A4.3.10.2 *Chemical stability*

Indicate if the substance or mixture is stable or unstable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Describe any stabilizers which are, or may need to be, used to maintain the product. Indicate the safety significance of any change in the physical appearance of the product.

A4.3.10.3 *Possibility of hazardous reactions*

If relevant, state if the substance or mixture will react or polymerize, releasing excess pressure or heat, or creating other hazardous conditions. Describe under what conditions the hazardous reactions may occur.

A4.3.10.4 ***Conditions to avoid***

List conditions such as heat, pressure, shock, static discharge, vibrations or other physical stresses that might result in a hazardous situation.

A4.3.10.5 ***Incompatible materials***

List classes of chemicals or specific substances with which the substance or mixture could react to produce a hazardous situation (e.g. explosion, release of toxic or flammable materials, liberation of excessive heat).

A4.3.10.6 ***Hazardous decomposition products***

List known and reasonably anticipated hazardous decomposition products produced as a result of use, storage and heating. Hazardous combustion products should be included in Section 5 – *Fire fighting measures* of the SDS.

A4.3.11 SECTION 11 – Toxicological information

A4.3.11.1 This section is used primarily by medical professionals, occupational health and safety professionals and toxicologists. A concise but complete and comprehensible description of the various toxicological (health) effects, and the available data used to identify those effects, should be provided. Under GHS classification, the relevant hazards, for which data should be provided, are:

(a) Acute toxicity;
(b) Skin corrosion/irritation;
(c) Serious eye damage/irritation;
(d) Respiratory or skin sensitization;
(e) Germ cell mutagenicity;
(f) Carcinogenicity;
(g) Reproductive toxicity;
(h) STOST-single exposure;
(i) STOST-repeated exposure; and
(j) Aspiration hazard.

If data for any of these hazards are not available, they should still be listed on the SDS with a statement that data are not available.

A4.3.11.2 The data included in this section should apply to the substance or mixture as used. The toxicological data should describe the mixture. If that information is not available, the classification under GHS and the toxicological properties of the hazardous ingredients should be provided.

A4.3.11.3 The health effects included in the SDS should be consistent with those described in the studies used for the classification of the substance or mixture.

A4.3.11.4 General statements such as “Toxic” with no supporting data or “Safe if properly used” are not acceptable as they may be misleading and do not provide a description of health effects. Phrases such as “not applicable”, “not relevant”, or leaving blank spaces in the health effects section can lead to confusion and misunderstanding and should not be used. For health effects where information is not available, this should be clearly stated. Health effects should be described accurately and relevant distinctions made. For example, allergic contact dermatitis and irritant contact dermatitis should be distinguished from each other.

A4.3.11.5 Where there is a substantial amount of test data on the substance or mixture, it may be desirable to summarize results. e.g. by route of exposure (See A4.3.11.1).

A4.3.11.6 Also provide information on the relevant negative data (See A4.2.2.3). Information to support negative test results should be provided (e.g. "carcinogenicity studies in the rat have shown no significant increase in the incidence of cancer").

A4.3.11.7 ***Information on the likely routes of exposure***

Provide information on the likely routes of exposure and the effects of the substance or mixture via each possible route of exposure, that is, through ingestion (swallowing), inhalation or skin/eye exposure. A statement should be made if health effects are not known.

A4.3.11.8 ***Symptoms related to the physical, chemical and toxicological characteristics***

Describe the potential adverse health effects and symptoms associated with exposure to the substance or mixture and its ingredients or known by-products. Provide information on the symptoms related to the physical, chemical, and toxicological characteristics of the substance or mixture following exposure related to the intended uses. Describe the first symptoms at the lowest exposures through to the consequences of severe exposure; for example, "headaches and dizziness may occur, proceeding to fainting or unconsciousness; large doses may result in coma and death".

A4.3.11.9 ***Delayed and immediate effects and also chronic effects from short and long term exposure***

Provide information on whether delayed or immediate effects can be expected after short or long term exposure. Also provide information on acute and chronic health effects relating to human exposure to the substance or mixture. Where human data are not available, animal data should be summarised and the species clearly identified. It should be indicated in the SDS whether toxicological data is based on human or animal data.

A4.3.11.10 ***Numerical measures of toxicity (such as acute toxicity estimates)***

Provide information on the dose, concentration or conditions of exposure that may cause adverse health effects. Where appropriate, doses should be linked to symptoms and effects, including the period of exposure likely to cause harm.

A4.3.11.11 ***Interactive effects***

Information on interactions should be included if relevant and readily available.

A4.3.11.12 ***Where specific chemical data are not available***

It may not always be possible to obtain information on the hazards of a substance or mixture. In cases where data on the specific substance or mixture are not available, data on the chemical class, if appropriate, may be used. Where generic data are used or where data are not available, this should be stated clearly in the SDS.

A4.3.11.13 ***Mixtures***

If a mixture has not been tested for its health effects as a whole then information on each ingredient listed under A4.3.3.2.1 should be provided and the mixture should be classified using the processes that are described in the GHS (Section 1.3.2.3 and subsequent chapters).

A4.3.11.14 ***Mixture versus ingredient information***

A4.3.11.14.1 Ingredients may interact with each other in the body resulting in different rates of absorption, metabolism and excretion. As a result, the toxic actions may be altered and the overall toxicity of the mixture may be different from its ingredients.

A4.3.11.14.2 It is necessary to consider whether the concentration of each ingredient is sufficient to contribute to the overall health effects of the mixture. The information on toxic effects should be presented for each ingredient, except:

(a) if the information is duplicated, it is not necessary to list this more than once. For example, if two ingredients both cause vomiting and diarrhoea, it is not necessary to list this twice. Overall, the mixture is described as causing vomiting and diarrhoea;

(b) if it is unlikely that these effects will occur at the concentrations present. For example, when a mild irritant is diluted in a non-irritating solution, there comes a point where the overall mixture would be unlikely to cause irritation;

(c) Predicting the interactions between ingredients is extremely difficult, and where information on interactions is not available, assumptions should not be made and instead the health effects of each ingredient should be listed separately.

A4.3.11.15 ***Other information***

Other relevant information on adverse health effects should be included even when not required by the GHS classification criteria.

A4.3.12 SECTION 12 – Ecological information

A4.3.12.1 Provide information to evaluate the environmental impact of the substance or mixture if it were released to the environment. This information can assist in handling spills, and evaluating waste treatment practices and should clearly indicate species, media, units, test duration and test conditions. Where information is not available this should be stated. Provide also a short summary of the data given under A4.3.12.3 to A4.3.12.7.

A4.3.12.2 Some ecotoxicological properties are substance specific, i.e. bioaccumulation, persistence and degradability. The information should therefore be given, where available and appropriate, for each substance of the mixture.

A4.3.12.3 ***Toxicity***

Information on toxicity can be provided using data from tests performed on aquatic and/or terrestrial organisms. This should include relevant available data on both acute and chronic aquatic toxicity for fish, crustaceans, algae and other aquatic plants. In addition, toxicity data on other organisms

(including soil micro-and macro-organisms) such as birds, bees and plants, should be included when available. Where the substance or preparation has inhibitory effects on the activity of micro-organisms, the possible impact on sewage treatment plants should be mentioned.

A4.3.12.4 ***Persistence and degradability***

Persistence and degradability is the potential for the substance or the appropriate constituents of a mixture to degrade in the environment, either through biodegradation or other processes, such as oxidation or hydrolysis. Test results relevant to assess persistence and degradability should be given where available. If degradation half-lives are quoted it must be indicated whether these half-lives refer to mineralization or to primary degradation. The potential of the substance or certain constituents (see also A4.3.12.6) of a mixture to degrade in sewage treatment plants should also be mentioned.

A4.3.12.5 ***Bioaccumulative potential***

Bioaccumulation is the potential for the substance or certain constituents of a mixture to accumulate in biota and, possibly, pass through the food chain. Test results relevant to assess the bioaccumulative potential should be given. This should include reference to the octanol-water partition coefficient (K_{ow}) and bioconcentration factor (BCF), if available.

A4.3.12.6 ***Mobility in soil***

Mobility in soil is the potential of a substance or the constituents of a mixture, if released to the environment, to move under natural forces to the groundwater or to a distance from the site of release. The potential for mobility in soil should be given where available. Information on mobility can be determined from relevant mobility data such as adsorption studies or leaching studies. For example, K_{oc} values can be predicted from octanol/water partition coefficients (K_{ow}). Leaching and mobility can be predicted from models.

NOTE: *Where real data on the substance or mixture is available this data will take precedence over models and predictions.*

A4.3.12.7 ***Other adverse effects***

Information on any other adverse effects to the environment should be included where available, such as environmental fate (exposure), ozone depletion potential, photochemical ozone creation potential, endocrine disrupting potential and/or global warming potential.

A4.3.13 SECTION 13 – Disposal considerations

A4.3.13.1 ***Disposal methods***

A4.3.13.1.1 Provide information for proper disposal, recycling or reclamation of the substance or mixture and/or its container to assist in the determination of safe and environmentally preferred waste management options, consistent with the requirements of the national competent authority. For the safety of persons conducting disposal, recycling or reclamation activities, please refer to the information in Section 8 – *Exposure controls/Personal protection* of the SDS.

A4.3.13.1.2 Specify disposal containers and methods.

A4.3.13.1.3 Discuss physical/chemical properties that may affect disposal options.

A4.3.13.1.4 Discourage sewage disposal.

A4.3.13.1.5 Where appropriate, identify any special precautions for incineration or landfill.

A4.3.14 SECTION 14 – Transport information

This section provides basic classification information for the transporting/shipment of a hazardous substance or mixture by road, rail, sea or air. Where information is not available or relevant this should be stated.

A4.3.14.1 *UN Number*

Provide the UN Number (i.e. four-figure identification number of the substance or article) from the *UN Model Regulations* [4].

A4.3.14.2 *UN Proper Shipping Name*

Provide the UN Proper Shipping Name from the *UN Model Regulations*[4]. For substances or mixtures the UN Proper Shipping Name should be provided in this subsection if it has not appeared as the GHS product identifier or national or regional identifiers.

A4.3.14.3 *Transport hazard class(es)*

Provide the transport class (and subsidiary risks) assigned to the substances or mixtures according to the most predominant hazard that they present in accordance with the *UN Model Regulations*[4].

A4.3.14.4 *Packing Group, if applicable*

Provide the Packing Group number from the *UN Model Regulations* [4], if applicable. The Packing Group number is assigned to certain substances in accordance with their degree of hazard.

A4.3.14.5 *Environmental hazards*

Indicate whether the substance or mixture is a known marine pollutant according to the IMDG Code[5], and if so, whether it is a "marine pollutant" or a "severe marine pollutant". Also indicate whether the substance or mixture is environmentally hazardous according to the *UN Model Regulations* [4], ADR[6], RID[7] and ADN[8].

A4.3.14.6 *Special precautions for user*

Provide information on any special precautions, which a user needs to be aware of, or needs to comply with in connection with transport.

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[4] ***UN Model Regulations*** *means the Model Regulations annexed to the most recently revised edition of the Recommendations on the Transport of Dangerous Goods published by the United Nations*

[5] ***IMDG Code*** *means the International Maritime Dangerous Goods code, as amended.*

[6] ***ADR*** *means the European Agreement concerning the International Carriage of Dangerous Goods by Road, as amended.*

[7] ***RID*** *means the Regulations concerning the International Carriage of Dangerous Goods by Rail, as amended.*

[8] ***ADN*** *means the European Agreement concerning the International Transport of Dangerous Goods by Inland Waterways, as amended.*

A4.3.15 SECTION 15 – Regulatory information

Describe any other regulatory information on the substance or mixture that is not provided elsewhere in the SDS (e.g. whether the substance or mixture is subject to the Montreal Protocol[9], the Stockholm Convention[10] or the Rotterdam Convention[11]).

A4.3.15.1 ***Safety, health and environmental regulations specific for the product in question***

Provide relevant national and/or regional information on the regulatory status of the substance or mixture (including its ingredients) under relevant safety, health and environmental regulations. This should include whether the substance is subject to any prohibitions or restrictions in the country or region into which it is being supplied.

A4.3.16 SECTION 16 – Other information

Provide information relevant to the preparation of the SDS in this section. This should incorporate other information which does not belong to sections 1 to 15 of the SDS, including information on preparation and revision of the SDS such as:

(a) the date of preparation of the latest revision of the SDS. When revisions are made to an SDS, unless it has been indicated elsewhere, clearly indicate where the changes have been made to the previous version of the SDS. Suppliers should maintain an explanation of the changes and be willing to provide it upon request;

(b) a key/legend to abbreviations and acronyms used in the SDS; and

(c) key literature references and sources for data used to compile the SDS.

NOTE: *While references are not necessary in SDS's, references may be included in this section if desired.".*

Current Annexes 4, 5 and 6

Current Annexes 4, 5 and 6 become new Annexes 5, 6 and 7 respectively. Renumber all the paragraphs of this annex and references thereto accordingly.

Add the following example at the end of renumbered annex 7.

"Example 7: Additional guidance when transport and other GHS information appear on a single packaging

- *Where transport and other GHS information appear on a single packaging (e.g. a 200 l drum), consideration must be given to ensuring the label elements are placed in a manner that addresses the needs of the different sectors.*

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[9] ***Montreal Protocol*** *means the Montreal Protocol on Substances that Deplete the Ozone Layer, as either adjusted and/or amended.*

[10] ***Stockholm Convention*** *means the Stockholm Convention on persistent organic pollutants.*

[11] ***Rotterdam Convention*** *means the Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade.*

- *Transport pictograms must convey information immediately in an emergency situation. They must be able to be seen from a distance, as well as in conditions that are smoky or otherwise partially obscure the package.*
- *The transport-related pictograms are distinct in appearance from pictograms intended solely for non-transport purposes which helps to distinguish them.*
- *The transport pictograms may be placed on a separate panel of a GHS label to distinguish them from the other information or may be placed adjacent to the other GHS information on the packaging.*
- *The pictograms may be distinguished by adjusting their size. Generally speaking, the size of the non-transport pictograms should be proportional to the size of the text of the other label elements. This would generally be smaller than the transport-related pictograms, but such size adjustments should not affect the clarity or comprehensibility of the non-transport pictograms.*

Following is an example of how such a label may appear:

Single packaging using 3 adjacent panels to convey multiple hazards.

Product classified as (1) Category 2 flammable liquid, (2) Category 4 acute toxicity by inhalation, and (3) Category 2 specific target organ/systemic toxicity, repeated exposure.

CODE

PRODUCT NAME

Danger
Keep out of the reach of children.
Read label before use.

COMPANY NAME

Street Address
City, State, Postal Code, Country
Phone Number
Emergency Phone Number

DIRECTIONS FOR USE:
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX

Highly flammable liquid and vapour.
Harmful if inhaled.
May cause liver and kidney damage through prolonged or repeated exposure.

Keep container tightly closed.
Keep away from heat/sparks/open flame-No smoking.
Use only outdoors or in a well-ventilated area.
Do not breath fume/gas/mist/vapours/spray.
Wear protective gloves and eye/face protection [as specified….]
Ground/bond container and receiving equipment.

IN CASE OF FIRE use [as specified] for extinction

FIRST AID
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Call a Poison Center or doctor/physician if you feel unwell.

Store in a cool, well-ventilated place.

UN Number
Proper shipping name

[Universal Product Code (UPC)]

Fill weight: XXXX Lot Number: XX
Gross weight: XXXX Fill Date: XXXX
Expiration Date: XXXXXX

Current Annexes 7, 8 and 9

Current Annexes 7, 8 and 9 become new Annexes 8, 9 and 10 respectively. Renumber all the paragraphs of these annexes and references thereto accordingly.

ANNEX 8 (former Annex 7)

A8.4.9 In the title, delete "-developmental toxicity". In the first paragraph and in the table under "Observations and remarks", replace "developmental" with "reproductive" (4 times).

ANNEX 9 (former Annex 8)

A9.2.1 Amend the fourth sentence, to read as follows:
"To address the needs for all different sectors (transport, supply and use) it was necessary to create two different sub-classes, one Acute sub-class, consisting of three categories and one chronic sub-class, consisting of 4 categories.".

In the fifth sentence, replace "classification category" with "sub-class", "hazard classes" with "hazard categories" and, in the text between brackets, "acute II and III" with "Acute 2 and 3".

In the last but one sentence, replace "classification classes" with "hazard categories" (twice).

In the last sentence, replace "hazard classes" with "hazard categories".

A9.2.2 Replace "classes" with "categories".

A9.2.3.1 In the third sentence, replace "Chronic I" with "Chronic Category I" (twice), "Chronic II" with "Chronic Category 2" and in the last sentence replace, "hazard classed" with "hazard sub-classes".

A9.2.3.2 In the first sentence replace "hazard bands" with "hazard classes" and in the last but one sentence replace "hazard band" with "hazard category".

A9.2.3.5 In the second sentence, replace "Class IV" with "Category 4".

A9.2.3.6 In the fifth sentence, replace "hazard band" with "hazard category".

A9.2.4.3 In the first sentence replace "class" with "sub-class"; In the third sentence replace "chronic hazard class" with "chronic hazard category" and "acute class" with "acute hazard category" and in the last sentence replace "hazard bands" with "hazard categories".

A9.2.4.4 Replace "chronic class IV" with "Chronic Category 4" (twice).

A9.2.5 In the last sentence, replace "hazard band" with "hazard category".

A9.3.2.5.1 In the last but one sentence, replace "would influence a more hazardous classification band" with "would influence classification in a more hazardous category".

A9.3.3.1.2 In the second sentence, replace “chronic and/or acute band I” with “ Chronic and/or Acute Category 1”; in the third sentence, replace “this band” with “this category” and in the last sentence, replace “Class II” and “Class III” with “Category 2” and “Category 3” respectively.

A9.3.3.2.2 In the last sentence, replace “chronic class IV” with “Chronic Category 4”.

A9.3.5.4 In the second sentence, replace “Class” with “Category” and “Chronic I” with “Chronic Category 1”.

A9.3.5.7.2 In the second sentence of the first indent, replace “Chronic I and/or Acute I classes” with “Chronic Category 1 and/or Acute Category 1”.
In the second sentence of the second indent, replace “Chronic IV class” with “Chronic Category 4”.

A9.4.2.4.8 In the first line of the footnote related to this paragraph, replace “chronic class IV” with “Chronic Category 4”.

A9.7.1.4 In the second sentence, replace “hazard band” with “hazard category”.

A9.7.5.1.1 In the last paragraph, replace “band” with “category”.

A9.7.5.2.3 Replace “Chronic IV” with “Chronic Category 4”.

A9.7.5.2.4.1 In (i), replace “Class I” with “Category 1” (twice);
In (ii), replace “Class II” with “Category 2” (twice); and
In (iii) replace “Class III” with “Category 3” (twice);

A9.7.5.2.4.2 Replace “Chronic” with “Chronic Category” (twice).

A9.7.5.3.2.2 In (ii), replace “Class” with “Category” and Chronic I” with “Chronic Category 1”;
In (ii), replace “Class” with “Category” and Chronic II” with “Chronic Category 2”;
In (iii), replace “Class” with “Category” (twice).

A9.7.5.3.3 and
A9.7.5.3.3.1 Replace “Chronic IV” with “Chronic Category 4”.

A9.7.5.3.3.2 In (i), (ii) and (iii), replace “Class” with “Category” (6 times).

A9.7.5.3.3.3 Replace “Chronic” with “Chronic Category” (twice).
