



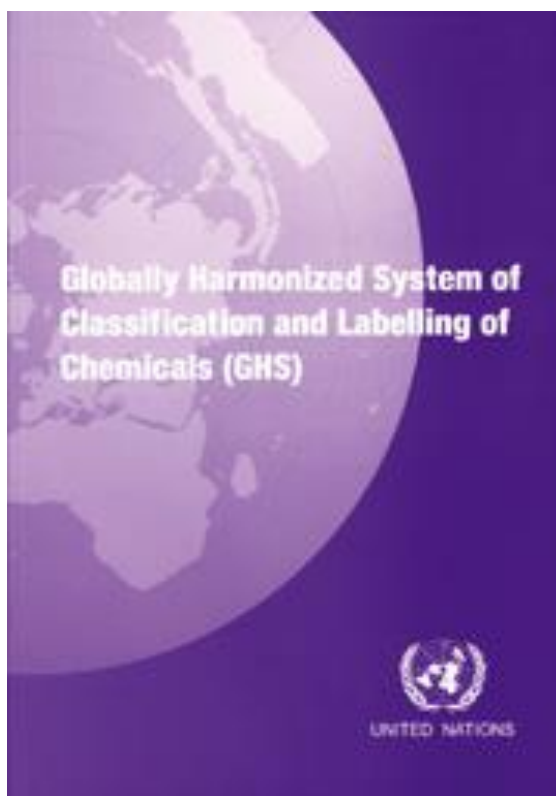
PEST CONTROL

PRODUCTS BOARD

LABELING GUIDELINES IN ACCORDANCE  
WITH THE GHS AND THE KENYAN LABELING  
REGULATIONS, 2024

*Version 1.0*

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## Definitions

**Active ingredient** means the part of the product that provides the pesticidal action.

**Building block approach** is a concept where hazard classes and categories described in the GHS are used by competent authorities to decide which hazard classes apply in their jurisdiction, while implementing the GHS in classification and labelling of pest control products keeping in mind the goal of full harmonization as well as international conventions.

**Co-formulant** means a non-active ingredient component of a formulated product.

**Colour band** means a band printed at the bottom part of the label of a colour indicating the acute hazard of the pesticide product.

**Container** means any object used to hold a pesticide product.

**Formulation** means the combination of various ingredients designed to render the product useful and effective for the purpose claimed and for the envisaged mode of application.

**Hazard** means the inherent property of a substance, agent or situation having the potential to cause undesirable consequences (e.g. properties that can cause adverse effects or damage to health, the environment or property).

**Hazard statement** means a statement assigned to a hazard class and category that describes the nature of the hazards of a pesticide, including, where appropriate, the degree of hazard.

**Importer:** A business (or a private person) importing a pest control product(s) into Kenya.

**Label and labelling** means the written, printed or graphic matter on, or attached to, the pesticide or the immediate container thereof and to the outside container or wrapper of the retail package of the pesticide.

**Leaflet** means a part of the product label that is supplied in the form of a detachable or separate leaflet(s), booklet(s) or similar, rather than attached permanently to the container.

**Manufacturer** means a corporation or other entity in the public or private sector (including an individual) engaged in the business or function (whether directly or through an agent or entity controlled by or under contract with it) of manufacturing a pesticide active ingredient or preparing its formulation or product.

**Mode of Action (MOA):** the biochemical process by which a pesticide disrupts normal pest biology usually resulting in the death of the pest. Normally this is a target binding site or a key biological process

**Packaging** means the container together with the protective wrapping used to carry pesticide products via wholesale or retail distribution to users.

**Pest Control Product (Pesticide)** means any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest, or regulating plant growth.

**Pesticide industry** means all organizations and individuals engaged in the manufacture, formulation or marketing pesticides and related products.

**Pesticide legislation** means any laws or regulations introduced to regulate the manufacture, marketing, distribution, labelling, packaging, use and disposal of pesticides in their qualitative, quantitative, health and environmental aspects.

**Pictogram** means a graphical composition that may include a symbol plus other graphic elements, such as a border, background pattern or colour that is intended to convey specific information.

**Precautionary statement** means a phrase (and or/pictogram) that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a pesticide, or improper storage or handling of a pesticide.

**Product (or pesticide product)** means the formulated product (pesticide active ingredient(s) and co-formulants), in the form in which it is packaged and sold.

**Risk** is the probability and severity of an adverse health or environmental effect occurring as a function of a hazard and the likelihood and the extent of exposure to a pesticide.

**Signal word** means a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label.

**Symbol** means graphical element intended to succinctly convey information.

**Toxicity** means a physiological or biological property which determines the capacity of a chemical to do harm or produce injury to a living organism by other than mechanical means.

## **Chapter 1: INTRODUCTION**

In Sub-Saharan Africa, pests and diseases pose a major challenge to the achievement of sustainable agricultural productivity, construction and public well-being. Therefore, effective pest and disease management is critical to the sustained enhanced productivity, protection of human health and environmental sustainability. The use of chemicals to enhance and improve life is widespread worldwide. Pest Control Products (PCPs) play a vital role in pest and disease management in crops, animals and public health. Through prudent use, PCPs can enhance agricultural and livestock productivity. However, PCPs are potentially hazardous to humans, animals, and the environment.

### **1.1. Legal Provisions**

In Kenya, labelling is a legal requirement and provided for in the Pest Control Products (Labelling, Advertising and Packaging) Regulations Legal Notice 194 of 2024. These require that all packages of pesticides display a standard label on the packaging material. Such labels are essentially the summaries of the technical dossiers and must be approved by PCPB.

The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) is a method developed by the United Nations for communicating chemical hazards. Under this system, all chemical containers must display a specific label. The labelling facilitates the safe shipping and use of hazardous substances.

The GHS includes the following elements:

- harmonized criteria for classifying substances and mixtures according to their health, environmental and physical hazards; and
- harmonized hazard communication elements, including requirements for labelling and safety data sheets.

### **1.2. Purpose**

GHS Harmonizes classification and labeling of chemicals for workplace safety, consumer protection, and environmental regulation. It Covers physical, health, and environmental hazards of chemicals. It is based on test data on the chemicals or mixtures, which gives an indication about the nature of the hazards (for instance explosive, toxic, flammable, carcinogens etc.). GHS includes also a system of communication of the hazards by labelling and by safety data sheets, which summarize the hazards and how to handle them.

The labeling and classification will:

- a) enhance the protection of human health and the environment by providing an internationally comprehensible system for hazard communication.
- b) reduce the need for testing and evaluation of chemicals; and
- c) facilitate international trade in chemicals whose hazards have been properly assessed and identified on an international basis.

The goal of the GHS is to identify the intrinsic hazards found in substances and mixtures, this is done by testing the substances and mixtures, e.g. for explosive properties, flammability, corrosivity, acute toxicity, carcinogenicity, environmental toxicity, etc. Relevant data regarding the hazards is used to classify the substance or mixture (e.g. acute dermal toxicity) and to categorise the severity of the hazard (e.g. Category 1) to convey information about these hazards, The Hazard statements, symbols and signal words have been standardized and harmonized and now form an integrated hazard communication system.

GHS Classification is based on hazards, not risk. The hazard class designates the nature of the physical, health or environmental hazard, e.g., flammable solid, carcinogen, oral acute toxicity. Hazard classes are segmented into categories depending on severity, e.g. five categories for oral acute toxicity and four categories for flammable liquids.

The Hazard classification is done in 3 steps:

- a) Identification of the relevant hazard data. The applicant must provide the scientific data to allow for identification generated in line with recognized internal best practices.
- b) Subsequent review of the data to ascertain the hazards associated with the substance or mixture; and
- c) A decision on whether the substance or mixture will be classified as hazardous and the degree of hazard, where appropriate, by comparison of the end points with GHS classification criteria, which are listed below

GHS has 3 main hazards groups

- a) Physical hazards: e.g. fire, explosion
- b) Health hazards: e.g. inhalation, dermal, oral
- c) Environmental hazards: e.g. water, soil, air

Each group is divided into more specific classes, and each class into more specific categories. GHS has 28 hazard classes distributed as follows:

- a) 16 hazard classes under “Physical Hazards”
- b) 10 hazard classes under “Health Hazards”
- c) 2 hazard classes under “Environmental Hazards.”

(Details can be found in the latest version of GHS Purple Book).

### 1.2.1 Classification of the mixtures

The mixtures will be classified appropriately based on the data provided. The chronic health hazard is generally provided for the active ingredient and the data provided can be used for classification. The criteria for classification of mixtures and bridging principles in the latest version of GHS Purple Book shall be used, if a need arises. The approach for classification of aquatic environmental hazards is tiered and is dependent upon the type of information available for the mixture itself and for its ingredients. Elements of the tiered approach include classification based on tested mixtures, classification based on bridging principles, the use of an “additivity formula”.

This labeling manual describes the classification criteria and the hazard communication elements by type of hazards based on Kenyan needs in the regulation of pest control products. The Manual provides guidance to the agrochemical industry and other stakeholders while classifying pest control products and preparing pesticide labels in Kenya in conformity with GHS. The manual is divided into 5 chapters.

- a) [Chapter 1](#) focusses on Introduction,
- b) [Chapter 2](#) on Physical Hazards,
- c) [Chapter 3](#) provides guidelines on Health Hazard,
- d) [Chapter 4](#) covers Environmental Hazards,
- e) [Chapter 5](#): Mode of action
- f) [Chapter 6](#): GHS Codification
- g) [Chapter 7](#): Precautionary Pesticide Pictograms.

The Manual includes six (6) Annexes:

- a) [Annex 1](#): Hazard Statement for Physical, Health & Environmental hazards
- b) [Annex 2](#): Decision Logics for Physical hazard
- c) [Annex 3](#): Decision logic for Health Hazards
- d) [Annex 4](#): Decision logic for Environmental Hazards
- e) [Annex 5](#): Safety Data Sheet
- f) [Annex 6](#): Sample Pesticide Label for Kenya

### **1.3 Labeling Manual Revision**

This GHS Labeling and Classification Manual for PCPs will be updated regularly to incorporate new information. Significant revisions will align with the biennial work cycle of the global GHS Sub-Committee of Experts.

## Chapter 2: PHYSICAL HAZARDS

### 2.0 Classification of Physical hazards

The classification criteria and label elements (hazard symbol, signal word and hazard statement) are those defined in the GHS. However, not all physical hazards described in the GHS are relevant to pesticides, because substances would not be authorized as a pesticide if they would pose such hazards (e.g. explosive substances or self-reactive substances).

Reference should be made to the GHS Purple Book for the criteria for classification as well as for label elements recommended for the various hazard categories. In case a pesticide product poses more than one physical hazard, all relevant symbols, signal words and hazard statements should be shown on the label.

**Table 1. Physical hazard as defined in the GHS and the likely relevance for pesticide labelling**

GHS Chapter	Hazard	Likely to be indicated on a pesticide label?	Remarks
2.1	Explosives	No	Such substances are normally not used as pesticides
2.2	Flammable gases	Yes	e.g. ethylene gas
2.3	Aerosols and chemicals under pressure	Yes	e.g. certain aerosol sprays
2.4	Oxidizing gases	No	Such substances are normally not used as pesticides
2.5	Gases under pressure	Yes	e.g. methyl bromide, carbon dioxide, aerosol sprays
2.6	Flammable liquids	Yes	
2.7	Flammable solids	Yes	Not common, but there are a few examples where this applies to pesticides
2.8	Self-reactive substances and mixtures	No	Such substances are normally not used as pesticides
2.9	Pyrophoric liquids	No	Such substances are normally not used as pesticides
2.10	Pyrophoric solids	No	Such substances are normally not used as pesticides
2.11	Self-heating substances and mixtures	Yes	Not common, but there are a few examples where this applies to pesticides
2.12	Substances and mixtures which, in contact with water, emit flammable gases	Yes	e.g. aluminium phosphide, magnesium phosphide Certain of these substances may also emit flammable gases after contact with moist air
2.13	Oxidizing liquids	Yes	e.g. sodium chlorate, sodium hypochlorite
2.14	Oxidizing solids	Yes	[Note: such products previously tended to be labelled as “corrosive”]
2.15	Organic peroxides	Yes	e.g. hydrogen peroxide, peracetic acid [Note: such products previously tended to be labelled as “corrosive”]
2.16	Corrosive to metals	Yes	
2.17	De-sensitized explosives	No	Such substances are normally not used in pesticides

Source: FAO/WHO Guidelines on Good Labelling Practices for Pesticides

In the subsequent section detail descriptions are made to the hazards that relates to pesticides.


## 2.1 Explosives

Not applicable for pesticides

## 2.2 Flammable gas

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



**Table 2. Classification criteria and labeling elements for flammable gases**

	Category 1	Category 2
Criteria	a) Gases, which at 20 °C and a standard pressure of 101.3 kPa: b) are ignitable when in a mixture of 13% or less by volume in air; or c) have a flammable range with air of at least 12 percentage points, regardless of the lower flammable limit	Gases, other than those of Category 1, which, at 20 °C and a standard pressure of 101.3 kPa, have a flammable range while mixed in air.
Symbol		No symbol
Signal word	Danger	Warning
Hazard Statement	Extremely flammable gas	Flammable gas

## 2.3 Aerosols and chemicals under pressure

*Aerosols*, (i.e. *aerosol dispensers*), are any non-refillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.

**Table 3. Classification criteria for aerosols**

	Category 1	Category 2	Category 3
Criteria	Contains $\geq 85\%$ flammable components and the chemical heat of combustion is $\geq 30$ kJ/g; or a) For spray aerosols, in the ignition distance test, ignition occurs at a distance $\geq 75$ cm (29.5 in), or b) For foam aerosols, in the aerosol foam flammability test (i) The flame height is $\geq 20$ cm (7.87 in) and the flame duration $\geq 2$ s; or (ii) The flame height is $\geq 4$ cm (1.57 in) and the flame duration $\geq 7$ s	Contains $> 1\%$ flammable components, or the heat of combustion is $\geq 20$ kJ/g; and a) For spray aerosols, in the ignition distance test, ignition occurs at a distance $\geq 15$ cm (5.9 in), or in the enclosed space ignition test, the (i) Time equivalent is $\leq 300$ s/m <sup>3</sup> ; or(ii): Deflagration density is $\leq 300$ g/m <sup>3</sup> b) For foam aerosols, in the aerosol foam flammability test, the flame height is $\geq 4$ cm and the flame duration is $\geq 2$ s and it does not meet the criteria for Category 1	Substances or mixtures that does not fall to category 1 and 2
Symbol			No symbol
Signal word	Danger	Warning	Warning
Hazard statement	Extremely flammable aerosol Pressurized container: May burst if heated	Flammable aerosol Pressurized container: May burst if heated	Pressurized container May burst if heated

Aerosols are classified in one of the three categories of this hazard class, depending on their flammable properties and their heat of combustion. They should be considered for classification in Category 1 or 2 if they contain more than 1% components (by mass) which are classified as flammable according to the GHS criteria, i.e.: flammable gases, liquids or solids; or if their heat of combustion is at least 20 kJ/g.

## 2.4 Oxidizing gases





Not applicable for pesticides

## 2.5 Gases under pressure

*Gases under pressure* are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20 °C, or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases.

Gases under pressure are classified, according to their physical state when packaged, in one of four groups in table 4. The critical temperature is the temperature above which a pure gas cannot be liquefied, regardless of the degree of compression.

**Table 4: Classification criteria for gases under pressure**




	Compressed gas	Liquefied gas	Refrigerated liquefied gas	Dissolved gas
Criteria	A gas which when packaged under pressure is entirely gaseous at -50 °C; including all gases with a critical temperature -50 °C	A gas which when packaged under pressure is partially liquid at temperatures above -50 °C. A distinction is made between: (a) High pressure liquefied gas: a gas with a critical temperature between -50°C and +65°C; and (b) Low pressure liquefied gas: a gas with a critical temperature above +65°C.	A gas which when packaged is made partially liquid because of its low temperature.	A gas which when packaged under pressure is dissolved in a liquid phase solvent
Symbol				
Signal word	Warning	Warning	Warning	Warning
Hazard statement	Contains gas under pressure; may explode if heated	Contains gas under pressure; may explode if heated	Contains refrigerated gas; May cause cryogenic burns or injury	Contains gas under pressure; may explode if heated

*NOTE: Aerosols should not be classified as gases under pressure.*

## 2.6 Flammable liquids

A *flammable liquid* means a liquid having a flash point of not more than 93 °C. A flammable liquid is classified in one of the four categories for this class according to the following Table 5:

**Table 5: Classification criteria for flammable liquids**

	Category 1	Category 2	Category 3	Category 4
Criteria	Flash point < 23 °C and initial boiling point 35°C	Flash point < 23°C and initial boiling point > 35°C	73°F(23°C) ≤ Flash point ≤ 140°F (60.5°C)	140°F(60.5°C) < Flash point ≤ 199.4°F (93°C)
Symbol				No symbol
Signal word	Danger	Danger	Warning	Warning
Hazard Statement	Extremely flammable liquid and vapour	Highly flammable liquid and vapour	Flammable liquid and vapour	Combustible liquid

*NOTE 1: Liquids with a flash point of more than 35 °C and not more than 60 °C may be regarded as non-flammable liquids for some regulatory purposes (e.g. transport) if negative results have been obtained in the sustained combustibility test L.2 of Part III, section 32 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria.*



*NOTE 2: Aerosols should not be classified as flammable liquids*

## 2.7 Flammable solids

A *flammable solid* is a solid which is readily combustible or may cause or contribute to fire through friction.

*Readily combustible solids* are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly.

**Table 6: Classification for Flammable Solids**

	Category 1	Category 2
Criteria	Burning rate test: Substances or mixtures other than metal powders: (a) wetted zone does not stop fire; and (b) burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time > 5 min	Burning rate test: Substances or mixtures other than metal powders: (a) wetted zone stops the fire for at least 4 min; and (b) burning time < 45 s or burning rate > 2.2 mm/s Metal powders: burning time > 5 min and 10 min
Symbol		
Signal word	Danger	Warning
Hazard statement	Flammable solid	Flammable solid

*NOTE 1: For classification tests on solid substances or mixtures, the tests should be performed on the substance or mixture as presented. If for example, for the purposes of supply or transport, the same chemical is to be presented in a physical form different from that which was tested and which is considered likely to materially alter its performance in a classification test, the substance must also be tested in the new form.*

*NOTE 2: Aerosols should not be classified as flammable solids*

## 2.8 Self-reactive substances and mixtures

Not applicable for pesticides

## 2.9 Pyrophoric liquids

Not applicable for pesticides

## 2.10 Pyrophoric solids



Not applicable for pesticides

## 2.11 Self – heating substances and mixtures

A self-heating substances or mixture is a solid or liquid or mixture, other than a pyrophoric liquid or solid which by reaction with air and without energy supply is liable to self-heat. This substance differs from a pyrophoric liquid or solid in that it will ignite only when in large amounts and after long periods of time (hours or days).

Self-heating of a substance or mixtures is a process where the gradual reaction of that substance or mixture with oxygen (in air) generates heat.




**Table 7: Classification for Self-heating substances and mixtures**

	Category 1	Category 2
Criteria	A positive result is obtained in a test using a 25 mm sample cube at 140 °C	1) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm cube sample at 140°C and the substance or mixture is to be packed in packages with volume of more than 3 m <sup>3</sup> or 2) A positive result is obtained in a test using a 100 mm sample cube at 140 and a negative result is obtained in a test using a 25 mm cube sample at 140°C, a positive result is obtained in a test using a 100 mm cube sample at 120°C and the substance or mixtures is to be packed in packages with a volume of more than 450 liters or 3) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a positive result is obtained in a test using a 100 mm cube sample at 100 °C
Symbol		
Signal word	Danger	Danger
Hazard statement	Self-heating; may catch fire	Self-heating in large quantities: may catch fire

### 2.12 Substances and Mixtures which, in Contact with Water, Emit Flammable Gases

*Substances or mixtures which, in contact with water, emit flammable gases* are solid or liquid substances or mixtures which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

**Table 8: Classification Criteria for substances and mixtures which, in contact with water emit flammable gases**

	Category 1	Category 2	Category 3
Criteria	Any substance or mixture which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 litres per kilogram of substance over any one minute	Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 litres per kilogram of substance per hour, and which does not meet the criteria for Category 1	Any substance or mixture which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is greater than 1 litre per kilogram of substance per hour, and which does not meet the criteria for Categories 1 and 2
Symbol			
Signal word	Danger	Danger	Warning



Hazard statement	In contact with water releases flammable gases which may ignite spontaneously	In contact with water releases flammable gases	In contact with water releases flammable gases
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### 2.13 Oxidizing liquids

An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause or contribute to, the combustion of other material/

An oxidizing liquid is classified in one of the three categories

**Table 9: Classification Criteria for Oxidizing liquids**




	Category 1	Category 2	Category 3
Criteria	Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, spontaneously ignites, or mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is less than that of a 1:1 mixture, by mass, of 50% perchloric acid and cellulose	Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to mean pressure rise time of a 1:1 mixture, by mass, of 40% aqueous sodium chlorate and cellulose: and the criteria for Category 1 are not met.	Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65% aqueous nitric acid and cellulose: and the criteria for categories 1 and 2 are not met.
Symbol			
Signal word	Danger	Danger	Warning
Hazard statement	May cause fire or explosion, strong oxidizer	May intensify fire; oxidizer	May intensify fire, oxidizer

### 2.14 Oxidizing solids

An oxidizing solid is a solid which while in itself is not necessarily combustible, may generally by yielding oxygen cause, or contribute to the combustion of other material.

**Table 10: Classification Criteria for Oxidizing solids**

	Category 1	Category 2	Category 3
Criteria	Any substance or mixture which in the 4:1 or 1:1 sample to cellulose ratio (by mass) tested exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass), of potassium bromate and cellulose  Any substance or mixture which in the 4:1 or 1:1 sample to cellulose ratio (by mass) tested exhibits a mean burning greater than the mean burning rate of a 3:1 mixture (by	Any substance or mixture which in the 4:1 or 1:1 sample to cellulose ratio (by mass) tested exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass), of potassium bromate and cellulose and criteria for Category 1 are not met	Any substance or mixture which in the 4:1 or 1:1 sample to cellulose ratio (by mass) tested exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass), of potassium bromate and cellulose and criteria for Category 1 and 2 are not met

	Category 1	Category 2	Category 3
	mass), of calcium peroxide and cellulose	Any substance or mixture which in the 4:1 or 1:1 sample to cellulose ratio (by mass) tested exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass), of calcium peroxide and cellulose and criteria for Category 1 are not met	Any substance or mixture which in the 4:1 or 1:1 sample to cellulose ratio (by mass) tested exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass), of calcium peroxide and cellulose and criteria for Category 1 and 2 are not met
Symbol			
Signal word	Danger	Danger	Warning
Hazard statement	May cause fire or explosion; strong oxidizer	May intensify fire; Oxidizer	May intensify fire; Oxidizer

*Note 1: Some oxidizing solids may also present explosion hazards under certain conditions (e.g when stored in large quantities). For example, some types of ammonium nitrate may give rise to an explosion hazard under extreme conditions and the 'Resistance to detonation test' may be used to assess this hazard. Appropriate comments should be made in the Safety Data Sheet.*







*Note 2: For classification tests on solid substances or mixtures, the tests should be performed on the substance or mixture as presented. If for example for the purpose of supply or transport, the same chemical is presented in the physical form different from that which was tested and which is considered likely to materially alter its performance in a classification test, the substances or mixture must also be tested in the new form.*

## 2.15 Organic peroxides

*Organic peroxides* are liquid or solids organic substances which contain bivalent -o-o- structure and may be considered derivatives of hydrogen peroxide. Where one or both hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic are thermally unstable substances or mixtures which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties:

- Be liable to explosive decomposition
- Burn rapidly
- Be sensitive to impact of friction
- React dangerously with other substances

**Table 11: Classification Criteria for Organic peroxides**


	Type A	Type B	Type C	Type D	Type E	Type F	Type G
Criteria	Can detonate, deflagrate rapidly as packaged	Neither detonates nor deflagrates rapidly but liable to undergo thermal explosion	Possesses explosive but neither detonates/deflagrates nor undergoes thermal explosion	Does not detonate at all, deflates slowly and show no violent effect when heated in confinement and <i>vice versa</i>	Possess explosive properties but Not detonated/deflagrates at all and show low or no effect when heated in confinement	Not detonated/deflagrates no effect when heated in confinement and low or no explosive power	Not detonated/deflagrates, no effect when heated in confinement and no explosive power provided it is thermally stable (Self-accelerating temp 60-75oC for 50kg package)
Symbol		 					-
Signal word	Danger	Danger	Danger	Warning	Warning	warning	-
Hazard statement	Heating may cause explosion	Heating may cause explosion	Heating may cause a fire or explosion	Heating may cause a fire	Heating may cause a fire	Heating may cause a fire	-

### 2.16 Corrosive to Metals

A substance or a mixture which is corrosive to metals is a substance or a mixture which by chemical action will materially damage, or even destroy, metals.

*NOTE: Where an initial test on either steel or aluminium indicates the substance or mixture being tested is corrosive the follow-up test on the other metal is not required.*

**Table 12: Classification Criteria for substances and mixtures corrosive to metals**

	Category 1
Criteria	Corrosion rate on either steel or aluminium exceeding 6.25 mm per year at a test temperature of 55 °C when tested on both materials
Symbol	
Signal word	Warning
Hazard statement	May be corrosive to metals

**2.17 De-sensitized explosives**

Not applicable for pesticides

### Chapter 3: GHS HEALTH HAZARDS

The GHS identifies ten (10) Health hazards. These range from acute to chronic toxicity. These are used as basis of classification and labeling of chemicals. These include:

1. Acute Toxicity
2. Skin Corrosion/Irritation
3. Serious Eye Damage/Eye Irritation
4. Respiratory or Skin Sensitization
5. Germ Cell Mutagenicity
6. Carcinogenicity
7. Reproductive Toxicology
8. Target Organ Systemic Toxicity – Single Exposure
9. Target Organ Systemic Toxicity – Repeated Exposure
10. Aspiration Toxicity

For labelling purposes, the pesticide formulation or end-user product will be classified based on the toxicological data for oral, dermal, inhalation, irritation and sensitization. The classification of the technical grades will be based on the toxicological data of the technical active ingredient.





#### 3.1 Acute Oral, Dermal and Inhalation Toxicity

Acute toxicity refers to those adverse effects occurring following oral or dermal administration of single dose of a substance or multiple given within 24hours or inhalation of 4 hours.





##### 3.1.1 Classification Criteria for Oral, Dermal and Inhalation Toxicity

The PCP can be allocated to one of five hazard categories based on acute toxicity by the oral, dermal or inhalation routes according to the cut-off as shown in Table 13, 14 & 15). These are expressed as lethal dose LD<sub>50</sub> (dermal & oral) and lethal concentration (LC<sub>50</sub>) (inhalation).





**Table 13: Classification Criteria for Acute Oral Toxicity**

	Category 1	Category 2	Category 3	Category 4	Category 5
Oral LD <sub>50</sub> (mg/kg body weight)	≤ 5	>5 ≤ 50	>50 ≤ 300	>300 ≤ 2000	>2000 ≤ 5000
Hazard symbol					No symbol
Signal word	Danger	Danger	Danger	Warning	Warning
Hazard Statement	Fatal if swallowed	Fatal if swallowed	Toxic if swallowed	Harmful if swallowed	May be harmful if swallowed

**Table 14: Classification Criteria for Acute Dermal Toxicity**

	Category 1	Category 2	Category 3	Category 4	Category 5
Dermal LD <sub>50</sub> (mg/kg body weight)	≤ 50	>50 ≤ 200	>200 ≤ 1000	>1000 ≤ 2000	>2000 ≤ 5000
Hazard symbol					No symbol
Signal word	Danger	Danger	Danger	Warning	Warning
Hazard Statement	Fatal in contact with skin	Fatal in contact with skin	Toxic in contact with skin	Harmful in contact with skin	May be harmful in contact with skin

**Table 15: Classification Criteria for Acute inhalation Toxicity**

	Category 1	Category 2	Category 3	Category 4	Category 5
Inhalation LC <sub>50</sub>	gas: ≤ 100ppm vapor ≤ 0.5mg/L dust, mist ≤ 0.05mg/L	gas: >100 ≤ 500ppm vapor >0.5 ≤ 2.0mg/l dust, mist >0.05 ≤ 0.5mg/l	gas: >500 ≤ 2500ppm vapor >2.0 ≤ 10.0mg/l dust, mist >0.5 ≤ 1.0mg/l	gas: >2500 ≤ 20,000ppm vapor >10.0 ≤ 20.0mg/l dust, mist >1.0 ≤ 5.0mg/l	LC <sub>50</sub> in the equivalent range of Oral LD <sub>50</sub> or Dermal LD <sub>50</sub> >2000 ≤ 5000
Hazard symbol					No symbol
Signal word	Danger	Danger	Danger	Warning	Warning
Hazard Statement	Fatal if inhaled	Fatal if inhaled	Toxic if inhaled	Harmful if inhaled	May be harmful if inhaled

For the purposes of inhalation classification, the terms Dust, Mist or Vapour are defined below as per GHS Purple Book. Dusts and mists have sizes <1-100µm.

**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

The values are based on 4 hours of testing in laboratory animals. If data are available indicating that the mechanism of toxicity was corrosivity to the respiratory track (destruction of mucosa after single or limited exposure analogous to skin corrosion) of the end use product, then it should be labeled “corrosive to respiratory tract”. The corrosivity evaluation should be based on expert judgement using such human and animal tests experience, existing data and pH values.

In case a pesticide product poses more than one GHS health hazard, the following precedence of relevant symbols, signal words and hazard statements to be shown on the label applies:

- If the skull-and-crossbones applies for one of the hazards, the exclamation mark for another hazard should **not** appear;
- If the corrosive symbol applies, the exclamation mark should **not** appear where it is used for skin or eye irritation;
- If the health hazard symbol appears for respiratory sensitization, the exclamation mark should not appear where it is used for skin sensitization or for skin or eye irritation.
- Where one hazard symbol applies to more than one hazard, the symbol will be used once on the label and the relevant hazard statement related to each hazard will be included. e.g. an Exclamation mark (⚠) due acute oral toxicity category 4, Skin irritation Category 2, will only appear once but the various hazard statement will be included i.e. Harmful if swallowed, Causes skin irritation

All assigned hazard statements should appear on the label. The only exception is:

- *Where a chemical is classified as skin Category 1, labelling for serious eye damage/eye irritation may be omitted as this information is already included in the hazard statement for skin Category 1 (Causes severe skin burns and eye damage)*





### 3.2 Skin Corrosion/Irritation

*Skin corrosion:* Production of irreversible damage to the skin namely, visible necrosis through the epidermis and into the dermis, following the application of a test substance for up to 4 hours (ulcers, bleeding, bloody scabs, discoloration due to blanching, complete areas of alopecia, scars).

*Skin irritation:* Production of reversible damage to the skin following the application of a test substance for up to 4 hours.

The classification criteria for skin corrosion/irritation are represented in Table 16 below:

**Table 16: Classification criteria for Skin corrosion/irritation**

	<b>Category 1:</b> Destruction of skin tissue, namely, visible necrosis through the epidermis and into the dermis, in at least one tested animal after exposure $\leq 4$ h			<b>Category 2 Irritation</b>	<b>Category 3 Mild irritation</b>
	<b>Subcategory 1 A</b>	<b>Subcategory 1 B</b>	<b>Subcategory 1 C</b>		
Criteria	Corrosive responses in at least one animal following exposure $\leq 3$ min during an observation period $< 1$ h	Corrosive responses in at least one animal following exposure $> 3$ min and $\leq 1$ h and observations $\leq 14$ days	Corrosive responses in at least one animal after exposures $> 1$ h and $\leq 4$ h and observations $\leq 14$ days	Mean score of $\geq 2.3$ and $\leq 4.0$ for erythema/eschar or for oedema in at least 2 of 3 tested animals from grading at 24, 48 and 72 hours after patch removal or, if reactions are delayed, from grades on 3 consecutive days after the onset of skin reactions; or (2) Inflammation that persists to the end of the observation period normally 14 days in at least 2 animals, particularly taking into account alopecia (limited area), hyperkeratosis, hyperplasia, and scaling; or (3) In some cases where there is pronounced variability of response among animals, with very definite positive effects related to chemical exposure in a single animal but less than the criteria above.	Mean score of $\geq 1.5$ and $< 2.3$ for erythema/eschar or for oedema from grading in at least 2 of 3 tested animals from grades at 24, 48 and 72 hours or, if reactions are delayed, from grades on 3 consecutive days after the onset of skin reactions (when not included in the irritant category above).
Symbol					(No symbol)
Signal word	Danger	Danger	Danger	Warning	Warning
Hazard statement	Causes severe skin burns and eye damage	Causes severe skin burns and eye damage	Causes severe skin burns and eye damage	Causes skin irritation	Causes mild skin irritation

### 3.3 Serious Eye Damage /Eye Irritation

*Serious eye damage* is the production of tissue damage in the eye or serious physical decay of vision, following application of a test substance to the anterior surface of the eye, which is not fully reversible for 21 days of application.

*Eye irritation* is the production of changes in the eye following the application of test substance to the anterior surface of the eye, which are fully reversible within 21 days of application.



#### 3.3.1 Classification criteria for substances

Substances are allocated to one of the categories within this hazard class, Category 1 (serious eye damage) or Category 2 (eye irritation), as follows:

- a. Category 1 (serious eye damage/irreversible effects on the eye): substances that have the potential to seriously damage the eyes.
- b. Category 2 (eye irritation/reversible effects on the eye): substances that have the potential to induce reversible eye irritation.

For those substances where there is pronounced variability among animal responses, this information may be considered in determining the classification.

**Table 17: Classification criteria for Serious eye damage/ Irreversible effects on the eye category**

	Category 1 <sup>(Note 1)</sup>	Category 2 <sup>(Note 2)</sup>	
		Category 2A	Category 2 B
Criteria	A substance that produces: (a) in at least one animal effects on the cornea, iris or conjunctiva that are not expected to reverse or have not fully reversed within an observation period of normally 21 days; and/or (b) in at least 2 of 3 tested animals, a positive response of: (i) corneal opacity $\geq 3$ ; and/or (ii) iritis $> 1.5$ ; calculated as the mean scores following grading at 24, 48 and 72 hours after instillation of the test material.	Substances that produce in at least 2 of 3 tested animals a positive response of: (a) corneal opacity $\geq 1$ ; and/or (b) iritis $\geq 1$ ; and/or (c) conjunctival redness $\geq 2$ ; and/or (d) conjunctival oedema (chemosis) $\geq 2$ calculated as the mean scores following grading at 24, 48 and 72 hours after instillation of the test material, and which fully reverses within an observation period of normally 21 days	Within Category 2A an eye irritant is considered mildly irritating to eyes (Category 2B) when the effects listed above are fully reversible within 7 days of observation.
Hazard Symbol			No Symbol
Signal word	Danger	Warning	Warning
Hazard statement	Causes serious eye damage	Causes serious eye damage	Causes eye irritation

*Note 1:* pH extremes like 2 and 11.5, may indicate serious eye damage, especially when associated

with significant acid/alkaline reserve (buffering capacity). Generally, such substances are expected to produce significant effects on the eyes. In the absence of any other information, a substance is considered to cause serious eye damage (Category 1) if it has a pH  $\leq 2$  or  $\geq 11.5$ . However, if consideration of acid/alkaline reserve suggests the substance may not cause serious eye damage despite the low or high pH value, this needs to be confirmed by other data, preferably by data from an appropriate validated *in vitro* test.

*Note 2:* Substances that have the potential to induce reversible eye irritation should be classified in Category 2 where further categorization into Category 2A and Category 2B is not required by PCPB or where data are not sufficient for further categorization. When a chemical is classified as Category 2, without further categorization, the classification criteria are the same as those for Category 2A. For substances inducing eye irritant effects reversing within an observation time of normally 21 days, Category 2A applies. For substances inducing eye irritant effects reversing within an observation time of 7 days, Category 2B applies.

### 3.3.2 Guidance to classification for eye hazard based on based on existing data from studies with 4 or more animals

The classification criteria for the skin and eye hazard classes are detailed in the GHS in terms of a 3-animal test. It has been identified that some older test methods may have used up to 6 animals. However, the GHS criteria do not specify how to classify based on existing data from tests with more than 3 animals. Guidance on how to classify based on existing data from studies with 4 or more animals is given in the following paragraphs.

Classification criteria based on a 3-animal test are detailed in Part 3 (Health Hazards) of GHS Purple Book. Evaluation of a 4, 5 or 6 animal study should follow the criteria in the following paragraphs, depending on the number of animals tested. Scoring should be done at 24, 48 and 72 hours after instillation of the test material.

#### **In the case of a study with 6 animals the following principles apply:**

1. The substance or mixture is classified as serious eye damage Category 1 if:
  - i. at least in one animal effects on the cornea, iris or conjunctiva are not expected to reverse or have not fully reversed within an observation period of normally 21 days; and/or
  - ii. at least 4 out of 6 animals show a mean score per animal of  $\geq 3$  for corneal opacity and/or  $> 1.5$  for iritis.
2. The substance or mixture is classified as eye irritation Category 2/2A if at least 4 out of 6 animals show a mean score per animal of:
  - i.  $\geq 1$  for corneal opacity; and/or
  - ii.  $\geq 1$  for iritis; and/or
  - iii.  $\geq 2$  for conjunctival redness; and/or
  - iv.  $\geq 2$  for conjunctival oedema (chemosis), and which fully reverses within an observation period of normally 21 days.
  - v. The substance or mixture is classified as irritating to eyes (Category 2B) if the effects listed in sub-paragraph (b) above are fully reversible within 7 days of observation.

#### **In the case of a study with 5 animals the following principles apply:**

1. The substance or mixture is classified as serious eye damage Category 1 if:
  - i. at least in one animal effects on the cornea, iris or conjunctiva are not expected to reverse or have not fully reversed within an observation period of normally 21 days; and/or
  - ii. at least 3 out of 5 animals show a mean score per animal of  $\geq 3$  for corneal opacity and/or  $> 1.5$  for iritis.
2. The substance or mixture is classified as eye irritation Category 2/2A if at least 3 out of 5 animals show a mean score per animal of:

- i.  $\geq 1$  for corneal opacity; and/or
  - ii.  $\geq 1$  for iritis; and/or
  - iii.  $\geq 2$  for conjunctival redness; and/or
  - iv.  $\geq 2$  for conjunctival oedema (chemosis), and which fully reverses within an observation period of normally 21 days.
3. The substance or mixture is classified as irritating to eyes (Category 2B) if the effects listed in sub-paragraph (b) above are fully reversible within 7 days of observation.

**In the case of a study with 4 animals the following principles apply:**

1. The substance or mixture is classified as serious eye damage Category 1 if:
  - i. at least in one animal effects on the cornea, iris or conjunctiva are not expected to reverse or have not fully reversed within an observation period of normally 21 days; and/or
  - ii. at least 3 out of 4 animals show a mean score per animal of  $\geq 3$  for corneal opacity and/or  $> 1.5$  for iritis.
2. Classification as eye irritation Category 2/2A if at least 3 out of 4 animals show a mean score per animal of:
  - i.  $\geq 1$  for corneal opacity; and/or
  - ii.  $\geq 1$  for iritis; and/or
  - iii.  $\geq 2$  for conjunctival redness; and/or
  - iv.  $\geq 2$  for conjunctival oedema (chemosis), and which fully reverses within an observation period of normally 21 days.


The substance or mixture is classified as irritating to eyes (Category 2B) if the effects listed in sub-paragraph (b) above are fully reversible within 7 days of observation.

### 3.4 Skin Sensitization

*Skin sensitizer* is a pesticide that will lead to an allergenic response following skin contact.

**Skin sensitizers:** Shall be classified in accordance with table below. Effects seen in either humans or animals will normally justify classification in a weight of evidence approach to skin sensitizers.

**Table 18: Classification criteria for Skin sensitizers**

Category		Hazard symbol	Signal word	Hazard Statement
1	<p><b>Skin Sensitizer:</b> if there is:</p> <ol style="list-style-type: none"> <li>a) evidence in human that substance can lead to sensitization by skin contact</li> <li>b) are positive results from appropriate animal test</li> </ol>		Warning	May cause an allergic skin reaction

### 3.5 Germ Cell Mutagenicity, Carcinogenicity & Reproductive Toxicity

PCPs which have classified as Carcinogenicity Categories 1A and 1B<sup>1</sup>. Germ cell mutagenicity Categories and Reproductive toxicity Categories 1A and 1B<sup>2</sup>. This also applies to co-formulants used

<sup>1</sup> Carcinogens:

**Category 1** substances are either known or presumed human carcinogens, based on evidence from epidemiological and/or animal studies.

**Category 1A** substances are known to have carcinogenic potential for humans, primarily based on human evidence, **Category 1B** substances are presumed to have carcinogenic potential for humans, mainly based on animal evidence.



<sup>2</sup> **Reproductive toxicants** are classified based on the strength and source of evidence showing they harm human sexual function, fertility, or development. These substances fall into the following categories:

in the end use products are unlikely to be authorized for use in Kenya. The chronic health hazard is generally provided for the active ingredient and the data provided can be used for classification.

The exclusion criteria include PCP active ingredient(s) and formulation(s) that meet the following conditions:

The criteria for classification of mixtures and bridging principles in the GHS Purple Book shall be used if a need arises.

**Table 19: Classification criteria for Carcinogenicity & Reproductive toxicity**

	Carcinogenicity	Reproductive toxicity	
	Category 2	Category 2	Additional category for effects on or via lactation
<b>Symbol</b>			No symbol
<b>Signal word</b>	Warning	Warning	No signal word
<b>Hazard statement</b>	Suspected of causing cancer  (State route of exposure if it is conclusively proven that no other routes of exposure cause the hazard <i>e.g.</i> Suspected of causing cancer by inhalation.	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) May cause harm to breast-fed children.	May cause harm to breast-fed children.

### 3.5.1 Classification criteria for mixtures for Carcinogenicity & Reproductive toxicity

#### 3.5.1.1 Classification of mixtures when data are available for the complete mixture

Classification of mixtures will be based on the available test data for the individual ingredients of the carcinogenic and/or reproductive toxic profile. The classification can be adjusted on a case-by-case basis, based on the available test data for the mixture, considering factors like dose, duration, and analysis. The documentation supporting this classification should be retained and available for review.

**Category 1A:** Known human reproductive toxicants based on strong human evidence.

**Category 1B:** Presumed human reproductive toxicants based primarily on animal studies showing clear reproductive harm, not secondary to other toxic effects.

**Category 2:** Suspected human reproductive toxicants with limited or less convincing evidence from human or animal studies. This classification applies when data are suggestive but not sufficient for Category 1 due to study limitations or mechanistic doubts.

### **3.5.1.2 Classification of mixtures when data are not available for the complete mixture: bridging principles**

Where the mixture itself has not been tested to determine its carcinogenicity and/or reproductive toxicity hazard, but there are sufficient data on both the individual ingredients and similar tested mixtures to adequately characterize the hazards of the mixture; these data will be used in accordance with the following agreed 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 for additional testing on animals.

#### ***Dilution***

If a tested mixture is diluted with a diluent which is not expected to affect the carcinogenicity and/or reproductive toxicity of other ingredients, then the new diluted mixture may be classified as equivalent to the original tested mixture.

#### ***Batching***

The carcinogenic and/or reproductive toxic potential of a tested production batch of a mixture can be assumed to be substantially equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer unless there is reason to believe there is significant variation in composition such that the carcinogenic and/or reproductive toxic potential of the untested batch has changed. If the latter occurs, a new classification is necessary.

#### ***Substantially similar mixtures***

Given the following:

- a. Two mixtures: (i) A + B;
- b. C + B;
- c. The concentration of mutagen ingredient B is the same in both mixtures;
- d. The concentration of ingredient A in mixture (i) equals that of ingredient C in mixture (ii);
- e. Data on toxicity for A and C are available and substantially equivalent, i.e. they are in the same hazard category and are not expected to affect the carcinogenicity and/or reproductive toxicity of B.

If mixture (i) or (ii) is already classified based on test data, then the other mixture can be classified in the same hazard category.

### **3.5.1.3 Classification of mixtures when data are available for all ingredients or only for some ingredients of the mixture**

The mixture will be classified as a carcinogen and/or reproductive toxicant when at least one ingredient has been classified as a Category 1 or Category 2 and is present at or above the appropriate cut-off value/concentration limit as shown in the tables below.

**Table 20: Cut-off/concentration limits triggering classification of a mixture(Carcinogenicity)**

Ingredient classified as:	Cut-off/concentration limits triggering classification of a mixture as:	
	Category 2 Carcinogen	
Category 2 carcinogen	≥ 0.1 % (Note 3) <sup>3</sup>	
	≥ 1.0 % (Note 4) <sup>4</sup>	

**Table 21: Cut-off/concentration limits triggering classification of a mixture (Reproductive toxicant)**

Ingredient classified as:	Cut-off/concentration limits triggering classification of a mixture as:	
	Category 2 Reproductive toxicant	Additional category for effects on or via lactation
Category 2 reproductive toxicant	≥ 0.1 % (Note 5) <sup>5</sup>	
	≥ 3.0 % (Note 6) <sup>6</sup>	
Additional category for effects on or via lactation		≥ 0.1 % (Note 7) <sup>7</sup>
		≥ 0.3 % (Note 8) <sup>8</sup>

### 3.6 Specific Target Organ Toxicity—Following Single Exposure

This relates to substances and mixtures that produce specific, non-lethal target organ toxicity arising from a single exposure. All significant health effects that can impair function, whether reversible or irreversible, immediate or delayed, that are not specifically addressed in other health hazard categories are included.

The classification depends upon availability of reliable evidence that a single exposure to the substance or mixture has produced consistent and identifiable toxic effect in humans, or, in experimental animals, toxicologically significant changes which have affected the function or morphology of a tissue/organ, or has produced serious changes to the biochemistry or hematology of the organism, and these changes are relevant for human health. Human data are the primary source of evidence for this hazard class. However, all data including human incidents, epidemiology, and

<sup>3</sup> NOTE 3: If a Category 2 carcinogen ingredient is present in the mixture at a concentration between 0.1 % and 1 %, every regulatory authority would require information on the SDS for a product. However, a label warning would be optional. Some authorities will choose to label when the ingredient is present in the mixture between 0.1 % and 1 %, whereas others would normally not require a label in this case.

<sup>4</sup> NOTE 4: If a Category 2 carcinogen ingredient is present in the mixture at a concentration of ≥ 1 %, both an SDS and a label would generally be expected.

<sup>5</sup> NOTE 5: If a Category 2 reproductive toxicant is present in the mixture as an ingredient at a concentration between 0.1 % and 3.0 %, every regulatory authority would require information on the SDS for a product. However, a label warning would be optional. Some authorities will choose to label when the ingredient is present in the mixture between 0.1 % and 3.0 %, whereas others would normally not require a label in this case.

<sup>6</sup> NOTE 4: If a Category 2 reproductive toxicant is present in the mixture as an ingredient at a concentration of ≥ 3.0%, both an SDS and a label would generally be expected.




<sup>7</sup> NOTE 7: If a reproductive toxicant or substance classified in the additional category for effects on or via lactation is present in the mixture as an ingredient at a concentration between 0.1 % and 0.3 %, every regulatory authority would require information on the SDS for a product. However, a label warning would be optional. Some authorities will choose to label when the ingredient is present in the mixture between 0.1 % and 0.3 %, whereas others would normally not require a label in this case.

<sup>8</sup> NOTE 8: If a reproductive toxicant or substance classified in the additional category for effects on or via lactation is present in the mixture as an ingredient at a concentration of ≥ 0.3 %, both an SDS and a label would generally, be expected.

studies conducted in experimental animals, is used to substantiate specific target organ toxic effects that merit classification.

The assessment should take into consideration also generalized changes of a less severe nature involving several organs. Exposure may occur by any route relevant to humans, principally oral, dermal or inhalation.

**Table 22: Classification criteria for specific target organ toxicity following single exposure**

		Guidance value ranges for:		
	Route of exposure/Units	Category 1	Category 2	Category 3
Criteria		Substances that have produced significant toxicity in humans, or that, based on evidence from studies in experimental animals, can be presumed to have the potential to produce significant toxicity in humans following single exposure.	Substances that, based on evidence from studies in experimental animals, can be presumed to have the potential to be harmful to human health following single exposure.	Transient target organ effects.
Guidance Values	Oral (rat) mg/kg body weight	$C \leq 300$	$2000 \geq C > 300$	Guidance values do not apply
	Dermal (rat or rabbit) mg/kg body weight	$C \leq 1000$	$2000 \geq C > 1000$	
	Inhalation (rat) gas ppmV/4h	$C \leq 2500$	$20000 \geq C > 2500$	
	Inhalation (rat) vapour mg/l/4h	$C \leq 10$	$20 \geq C > 10$	
	Inhalation (rat) dust/mist/fume mg/l/4h	$C \leq 1.0$	$5.0 \geq C > 1.0$	
Symbol				
Signal word		Danger	Warning	Warning
Hazard statement		Causes damage to organs (or state all organs affected if known) (state route of exposure if 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 conclusively proven that no other routes of exposure cause the hazard)	May cause respiratory irritation; or May cause drowsiness or dizziness

**Note 1:** The specific target organ/system that has been primarily affected by the classified substance may be identified, or the substance may be identified as a general toxicant. Determine the primary target organ/system of toxicity and classify for that purpose, e.g. hepatotoxicants and neurotoxicants. Data should be carefully examined, in order not to include secondary effects (e.g. a hepatotoxicant can produce secondary effects in the nervous or gastrointestinal systems). Examples of the relevant toxic effects are given under article 3.8.2.1.7.3 in the GHS manual, while those effects that may not support classification under Category 1 and 2 can be found in article 3.8.2.1.8 of the manual.

**Note 2:** Guidance values and ranges mentioned in this table are intended to assist with classification decisions and are not strict demarcation values.



### 3.7 Specific Target Organ Toxicity—Following Repeated Exposure

This relates to substances and mixtures that produce specific, non-lethal target organ toxicity arising from a repeated exposure. All significant health effects that can impair function, whether reversible or irreversible, immediate or delayed, that are not specifically addressed in other health hazard categories are included

The classification depends upon the availability of reliable evidence that a repeated exposure to the substance or mixture has produced a consistent and identifiable toxic effect in humans or, in experimental animals, toxicologically significant changes which have affected the function or morphology of a tissue/organ or have produced serious changes to the biochemistry or hematology of the organism, and these changes are relevant for human health. It is recognized that human data will be the primary source of evidence for this hazard class.

The assessment should take into consideration not only significant changes in a single organ or biological system but also generalized changes of a less severe nature involving several organs. Specific target organ toxicity can occur by any route that is relevant for humans, i.e., principally oral, dermal, or inhalation.

**Table 23: Classification criteria for Specific Target Organ Toxicity—Following Repeated Exposure**

		Guidance value ranges for:	
	Route of exposure/Units	Category 1	Category 2
Criteria		Substances that have produced significant toxicity in humans, or that, on the basis of evidence from studies in experimental animals can be presumed to have the potential to produce significant toxicity in humans following repeated exposure.	Substances that, on the basis of evidence from studies in experimental animals can be presumed to have the potential to be harmful to human health following repeated exposure
Guidance Values	Oral (rat) mg/kg body weight	$C \leq 10$	$10 \geq C > 100$
	Dermal (rat or rabbit) mg/kg body weight	$C \leq 20$	$20 \geq C > 200$
	Inhalation (rat) gas ppmV/6h/d	$C \leq 50$	$50 \geq C > 250$
	Inhalation (rat) vapour mg/litre/6h/d	$C \leq 0.2$	$20 \geq C > 10$
	Inhalation (rat) dust/mist/fume mg/litre/6h/d	$C \leq 0.02$	$5.0 \geq C > 1.0$
Symbol			
Signal word		Danger	Warning
Hazard statement		Causes damage to organs (state all organs affected, if known) through prolonged or repeated exposure (state	May cause damage to organs (state all organs affected, if known) through prolonged or repeated exposure (state

		Guidance value ranges for:	
	Route of exposure/Units	Category 1	Category 2
		route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)

Note: “bw” is for body weight, “h” for “hour” and “d” for “day”.

### 3.7.1 Classification criteria for mixtures specific target organ toxicity for single exposure and repeated exposure

Mixtures are classified using the same criteria as for substances, or alternatively as described below. As with substances, mixtures should be classified for specific target organ toxicity for single exposure and repeated exposure independently.

#### 3.7.1.1 Classification of mixtures when data are available for the complete mixture

When reliable and good-quality evidence from human experience or appropriate studies in experimental animals, as described in the criteria for substances, is available for the mixture, then the mixture can be classified by weight of evidence assessment of this data. Care should be exercised in evaluating data on mixtures so that the dose, duration, observation, or analysis does not render the results inconclusive.

Where the mixture itself has not been tested to determine its specific target organ toxicity, but there are sufficient data on both the individual ingredients and similar tested mixtures to adequately characterize the hazards 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 on animals.

#### *Dilution*

If a tested mixture is diluted with a diluent which has the same or a lower toxicity classification as the least toxic original ingredient and which is not expected to affect the toxicity of other ingredients, then the new diluted mixture may be classified as equivalent to the original tested mixture.

#### *Batching*

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

#### 3.7.1.1.1 Concentration of highly toxic mixtures

If in a tested mixture of Category 1, the concentration of a toxic ingredient is increased, the resulting concentrated mixture should be classified in Category 1 without additional testing.

#### 3.7.1.1.2 Interpolation within one hazard category

For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same hazard category, and where untested mixture C has the same

toxicologically active ingredients as mixtures A and B but has concentrations of toxicologically active ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same hazard category as A and B.

### 3.7.1.1.2.1 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. Data on toxicity for A and C are available and substantially equivalent, i.e. they are in the same hazard category and are not expected to affect the toxicity of B.

If mixture (i) or (ii) is already classified based on test data, then the other mixture can be classified in the same hazard category.

### 3.7.1.1.2.2 Aerosols

An aerosolized form of a mixture may be classified in the same hazard category as the tested, non-aerosolized form of the mixture for oral and dermal toxicity provided the added propellant does not affect the toxicity of the mixture on spraying. Classification of aerosolized mixtures for inhalation toxicity should be considered separately.

### 3.7.1.2 Classification of mixtures when data are available for all ingredients or only for some ingredients of the mixture

Where there is no reliable evidence or test data for the specific mixture itself, and the bridging principles cannot be used to enable classification, then classification of the mixture is based on the classification of the ingredient substances. In this case, the mixture will be classified as a specific target organ toxicant (specific organ specified), following repeated exposure, when at least one ingredient has been classified as a Category 1 or Category 2 specific target organ toxicant – repeated exposure and is present at or above the appropriate cut-off value/concentration limit as mentioned in table below for Category 1 and 2 respectively.

**Table 24: Cut-off/concentration limits triggering classification of a mixture (specific target organ toxicity for single exposure and repeated exposure)**

Ingredient classified as:	Cut-off/concentration limits triggering classification of a mixture as:	
	Category 1	Category 2
Category 1 target organ toxicity	≥ 1.0 % (Note 9) <sup>9</sup>	≥ 1.0 % > 10.0% (Note 10) <sup>10</sup>
	≥ 10.0 % (Note 11) <sup>11</sup>	
		≥ 1.0% (Note 12) <sup>12</sup>

<sup>9</sup> NOTE 9: If a Category 1 specific target organ toxicant is present in the mixture as an ingredient at a concentration between 1.0 % and 10 %, every regulatory authority would require information on the SDS for a product. However, a label warning would be optional. Some authorities will choose to label when the ingredient is present in the mixture between 1.0 % and 10 %, whereas others would normally not require a label in this case.

<sup>10</sup> NOTE 10: If a Category 1 specific target organ toxicant is present in the mixture as an ingredient at a concentration between 1.0 % and 10 %, some authorities classify this mixture as a Category 2 specific target organ toxicant, whereas others would not.

<sup>11</sup> NOTE 11: If a Category 1 specific target organ toxicant is present in the mixture as an ingredient at a concentration of ≥ 10 %, both an SDS and a label would generally be expected.

<sup>12</sup> NOTE 12: If a Category 2 specific target organ toxicant is present in the mixture as an ingredient at a concentration between 1.0 % and 10 %, every regulatory authority would require information on the SDS for a product. However, a label warning would be optional. Some authorities will choose to label when the

Ingredient classified as:	Cut-off/concentration limits triggering classification of a mixture as:	
	Category 1	Category 2
Category 2 target organ toxicity		≥10.0% (Note 13) <sup>13</sup>

### 3.8 Aspiration Hazard



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

*Aspiration* means the entry of a liquid or solid chemical directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea or lower respiratory tract. Aspiration toxicity includes severe effects such as chemical pneumonia, varying degrees of pulmonary injury, or death following aspiration. Aspiration of a substance or mixture can occur as it is vomited. This may have consequence on labeling especially where induction of vomiting is included on the label.

Some hydrocarbons (petroleum distillates) and certain chlorinated hydrocarbons have been shown to pose aspiration hazard in humans. The classification criteria refer to kinematic viscosity.

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

**Table 25: Classification criteria of Aspiration hazards**

	Category 1	Category 2
	a) Based on reliable & good quality human evidence b) It is a hydrocarbon and has a kinematic viscosity ≤ 20.5 mm <sup>2</sup> /s at 40° C.	On basis of existing animal studies and expert judgement that takes into account surface tension, water solubility, boiling point and volatility, substances other those classified in Cat. 1 which have kinematic viscosity ≤14 mm <sup>2</sup> /s at 40°C
Hazard symbol		
Signal word	Danger	Warning
Hazard Statement	May be fatal if swallowed and enters airways	May be harmful if swallowed and enters airways

ingredient is present in the mixture between 1.0 % and 10 %, whereas others would normally not require a label in this case.

<sup>13</sup> NOTE 5: If a Category 2 specific target organ toxicant is present in the mixture as an ingredient at a concentration of ≥ 10 %, both an SDS and a label would generally be expected.

## Chapter 4: ENVIRONMENTAL HAZARDS

The aquatic environment and hazards to the ozone layer are classified by the GHS. No other environmental hazards are covered. For labelling purposes, both the end-user product and active ingredient should be classified. PCPs will be classified according to acute and chronic aquatic toxicity. Reference should be made to the GHS Purple Book.

The basic elements for use within the harmonized system for environmental hazards are.

- 1) Acute toxicity
- 2) Chronic aquatic toxicity
  - a) Potential for or actual bioaccumulation; and
  - b) Degradation (biotic or abiotic) for organic chemicals (likely persistence in the environment)

**Table 26: Environmental hazards and their likely relevance for pesticide labelling**

GHS chapter	Hazard	Likely to be indicated on a pesticide label?	Remarks
4.1	Hazardous to the aquatic environment	Yes	-
4.2	Hazardous to the ozone layer	No	With the exception of methyl bromide
--	Other environmental hazards (e.g.: for wildlife, livestock, pollinators, natural enemies of pests, soil organisms, groundwater, etc.)	--	Not covered by the GHS. Other internationally accepted labelling criteria for these hazards shall be considered

Source: Source: FAO/WHO Guidelines on Good Labelling Practices for Pesticides


**Note:** For hazards not covered by GHS such as effects on pollinators, continued framework on the assessment on the effect and statement such as ‘*Not to be used when crop is in bloom*’ should be used.

### 4.1 Acute aquatic toxicity

*Acute aquatic toxicity* means the intrinsic property of a substance to be injurious to an organism in a short-term aquatic exposure to that substance. *Short-term (acute) hazard*, for classification purposes, means the hazard of a chemical caused by its acute toxicity to an organism during short-term aquatic exposure to that chemical.

Acute aquatic toxicity would normally be determined using a fish 96-hour LC<sub>50</sub> (OECD Test Guideline 203 or equivalent), a crustacea species 48-hour EC<sub>50</sub> (OECD Test Guideline 202 or equivalent) and/or an algal species 72- or 96-hour EC<sub>50</sub> (OECD Test Guideline 201 or equivalent). These species are considered as surrogate for all aquatic organisms and data on other species such as Lemna may also be considered if the test methodology is suitable.

**Table 27: Classification criteria for Acute aquatic toxicity**

	<b>Category 1 (Note 2)</b>	<b>Category 2</b>	<b>Category 3</b>
Criteria	96 hr LC <sub>50</sub> (for fish) ≤1 mg/l and/or  48 hr EC <sub>50</sub> (for crustacea) ≤1 mg/l and/or  72 or 96hr ErC <sub>50</sub> (for algae or other aquatic plants) ≤1 mg/l (Note 3)	96 hr LC <sub>50</sub> (for fish) >1 but 10 mg/l and/or  48 hr EC <sub>50</sub> (for crustacea) >1 but 10 mg/l and/or  72 or 96hr ErC <sub>50</sub> (for algae or other aquatic plants) >1 but 10 mg/l (Note 3)	96 hr LC <sub>50</sub> (for fish) >10 but ≤100mg/l and/or  48 hr EC <sub>50</sub> (for crustacea) >10 but ≤100mg/l and/or  72 or 96hr ErC <sub>50</sub> (for algae or other aquatic plants) >10 but ≤100mg/l (Note 3)
Symbol		No symbol	No symbol
Signal word	Warning	No signal word	No signal word
Hazard statement	Very toxic to aquatic life	Toxic to aquatic life	Harmful to aquatic life

*NOTE 1: The organisms' fish, crustacea and algae are tested as surrogate species covering a range of trophic levels and taxa, and the test methods are highly standardized. Data on other organisms may also be considered, however, provided they represent equivalent species and test endpoints.*

*NOTE 2: When classifying substances as Acute 1 and/or Chronic 1, it is necessary at the same time to indicate an appropriate M factor (to apply the summation method as annexed*

*NOTE 3: Where the algal toxicity ErC<sub>50</sub> [= EC<sub>50</sub> (growth rate)] falls more than 100 times below the next most sensitive species and results in a classification based solely on this effect, consideration should be given to whether this toxicity is representative of the toxicity to aquatic plants. Where it can be shown that this is not the case, professional judgment should be used in deciding if classification should be applied. Classification should be based on the ErC<sub>50</sub>. In circumstances where the basis of the EC<sub>50</sub> is not specified and no ErC<sub>50</sub> is recorded, classification should be based on the lowest EC<sub>50</sub> available.*

In addition to the hazard communication elements discussed above, environmental risk assessment of the use of the pesticide product may result in specific precautionary statements and pictograms to be included on the label. This will apply to the hazards covered by the GHS but also to a much wider range of environmental risks, such as possible adverse effects on birds, wildlife, livestock, bees, natural enemies of pests, soil organisms and processes, groundwater, etc.

#### 4.2 Chronic Aquatic Toxicity

Chronic aquatic toxicity refers to the intrinsic property of a substance to cause adverse effects to aquatic organisms from aquatic exposures which are determined in relation to the life cycle of the organism. Such chronic effects usually include a range of sub-lethal endpoints and are generally expressed in terms of a No Observable Effect Concentration (NOEC), or an equivalent EC<sub>x</sub>. The observable endpoints typically include survival, growth and/or reproduction.

Chronic toxicity data are less available than acute data and the range of testing procedures less standardized. They include OECD TG's 210 (Fish Early Life Stage) or (Daphnia Reproduction) and

201 (Algal Growth Inhibition although this is not a long-term study) can be accepted. Chronic toxicity exposure duration can vary widely depending on the test endpoint measures and test species used.

#### **4.2.1 Degradability**

Degradability is an important property of a substance determining its likely persistence in the environment; it is a relevant parameter for the assessment of the environmental fate of a substance. Environmental degradation may be biotic or abiotic (e.g. hydrolysis) and the criteria used reflect this fact. Ready biodegradation can most easily be defined using the OECD biodegradability tests OECD Test Guideline 301(A-F). A pass level of degradation in these tests of 60 % (theoretical oxygen demand) or 70 % (based on Dissolved Organic Carbon) in 28 days can be considered as indicative of ready biodegradation/rapid degradation in most environments. These are freshwater tests and thus, the use of the results from OECD Test Guideline 306 which is more suitable for marine environments, has also been included.

Where such data are not available, a Biological Oxygen Demand (BOD) (5 days)/Chemical Oxygen Demand (COD) ratio more than or equal to 0.5 is considered as indicative of rapid degradation. (GHS 4.1.1.6; 4.1.2.11; more details in Annex A9.4 and lists of Test guidelines in Annex 9 Appendix V.)

For the classification based on chronic toxicity a differentiation is made between rapidly degradable and non-rapidly degradable substances. The GHS Purple Book notes that lack of rapid degradability is based on either a lack of biodegradability or other evidence of lack of rapid degradation. When no useful data on degradability are available, either experimentally determined or estimated data, the substance should be regarded as not degradable. Further guidance is provided in GHS Purple Book Annex 9 A9.3.3.2. The table 4.1.1 of the GHS Purple Book) provides the categories for substances hazardous to the aquatic environment with the consideration of whether they are rapidly or non-rapidly degradable.

#### **4.2.2 Bioaccumulation Potential**




The potential for bioaccumulation would normally be determined by using the octanol/water partition co-efficient, usually reported as a log Kow determined by OECD Test guidelines 107, 117 or 123. While this represents a potential to bioaccumulate and experimentally determined Bioconcentration Factor (BCF) provides a better measure and should be used in preference when available. A BCF should be determined according to OECD Test Guideline 305. According to the GHS Purple Book, potential to bioaccumulate, based on an experimentally derived BCF  $\geq 500$  or, if absent, a log Kow  $\geq 4$  provided log Kow is an appropriate descriptor for the bioaccumulation potential of the substance. Measures log Kow values take precedence over estimated values

### **4.3 Classification criteria for substances hazardous to the Aquatic Environment**

Whilst the harmonized classification system consists of three short-term (acute) classification categories and four long-term (chronic) classification categories, the core part of the harmonized classification system for substances consists of three-short term (acute) classification categories and three long-term (chronic) classification categories (see table 4.1.1 (a) and (b)).

The short term (acute) and long-term (chronic) classification categories are applied independently. The criteria for classification of a substance in Acute 1 to 3 are defined on the basis of the acute toxicity data only (EC<sub>50</sub> of LC<sub>50</sub>). The criteria for classification of a substance into Chronic 1 to 3 follow a tiered approach where the first step is to see if available information on chronic toxicity merits long-term hazard classification. In absence of adequate chronic toxicity data, the subsequent step is to combine two types of information i.e. acute toxicity data and environmental data (degradability and bioaccumulation data) (see figure 4.1.1 of GHS Manual Chapter 4).

**Table 28: Classification Criteria for Substances Hazardous to the Aquatic Environment**

Classification Categories					
Short-term (acute) hazard (Note 1)	<ul style="list-style-type: none"> <li>Symbol,</li> <li>signal word,</li> <li>hazard statement</li> </ul>	Long-term (chronic) hazard (Note 2)			<ul style="list-style-type: none"> <li>Symbol,</li> <li>signal word,</li> <li>hazard statement</li> </ul>
		Adequate chronic toxicity data available		Adequate chronic toxicity data not available (Note 1)	
		Non-rapidly degradable substances (Note 3)	Rapidly degradable substances (Note 3)		
<b>Category: Acute 1</b> $L(E)C_{50} \leq 1.00$	 <ul style="list-style-type: none"> <li>Warning</li> <li>Very toxic to aquatic life</li> </ul>	<b>Category: Chronic 1</b> $NOEC \text{ or } EC_{10} \leq 0.1$	<b>Category: Chronic 1</b> $NOEC \text{ or } EC_{10} \leq 0.01$	<b>Category: Chronic 1</b> $L(E)C_{50} \leq 1.00$ and lack of rapid degradability and/or $BCF \geq 500$ or, if absent $\log K_{ow} \geq 4$	 <ul style="list-style-type: none"> <li>Warning</li> <li>Very toxic to aquatic life with long lasting effects</li> </ul>
<b>Category: Acute 2</b> $1.00 < L(E)C_{50} \leq 10.0$	No symbol No signal word Toxic to aquatic life	<b>Category: Chronic 2</b> $0.1 < NOEC \text{ or } EC_{10} \leq 1$	<b>Category: Chronic 2</b> $0.01 < NOEC \text{ or } EC_{10} \leq 0.1$	<b>Category: Chronic 2</b> $1.00 < L(E)C_{50} \leq 10.0$ and lack of rapid degradability and/or $BCF \geq 500$ or, if absent $\log K_{ow} \geq 4$	 <ul style="list-style-type: none"> <li>No signal word</li> <li>Toxic to aquatic life with long lasting effects</li> </ul>
<b>Category: Acute 3</b> $10.0 < L(E)C_{50} \leq 100$	No symbol No signal word Harmful to aquatic life	<b>Category: Chronic 3</b> $1 < NOEC \text{ or } EC_{10} \leq 10$	<b>Category: Chronic 3</b> $1 < NOEC \text{ or } EC_{10} \leq 10$	<b>Category: Chronic 3</b> $10.0 < L(E)C_{50} \leq 100$ and lack of rapid degradability and/or $BCF \geq 500$ or, if absent $\log K_{ow} \geq 4$	No symbol No signal word Harmful to aquatic life with long lasting effects.
-	-	<b>Category: Chronic 4 (Note 4)</b> Example: Note 5 No acute toxicity and lack of rapid degradability and $BCF \geq 500$ or, if absent $\log K_{ow} \geq 4$ unless $NOEC > 1 \text{ mg/l}$			No symbol No signal word May cause long lasting harmful effects to aquatic life.

**NOTE 1:** Acute toxicity based on  $L(E)C_{50}$  values in mg/l for fish, crustacea and/or algae or other aquatic plants (or QSAR estimation if no experimental data).

**NOTE 2:** *Substances are classified in the various chronic categories where there are adequate chronic toxicity data available for all three trophic levels (algae, invertebrates and fish). (Adequate means that the data sufficiently cover the endpoint of concern. Generally this will be NOEC or EC<sub>10</sub> measured test data, but in order to avoid unnecessary testing it can, on a case-by-case basis, also be estimated data, e.g. (Q)SAR, or for chronic cases expert judgement).*

**NOTE 3:** *Chronic toxicity based on NOEC or equivalent EC<sub>10</sub> values in mg/l for fish or invertebrates or other recognized measures for chronic toxicity.*

**NOTE 4:** *The system also intends to identify the substances to be classified in the category Chronic 4 for cases where the data is available but do not allow classification under the above categories, but there is nevertheless some grounds for concern.*

**NOTE 5:** *For poorly soluble substances or substances behaving as such, where toxicity cannot be demonstrated at levels up to the limit of solubility in combination with no rapid degradability and potential for bioaccumulation, it can be demonstrated that the substance does not pose a (chronic) hazard. Poorly soluble substances for which no acute toxicity is recorded at levels up to the water solubility and which are not rapidly degradable and have a log K<sub>ow</sub> ≥ 4 indicating a potential to bioaccumulate will be classified in Category Chronic 4 “Safety Net” classification unless other scientific evidence exists showing classification to be unnecessary. Such evidence would include experimentally determined BCF < 500, or a chronic toxicity NOEC > 1mg/l or evidence of rapid degradation in the environment.*

The organisms’ fish, crustacea and algae are tested as surrogate species covering a range of trophic levels and taxa, and the test methods are highly standardized. Data on other organisms may also be considered, however, provided they represent equivalent species and test endpoints.

When classifying substances as Acute 1 and/or Chronic 1, it is necessary at the same time to indicate an appropriate M factor (See 4.1.3.5.5.5. to apply the summation method as annexed)

Where the algal toxicity ErC<sub>50</sub> [= EC<sub>50</sub> (growth rate)] falls more than 100 times below the next most sensitive species and results in a classification based solely on this effect, consideration should be given to whether this toxicity is representative of the toxicity to aquatic plants. Where it can be shown that this is not the case, professional judgment should be used in deciding if classification should be applied. Classification should be based on the ErC<sub>50</sub>. In circumstances where the basis of the EC<sub>50</sub> is not specified and no ErC<sub>50</sub> is recorded, classification should be based on the lowest EC<sub>50</sub> available.

Potential to bioaccumulate, based on an experimentally derived BCF ≥ 500 or, if absent, a log K<sub>ow</sub> ≥ 4, provided log K<sub>ow</sub>, provided log K<sub>ow</sub> is an appropriate descriptor of the substance. Measure log K<sub>ow</sub> values take precedence over estimated values and measured values and measured BCF values take precedence over log K<sub>ow</sub> values

#### **4.3.1 Safety Net Classification (Chronic 4)**

The GHS system also introduces a “safety net” classification (Chronic 4) for use when the data available do not allow classification under the formal criteria but there are nevertheless some grounds for concern. The precise criteria are not defined with one exception; for poorly water-soluble substances for which no toxicity has been demonstrated, classification can occur if the substance is both not rapidly degraded and has potential to bioaccumulate. It is considered that low exposure levels and potentially slow uptake into the organism. The need for this classification can be negated by demonstrating that the substance does not require classification for aquatic long term (chronic) hazards.

Substances with acute toxicities well below 1 mg/l or chronic toxicities well below 0.1 mg/l (if non-rapidly degradable) and 0.01 mg/l (if rapidly degradable) contribute as ingredients of a mixture to the toxicity of the mixture even at a low concentration and should be given increased weight in applying the summation method (see note 2 to table 4.1.1 and paragraph 4.1.3.5.5.5)

#### **4.4 Classification criteria for mixtures**

The approach for classification of aquatic environmental hazards is tiered and is dependent upon the type of information available for the mixture itself and for its ingredients. Elements of the tiered approach include classification based on tested mixtures, classification based on bridging principles, the use of an “additivity formula”.

The “relevant ingredients” of a mixture are those which are present in a concentration equal to or greater than 0.1% (w/w) for ingredients classified as Acute and/or Chronic 1 and equal to or greater than 1% (w/w) for other ingredients, unless there is a presumption (e.g. in the case of highly toxic ingredients) that an ingredient present at a concentration less than 0.1% can still be relevant for classifying the mixture for aquatic environmental hazards.

The substances with acute toxicities well below 1 mg/l or chronic toxicities well below 0.1 mg/l (if non-rapidly degradable) and 0.01 mg/L (if rapidly degradable) contribute as ingredients of a mixture to the toxicity of the mixture even as low concentration and should be given increased weight in applying the summation method see note 2 table 4.1.1 and paragraph 4.1.3.5.5.5 in the GHS Purple Book)

##### **4.4.1 Classification of mixtures when toxicity data are available for the complete mixture**

When the mixture as a whole has been tested to determine its aquatic toxicity, this information can be used for classifying the mixture according to the criteria that have been agreed for substances. On the data for fish, crustacea and algae/plants (see 4.1.1.3 and 4.1.1.4). When adequate acute or chronic data for the mixture as a whole are lacking, “bridging principles” or “summation method” should be applied (see paragraphs 4.1.3.4 and 4.1.3.5 and decision logic 4.1.5.2.2).

##### **4.4.2 Classification of mixtures when toxicity data are not available for the complete mixture: bridging principles**

Where the mixture itself has not been tested to determine its aquatic environmental hazard, but there are sufficient data on the individual ingredients and similar tested mixtures to adequately characterize the hazards of the mixture, this data will be used in accordance with the bridging principles detailed in 4.1.3.4 of GHS Purple Book). 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 for additional testing in animals.

##### **4.4.3 Classification of mixtures when toxicity data are available for all ingredients or only for some ingredients of the mixture.**

The classification of a mixture is based on summation of the concentrations of its classified ingredients. The percentage of ingredients classified as “Acute” or “Chronic” will feed straight into the summation method are described in 4.1.3.5.5.

The mixtures can be made of a combination of both ingredients that are classified (as Acute 1,2,3 and/or Chronic 1,2,3,4) and those for which adequate toxicity data is available. When adequate toxicity data are available for more than one ingredient in the mixture, the combined toxicity of those

ingredients may be calculated using the following additivity formulas (a) or (b), depending on the nature of the toxicity data.

(a) Based on acute aquatic toxicity:

$$\frac{\sum C_i}{L(E)C_{50_m}} = \sum_n \frac{C_i}{L(E)C_{50_i}}$$

Where:

$C_i$  = Concentration of ingredient i (weight percentage);

$L(E)C_{50_i}$  =  $LC_{50}$  or  $EC_{50}$  for ingredient i, in (mg/l);

$N$  = number of ingredients, and i is running from 1 to n;

$L(E)C_{50_m}$  =  $L(E)C_{50}$  of the part of the mixture with test data;

The calculated toxicity may be used to assign that portion of the mixture a short-term (acute) hazard category which is then subsequently used in applying the summation method;

(b) Based on chronic aquatic toxicity;

$$\frac{\sum C_i + \sum C_j}{EqNOEC_m} = \sum_n \frac{C_i}{NOEC_i} + \sum_n \frac{C_j}{0.1 \times NOEC_j}$$

Where:

$C_i$  = concentration of ingredients i (weight percentage) covering the rapidly degradable ingredients;

$C_j$  = concentration of ingredient j (weight percentage) covering the non-rapidly degradable ingredients;

$NOEC_i$  = NOEC (or other recognized measures for chronic toxicity) for ingredient i covering the rapidly degradable ingredients, in mg/l;

$NOEC_j$  = NOEC (or other recognized measures for chronic toxicity) for ingredient j covering the non-rapidly degradable ingredients, in mg/l;

$N$  = number of ingredients, and i and j are running from 1 to n;

$EqNOEC_m$  = Equivalent NOEC of the part of the mixture with test data;

(c)

#### 4.4.4 M Factor


**M-factor** stands for multiplying factor for substances that are highly toxic to aquatic environment (i.e.,  $LC_{50}$  or  $EC_{50} < 1 \text{ mg/L}$ ). When classifying a substance as **acute aquatic toxicity category 1** or **chronic aquatic toxicity category 1** under GHS, it is usually necessary to indicate an appropriate M-factor (**Note:** This is mandatory under EU CLP regulation). The purpose of applying M-factor is to give an increased weight to highly toxic components when classifying a **mixture**. The degradation and bio-concentration shall also be considered.

#### 4.5 Hazardous to Ozone Layer

The Ozone Depleting Potential (ODP) is an integrative quantity, distinct for each halocarbon source species, that represents the extent of ozone depletion in the stratosphere expected from the halocarbon on a mass for mass basis relative to CFC-11. The formal definition of ODP is the ratio of integrated perturbations to total ozone, for a different mass emission of a particular compound relative to an equal emission of CFC-11.

##### 4.5.1 Classification criteria for substances hazardous to Ozone layer

**Table 29: Classification criteria for substances hazardous to Ozone layer**

	Category 1
Criteria	Any of the controlled substances listed in the annexes to the Montreal Protocol; or Any Mixture containing at least one ingredient listed in the annexes to the Montreal Protocol, at a concentration > 0.1%
Symbol	
Signal word	Warning
Hazard Statement	Harms public health and the environment by destroying ozone in the upper atmosphere

## Chapter 5: MODE OF ACTION

Resistance management is a critical component of sustainable pest control. Repeated use of pesticides with the same mode of action (MoA), without incorporating alternative MoA's or non-chemical control strategies, significantly increases the risk of resistance development in pests, diseases, and weeds. To mitigate this, it is considered best practice to rotate products containing active substances with different modes of action.

Providing clear mode of action information on pesticide labels—supported by training and educational resources—is essential to equip growers with the knowledge needed to implement effective resistance management practices. In Kenya, mode of action labelling is a regulatory requirement. To further enhance communication, it is recommended that MoA group identifiers be prominently displayed at the top of the primary/principal display panel. This labeling approach empowers users to make informed decisions that contribute to the long-term efficacy of pest management solutions.

Examples of MoA groups:

GROUP	1A	INSECTICIDE
GROUP	7	FUNGICIDE
GROUP	5	HERBICIDE
GROUP	N-3	NEMATICIDE

Where a product has two or more active ingredients, and these are represented by two or more modes of action, two or more appropriate MoA identifier letters or numbers should be used in a single statement. For Example:

GROUP	1A	5	INSECTICIDE
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If the product contains two or more active constituents which perform different functions, for example, an insecticide and a fungicide. You must show each function separately (that is, one indicator panel for the insecticide and another for the fungicide component). For Example:

GROUP	1A	INSECTICIDE
GROUP	7	FUNGICIDE

While including the above information on the label, reference should be made to the Resistance Action Committee (RAC) Classification Schemes as per the pest control product class i.e. Insecticide Resistance Action Committee (IRAC), Fungicide Resistance Action Committee (FRAC) and Herbicide Resistance Action Committee (HRAC). The Pesticide MOA Group Reference Information can be obtained from the Resistance Action Committee (RAC) websites as below:

- Insecticide Resistance Action Committee (IRAC): <https://irac-online.org>
- Fungicide Resistance Action Committee (FRAC): <https://www.frac>
- Herbicide Resistance Action Committee (HRAC): <https://www.hracglobal.com>

**Resistance management statement** should be included on the secondary panel of all pesticide labels. The following should be incorporated in the text:

- a) The name of the active ingredient(s) and mode of action identifier (IRAC MoA groups).
- b) A statement that the product should be rotated with different modes of action in the same crop growth cycle or season.

Example:

*PRODUCT NAME insecticide/fungicide/herbicide* contains the active ingredient *ACTIVE INGREDIENT NAME* and is a Group *IRAC/FRAC/HRAC NUMBER*. Repetitive/continual use of *PRODUCT NAME* can lead to pest resistance. It is recommended that *PRODUCT NAME* is alternated with pest control products with a different **MODE OF ACTION**.

## Chapter 6: GHS CODIFICATION

This section is adapted from Annex 3 of the GHS Purple Book.

### 6.1 Codification of hazard statements

Hazard statements are assigned a unique alphanumerical code which consists of one letter and three numbers, as follows:

1. (a) the letter “H” (for “hazard statement”);
2. (b) a number designating the type of hazard to which the hazard statement is assigned according to the numbering of the different parts of the GHS, as follows:
  - “2” for physical hazards;
  - “3” for health hazards;
  - “4” for environmental hazards;
3. (c) two numbers corresponding to the sequential numbering of hazards arising from the intrinsic properties of the substance or mixture, such as explosivity (codes from 200 to 210), flammability (codes from 220 to 230), etc.

The relevant codes are represented in Annex I.

### 6.2 Codification of Precautionary Statements

For the purposes of the GHS, there are five types of precautionary statements: general, prevention, response (in case of accidental spillage or exposure, emergency response and first-aid), storage and disposal. For guidance on the use of GHS precautionary statements, including advice on the selection of the appropriate statements for each GHS hazard class and category, see section 3 to this annex. Precautionary statements are assigned a unique alphanumerical code which consists of one letter and three numbers as follows:

1. (a) a letter “P” (for “precautionary statement”)
2. (b) one number designating the type of precautionary statement as follows:
  - “1” for general precautionary statements;
  - “2” for prevention precautionary statements;
  - “3” for response precautionary statements;
  - “4” for storage precautionary statements;
  - “5” for disposal precautionary statements;
3. (c) two numbers (corresponding to the sequential numbering of precautionary statements)

For more information, reference to GHS Purple Book should be made.










### 6.3 Codification of Pictograms

Pictogram means a graphical composition that may include a symbol plus other graphic elements, such as a border, background pattern or colour that is intended to convey specific information. This section contains the recommended code assigned to each of the pictograms prescribed by the GHS for sectors other than transport. The pictogram code is intended to be used for references purposes. It is not part of the pictogram and should not appear on labels or in section 2 of the safety data sheet.

GHS pictograms for sectors other than transport are assigned a unique alphanumeric code as follows:

1. (a) the letters “GHS”; and
2. (b) a sequential number “01”, “02”, “03” etc. assigned in accordance with Table below.

**Table 30: GHS Codification of Pictograms**

Code	Hazard pictogram	Symbol
GHS01		Exploding bomb
GHS02		Flame
GHS03		Flame over circle
GHS04		Gas cylinder
GHS05		Corrosion
GHS06		Skull and crossbones
GHS07		Exclamation mark
GHS08		Health hazard
GHS09		Environment

### **Chapter 7: PRECAUTIONARY PEST CONTROL PRODUCTS PICTOGRAMS**

The FAO approved pictograms and any other advised by the Pest Control Products Board should be used to convey general and safety precautions. The pictogram will be inserted in label and should be in black and white. Their sizes should be appropriate. The minimum sizes of pictograms are 7mm x 7mm for all pack sizes.

The pictograms used on any individual pesticide label must relate to the specific safety advice associated with that product: the lower the hazards associated with the product, the fewer the pictograms which are needed. The pictogram selected must be appropriate to the safety precautions needed for the specific product formulation.

It is recommended that all hazard and precautionary statements be at least 8-point type, and all other text the preferred size is 11-points. The print style preferred is Helvetica (European Grotesque) or Modern. Avoid italics, except for Latin names.

## REFERENCE

- United Nations, 2023 The Globally harmonized system of classification and labelling of chemicals (GHS) Tenth revised edition. ST/SG/AC.10/30/Rev.10. United Nations Economic Commission for Europe, Geneva [Available at: [http://www.unece.org/trans/danger/publi/ghs/ghs\\_welcome\\_e.html](http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html)]
- FAO and WHO. 2022. Guidance on good labelling practice for pesticides (Second revision) – International Code of Conduct on Pesticide Management. Rome available at: <https://openknowledge.fao.org/server/api/core/bitstreams/63cc86f5-c519-4021-ace3-5aa42adb7e49/content>
- FAO/WHO 2015. International code of conduct on pesticide management. Guidelines on Good labelling practice for pesticides as revised in August 2022. Food and Agriculture Organization of the United Nations, Rome & World Health Organization, Geneva. [Available at: <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/en/>]
- CropLife International. 2012. The implementation of the Globally Harmonized System of Classification and Labelling of Chemicals and labelling of crop protection products. Position paper. CropLife International. Brussels. [Available at [https://croplife.org/wp-content/uploads/pdf\\_files/Position-Paper-The-Implementation-of-the-Globally-Harmonised-System-of-Classification-and-Labelling-of-Chemicals-August-2012.pdf](https://croplife.org/wp-content/uploads/pdf_files/Position-Paper-The-Implementation-of-the-Globally-Harmonised-System-of-Classification-and-Labelling-of-Chemicals-August-2012.pdf) : <http://croplife.org/crop-protection/regulatory/product-management/globally-harmonized-system-of-hazard-classification-and-labeling/>]
- The Pest Control Products Cap 346 of 1982
- The Pest Control Products (Labelling, Advertising and Packaging) Regulations Legal Notice 194 of 2024.
- EAC Harmonized Guidelines for Labelling Pest Control Products, June 2024
- Globally harmonized systems (GHS) for classification and of chemicals produced by OSHA.
- OECD, 2011 OECD Guidelines for the Testing of Chemicals Freshwater Alga and Cyanobacteria, Growth Inhibition Test 201
- OECD, 2004 OECD Guidelines for the Testing of Chemicals Daphnia sp. Acute Immobilization Test 202
- OECD, 2002 Guideline for the Testing of Chemicals Acute Eye Irritation/Corrosion 405.
- OECD, 1992 OECD Guidelines for the Testing of Chemicals Fish, Acute Toxicity Test 203
- World Health Organization (WHO). 2019. *The WHO recommended classification of pesticides by hazard and guidelines to classification 2019*. World Health Organization, Geneva [Available at: <https://www.who.int/publications/i/item/9789240005662>

## Annex 1: Hazard Statement for Physical, Health & Environmental hazards

### Annex Ia: Hazard statement codes for Physical Hazards

**Table 31: Hazard statement codes for Physical Hazards**

Code	Physical hazard statements (2)	Hazard class (GHS chapter) (2)	Hazard category (4)
H200	Unstable explosive	Explosives (chapter 2.1)	Unstable explosive
H201	Explosive; mass explosion hazard	Explosives (chapter 2.1)	Division 1.1
H202	Explosive; severe projection hazard	Explosives (chapter 2.1)	Division 1.2
H203	Explosive; fire, blast or projection hazard	Explosives (chapter 2.1)	Division 1.3
H204	Fire or projection hazard	Explosives (chapter 2.1)	Division 1.4
H205	May mass explode in fire	Explosives (chapter 2.1)	Division 1.5
H206	Fire, blast or projection hazard; increased risk of explosion if desensitizing agent is reduced	Desensitized explosives (chapter 2.17)	1
H207	Fire or projection hazard; increased risk of explosion if desensitizing agent is reduced	Desensitized explosives (chapter 2.17)	2, 3
H208	Fire hazard; increased risk of explosion if desensitizing agent is reduced	Desensitized explosives (chapter 2.17)	4
H220	Extremely flammable gas	Flammable gases (chapter 2.2)	1
H221	Flammable gas	Flammable gases (chapter 2.2)	2
H222	Extremely flammable aerosol	Aerosols (chapter 2.3)	1
H223	Flammable aerosol	Aerosols (chapter 2.3)	2
H224	Extremely flammable liquid and vapour	Flammable liquids (chapter 2.6)	1
H225	Highly flammable liquid and vapour	Flammable liquids (chapter 2.6)	2
H226	Flammable liquid and vapour	Flammable liquids (chapter 2.6)	3
H227	Combustible liquid	Flammable liquids (chapter 2.6)	4
H228	Flammable solid	Flammable solids (chapter 2.7)	1, 2
H229	Pressurized container: may burst if heated	Aerosols (chapter 2.3)	1, 2, 3
H230	May react explosively even in the absence of air	Flammable gases (including chemically unstable gases) (chapter 2.2)	A (Chemically unstable gases)
H231	May react explosively even in the absence of air at elevated pressure and/or temperature	Flammable gases (including chemically unstable gases) (chapter 2.2)	B (Chemically unstable gases)
H240	Heating may cause an explosion	Self-reactive substances and mixtures (chapter 2.8); and Organic peroxides (chapter 2.15)	Type A
H241	Heating may cause a fire or explosion	Self-reactive substances and mixtures (chapter 2.8); and Organic peroxides (chapter 2.15)	Type B

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

**Annex Ib: Hazard statement codes for Health Hazards**

**Table 32: Hazard statement codes for Health Hazards**

Code (1)	Health hazard statements (2)	Hazard class (GHS chapter) (3)	Hazard category (4)
H300	Fatal if swallowed	Acute toxicity, oral (chapter 3.1)	1, 2
H301	Toxic if swallowed	Acute toxicity, oral (chapter 3.1)	3
H302	Harmful if swallowed	Acute toxicity, oral (chapter 3.1)	4
H303	May be harmful if swallowed	Acute toxicity, oral (chapter 3.1)	5
H304	May be fatal if swallowed and enters airways	Aspiration hazard (chapter 3.10)	1
H305	May be harmful if swallowed and enters airways	Aspiration hazard (chapter 3.10)	2
H310	Fatal in contact with skin	Acute toxicity, dermal (chapter 3.1)	1, 2
H311	Toxic in contact with skin	Acute toxicity, dermal (chapter 3.1)	3
H312	Harmful in contact with skin	Acute toxicity, dermal (chapter 3.1)	4
H313	May be harmful in contact with skin	Acute toxicity, dermal (chapter 3.1)	5
H314	Causes severe skin burns and eye damage	Skin corrosion/irritation (chapter 3.2)	1A, 1B, 1C
H315	Causes skin irritation	Skin corrosion/irritation (chapter 3.2)	2
H316	Causes mild skin irritation	Skin corrosion/irritation (chapter 3.2)	3
H317	May cause an allergic skin reaction	Sensitisation, skin (chapter 3.4)	1, 1A, 1B
H318	Causes serious eye damage	Serious eye damage/eye irritation (chapter 3.3)	1
H319	Causes serious eye irritation	Serious eye damage/eye irritation (chapter 3.3)	2A
H320	Causes eye irritation	Serious eye damage/eye irritation (chapter 3.3)	2B
H330	Fatal if inhaled	Acute toxicity, inhalation (chapter 3.1)	1, 2
H331	Toxic if inhaled	Acute toxicity, inhalation (chapter 3.1)	3
H332	Harmful if inhaled	Acute toxicity, inhalation (chapter 3.1)	4
H333	May be harmful if inhaled	Acute toxicity, inhalation (chapter 3.1)	5
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled	Sensitisation, respiratory (chapter 3.4)	1, 1A, 1B
H335	May cause respiratory irritation	Specific target organ toxicity, single exposure; Respiratory tract irritation (chapter 3.8);	3

Code (1)	Health hazard statements (2)	Hazard class (GHS chapter) (3)	Hazard category (4)
H336	May cause drowsiness or dizziness	Specific target organ toxicity, single exposure; Narcotic effects(chapter 3.8)	3
H340	May cause genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	Germ cell mutagenicity (chapter 3.5)	1A, 1B
H341	Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	Germ cell mutagenicity (chapter 3.5)	2
H350	May cause cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	Carcinogenicity (chapter 3.6)	1A, 1B
H351	Suspected of causing cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	Carcinogenicity (chapter 3.6)	2
H360	May damage 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)	Reproductive toxicity (chapter 3.7)	1A, 1B
H361	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)	Reproductive toxicity (chapter 3.7)	2
H362	May cause harm to breast-fed children	Reproductive toxicity, effects on or via lactation (chapter 3.7)	Additional category
H370	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)	Specific target organ toxicity, single exposure (chapter 3.8)	1
H371	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)	Specific target organ toxicity, single exposure (chapter 3.8)	2
H372	Causes damage to organs ( 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)	Specific target organ toxicity, repeated exposure (chapter 3.9)	1

Code (1)	Health hazard statements (2)	Hazard class (GHS chapter) (3)	Hazard category (4)
H373	May cause damage to organs ( 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)	Specific target organ toxicity, repeated exposure (chapter 3.9)	2
H300 + H310	Fatal if swallowed or in contact with skin	Acute toxicity, oral (chapter 3.1) and acute toxicity dermal (chapter 3.1)	1, 2
H300 + H330	Fatal if swallowed or if inhaled	Acute toxicity, oral (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	1, 2
H310 + H330	Fatal in contact with skin or if inhaled	Acute toxicity, dermal (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	1, 2
H300 + H310 + H330	Fatal if swallowed, in contact with skin or if inhaled	Acute toxicity, oral (chapter 3.1), acute toxicity, dermal (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	1, 2
H301 + H311	Toxic if swallowed or in contact with skin	Acute toxicity, oral (chapter 3.1) and acute toxicity dermal (chapter 3.1)	3
H301 + H331	Toxic if swallowed or if inhaled	Acute toxicity, oral (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	3
H311 + H331	Toxic in contact with skin or if inhaled	Acute toxicity, dermal (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	3
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled	Acute toxicity, oral (chapter 3.1), acute toxicity, dermal (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	3
H302 + H312	Harmful if swallowed or in contact with skin	Acute toxicity, oral (chapter 3.1) and acute toxicity dermal (chapter 3.1)	4
H302 + H332	Harmful if swallowed or if inhaled	Acute toxicity, oral (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	4
H312 + H332	Harmful in contact with skin or if inhaled	Acute toxicity, dermal (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	4
H302 + H312 + H332	Harmful if swallowed, in contact with skin or if inhaled	Acute toxicity, oral (chapter 3.1), acute toxicity, dermal (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	4
H303 + H313	May be harmful if swallowed or in contact with skin	Acute toxicity, oral (chapter 3.1) and acute toxicity dermal (chapter 3.1)	5

<b>Code (1)</b>	<b>Health hazard statements (2)</b>	<b>Hazard class (GHS chapter) (3)</b>	<b>Hazard category (4)</b>
H303 + H333	May be harmful if swallowed or if inhaled	Acute toxicity, oral (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	5
H313 + H333	May be harmful in contact with skin or if inhaled	Acute toxicity, dermal (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	5
H303 + H313 + H333	May be harmful if swallowed, in contact with skin or if inhaled	Acute toxicity, oral (chapter 3.1), acute toxicity, dermal (chapter 3.1) and acute toxicity, inhalation (chapter 3.1)	5
H315 + H320	Causes skin and eye irritation	Skin corrosion/irritation (chapter 3.2) and serious eye damage/eye irritation (chapter 3.3)	2 (skin)/2B (eye)

**Annex 1c: Hazard statement codes for environmental hazards**

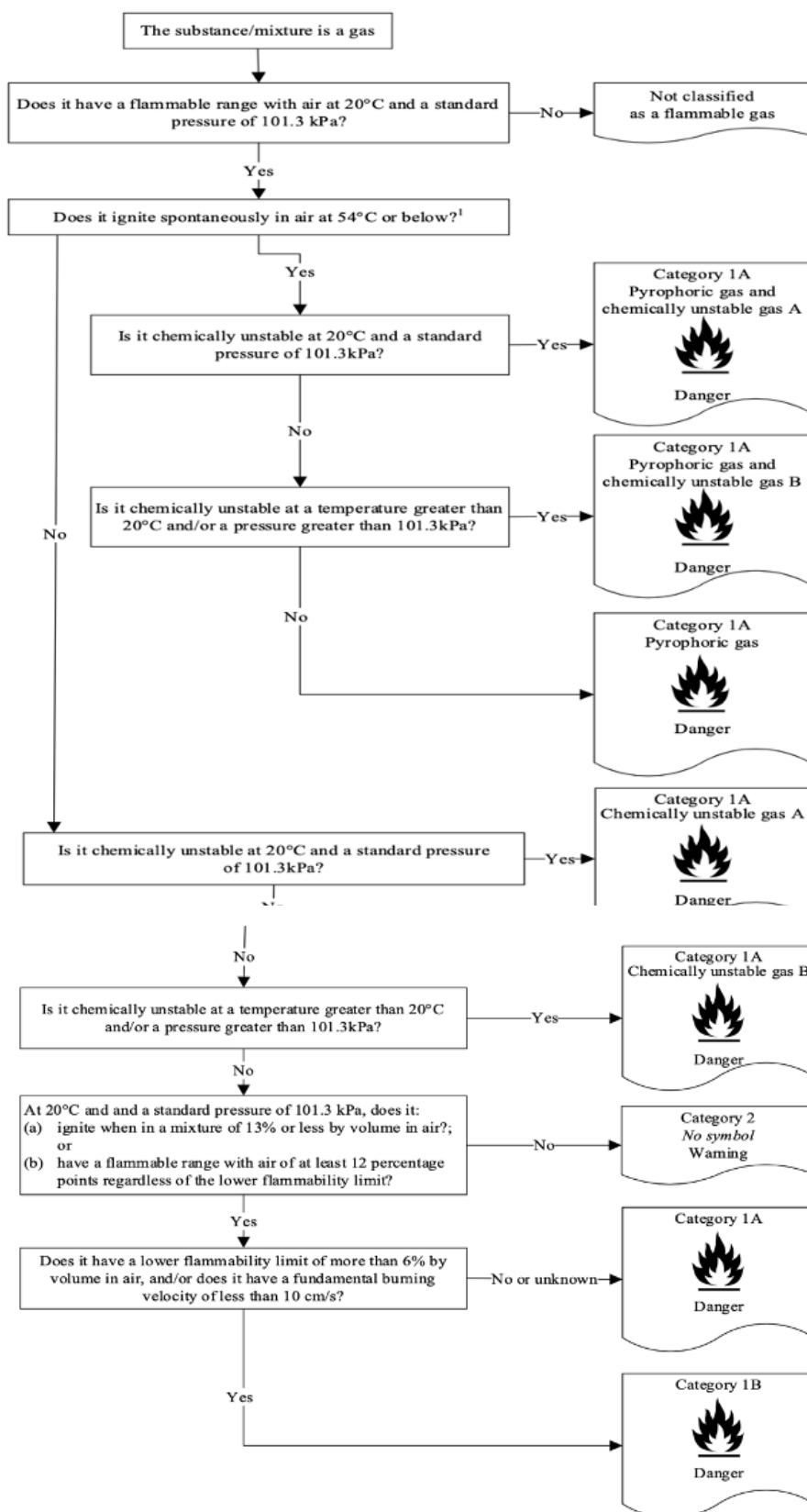
**Table 33: Hazard statement codes for environmental hazards**

<b>Code (1)</b>	<b>Environmental hazard statements (2)</b>	<b>Hazard class (GHS chapter) (4)</b>	<b>Hazard category(4)</b>
H400	Very toxic to aquatic life	Hazardous to the aquatic environment, acute hazard (chapter 4.1)	1
H401	Toxic to aquatic life	Hazardous to the aquatic environment, acute hazard (chapter 4.1)	2
H402	Harmful to aquatic life	Hazardous to the aquatic environment, acute hazard (chapter 4.1)	3
H410	Very toxic to aquatic life with long lasting effects	Hazardous to the aquatic environment, long-term hazard (chapter 4.1)	1
H411	Toxic to aquatic life with long lasting effects	Hazardous to the aquatic environment, long-term hazard (chapter 4.1)	2
H412	Harmful to aquatic life with long lasting effects	Hazardous to the aquatic environment, long-term hazard (chapter 4.1)	3
H413	May cause long lasting harmful effects to aquatic life	Hazardous to the aquatic environment, long-term hazard (chapter 4.1)	4
H420	Harms public health and the environment by destroying ozone in the upper atmosphere	Hazardous to the ozone layer (chapter 4.2)	1

**Annex 2: Decision Logics**

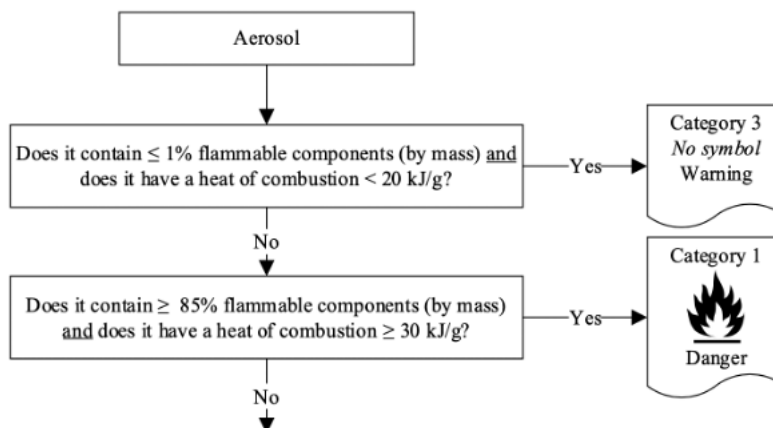
The decision logic and guidance which follow are not part of the harmonized classification system but have been provide here as additional guidance. It is strongly recommended that the applicant studies the criteria before and during use of the decision logic.

### Annex 2a: Decision logic for flammable gas

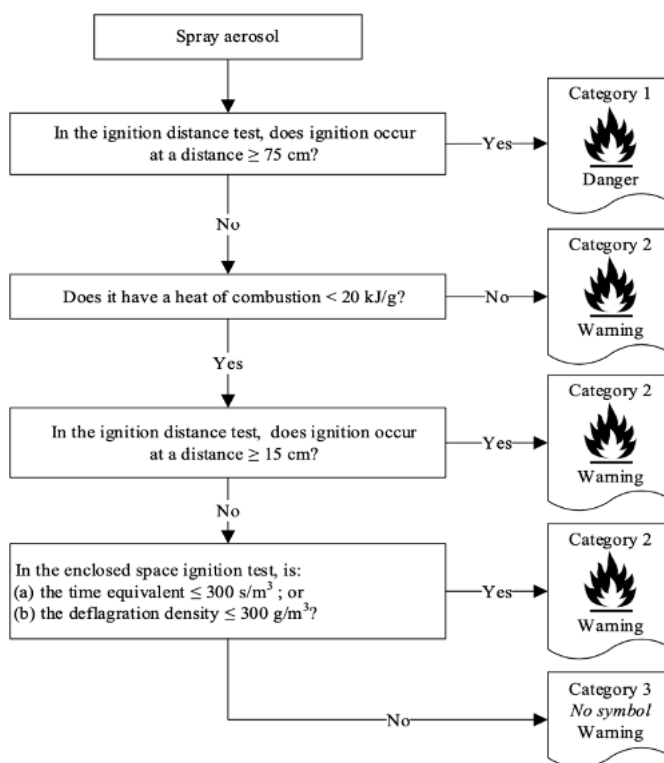


## Annex 2b Decision logic for Flammable aerosols

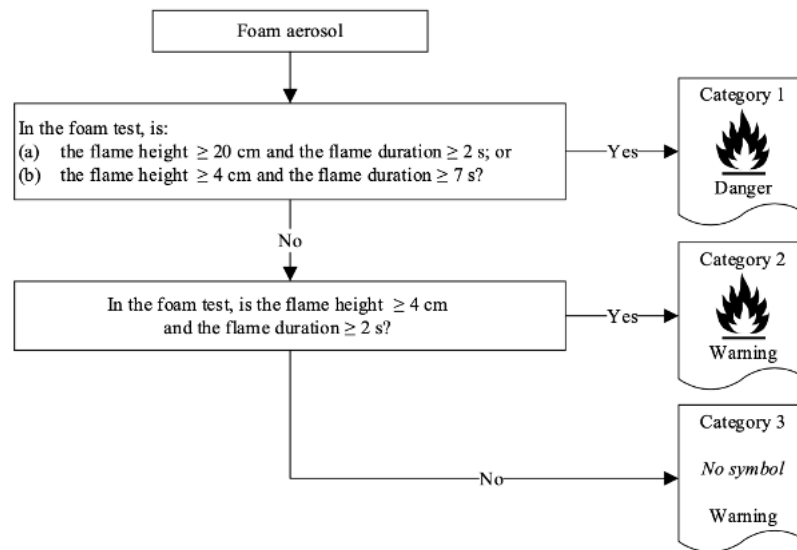
### Decision logic for aerosols



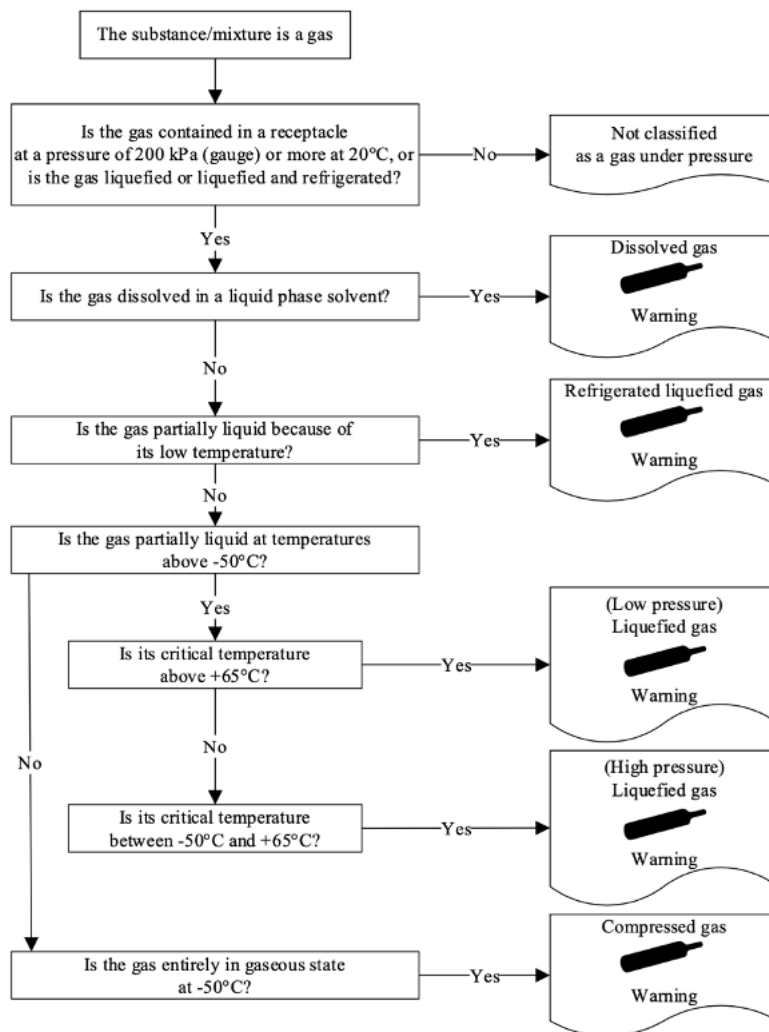
### Decision logic for spray aerosols



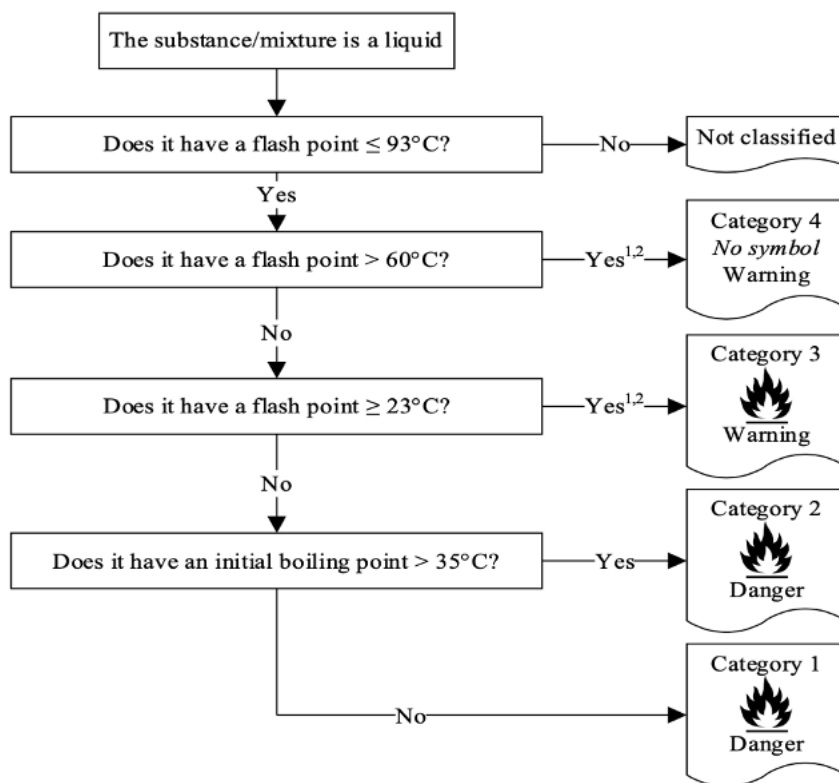
### Decision logic for foam aerosols



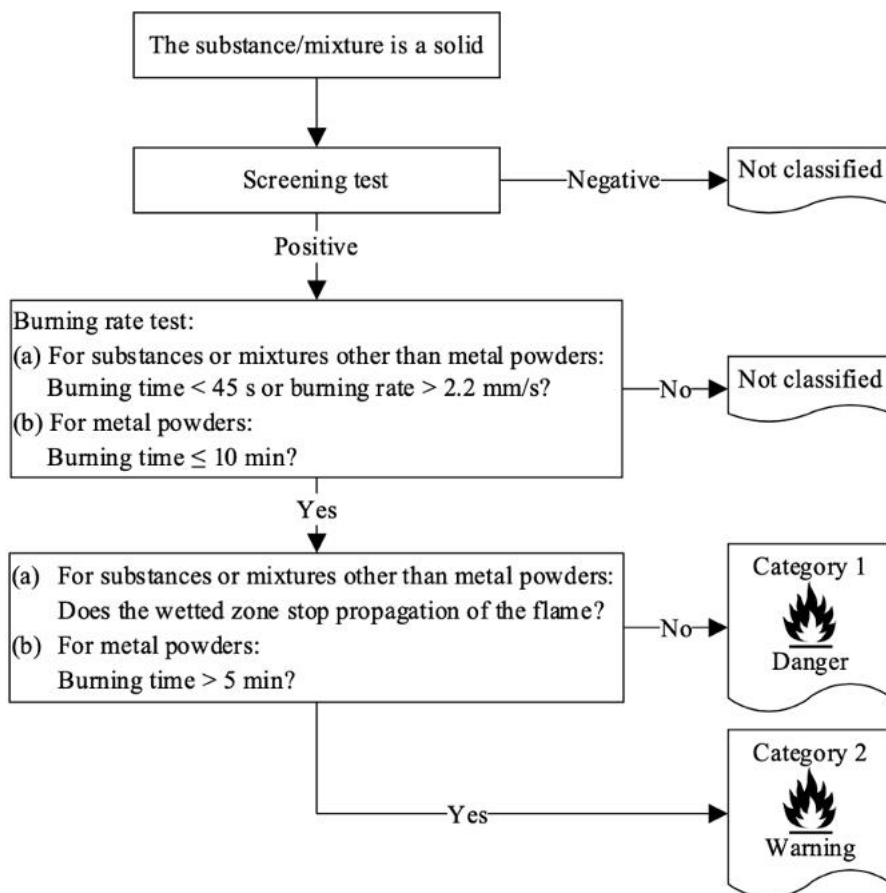
### Annex 2c: Decision logic for gases under pressure



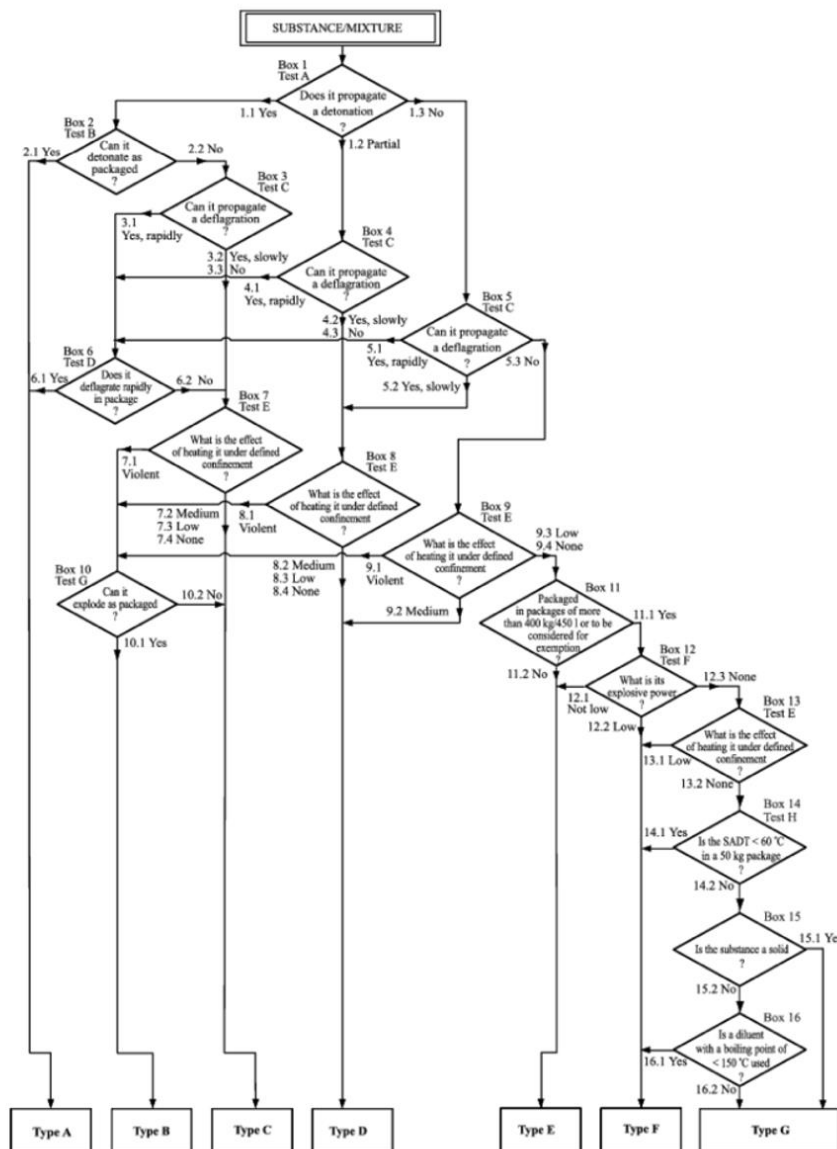
### Annex 2d: Decision logic for flammable liquids



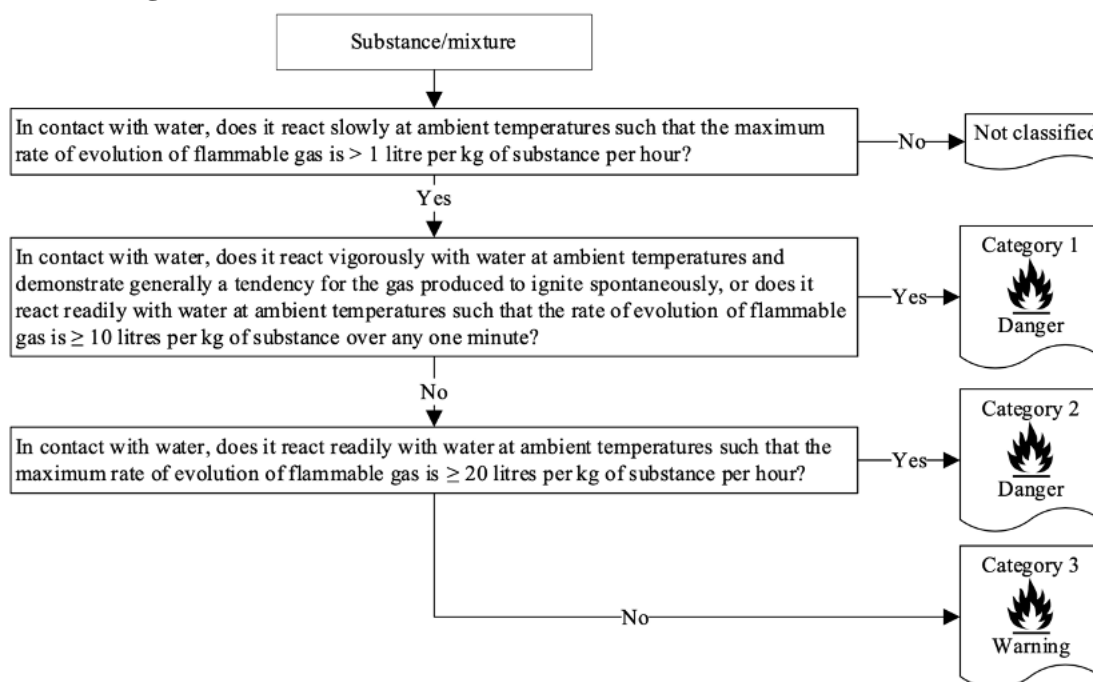
### Annex 2e: Decision logic for flammable solids



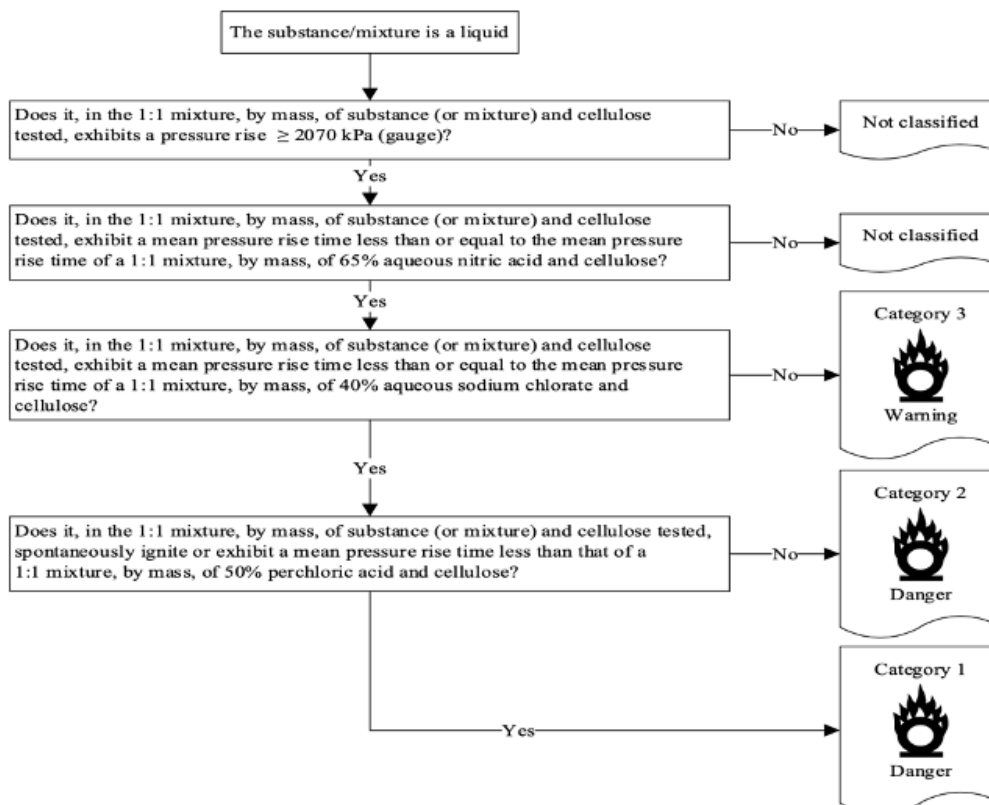
**Annex 2f: Decision logic for self – reactive substance and mixtures**



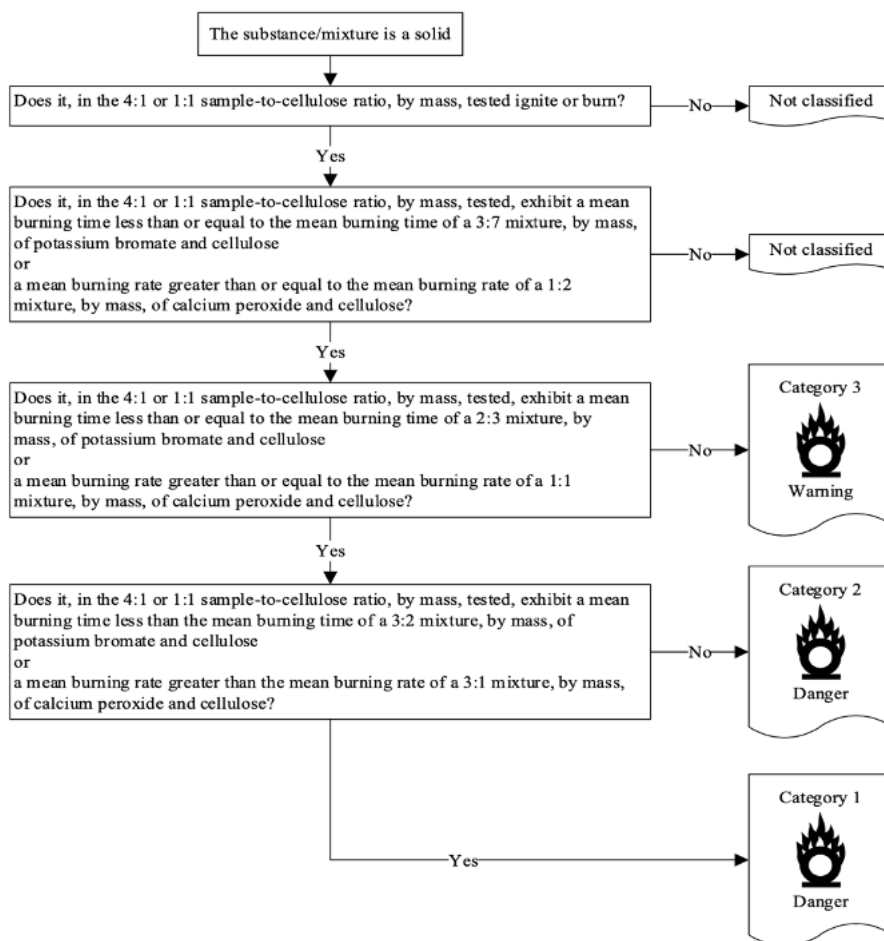
### Annex 2g: Decision logic for substance and mixtures which in contact with water emits flammable gases



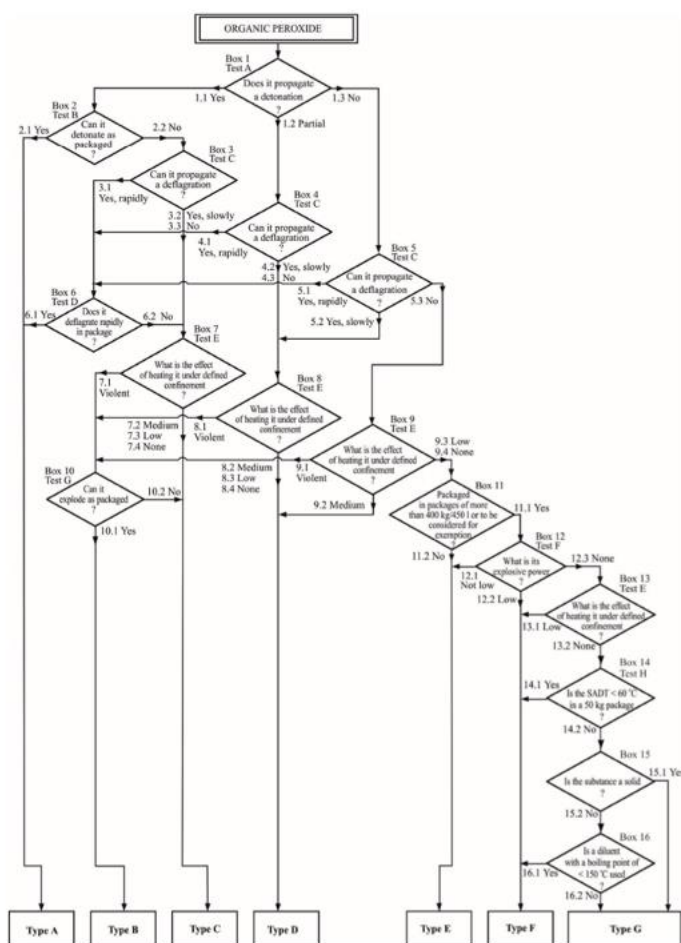
### Annex 2h: Decision logic for oxidizing liquids



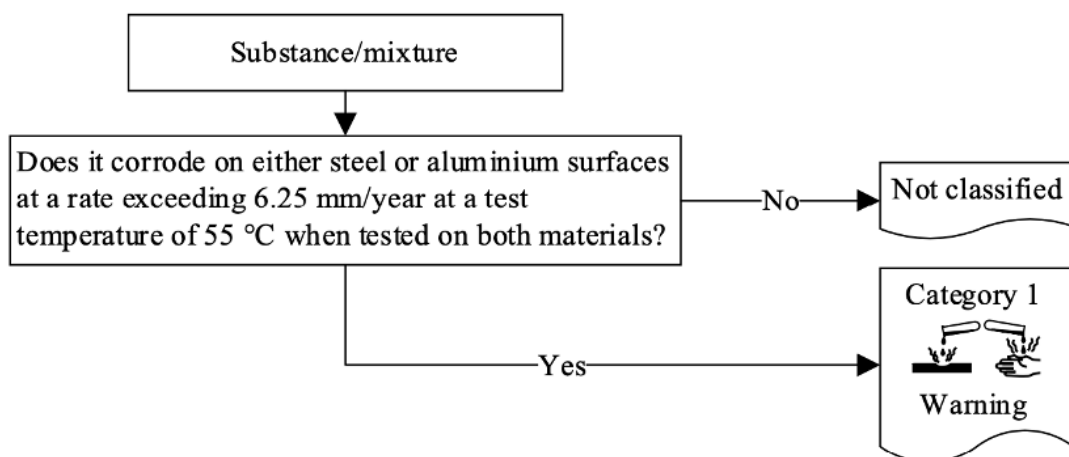
### Annex 2(i): oxidizing solids



### Annex 2(x) Decision logic for organic peroxides

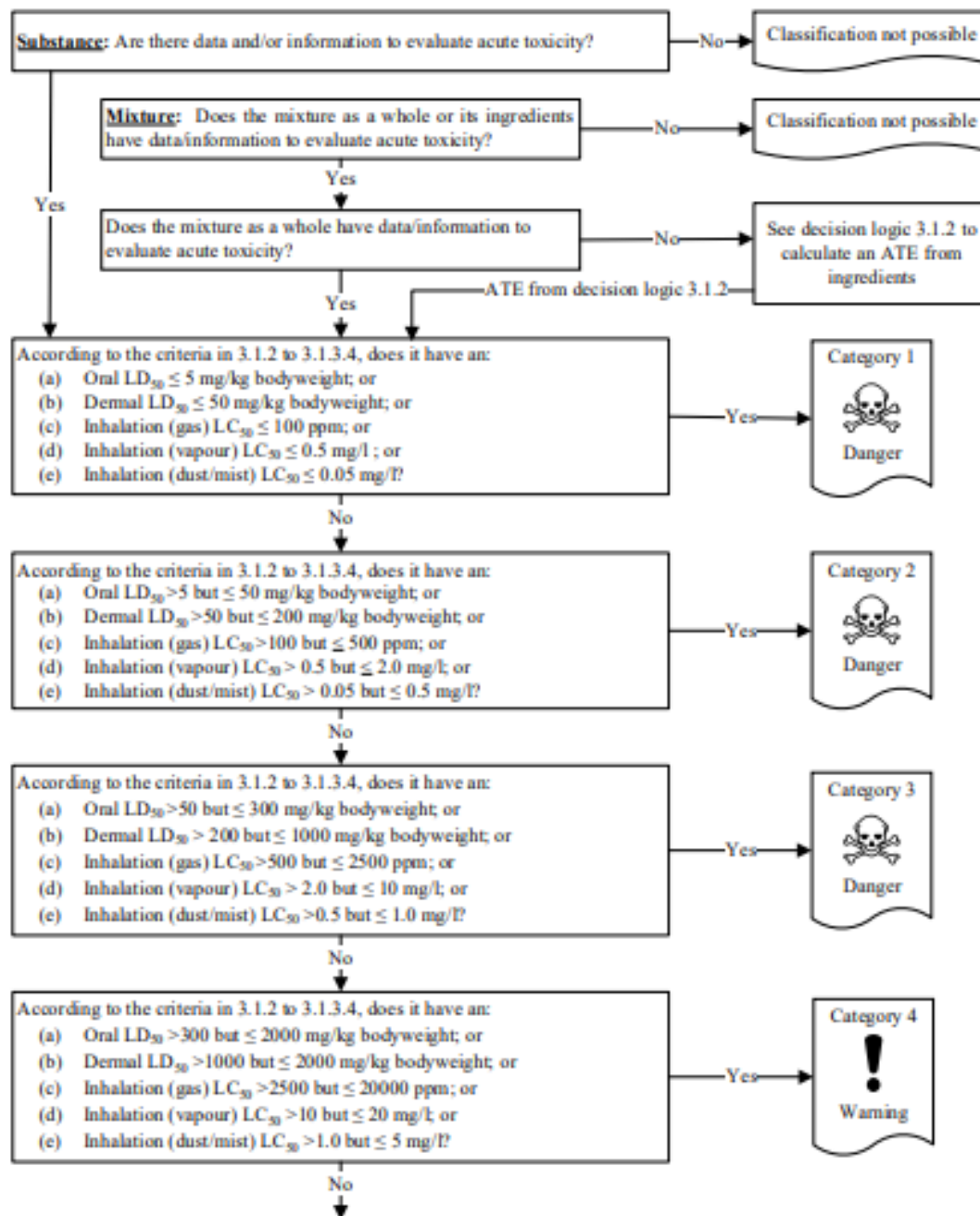


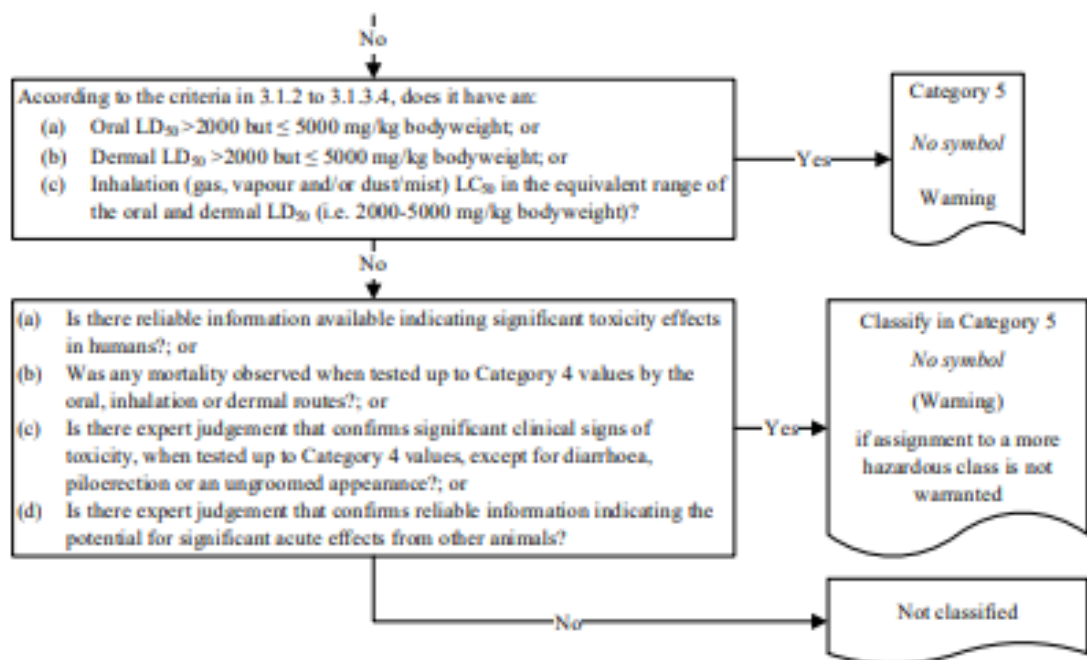
### Annex 2(xi) Decision logic for corrosive to metals



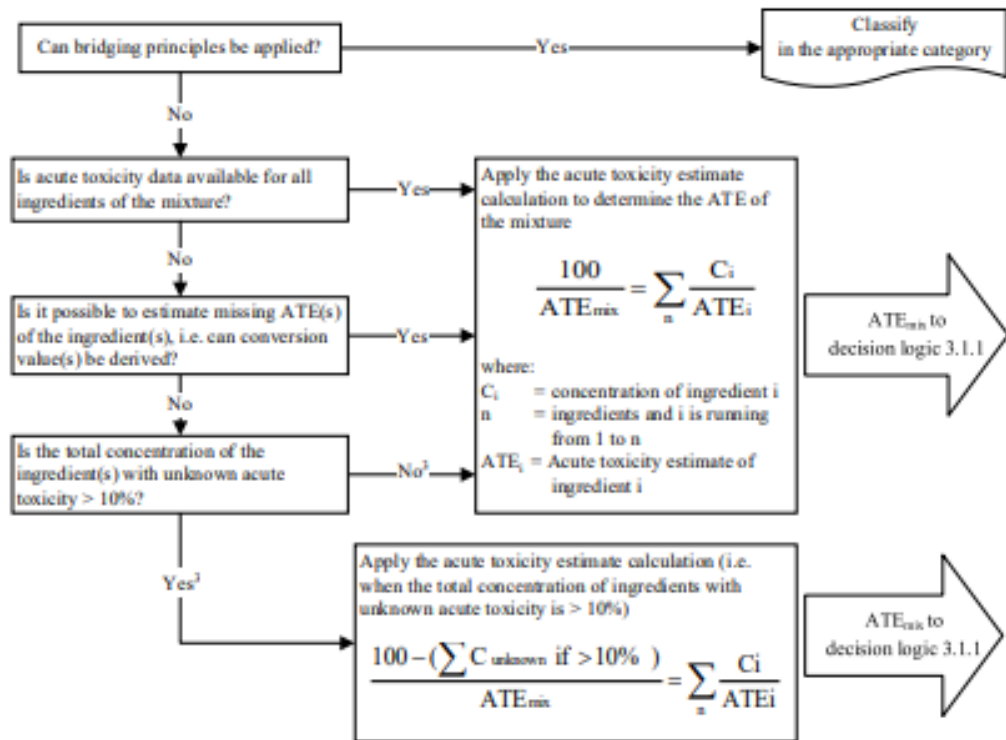
### Annex 3: Decision logic for Health Hazards

#### 3.1.5.1 Decision logic 3.1.1 for acute toxicity

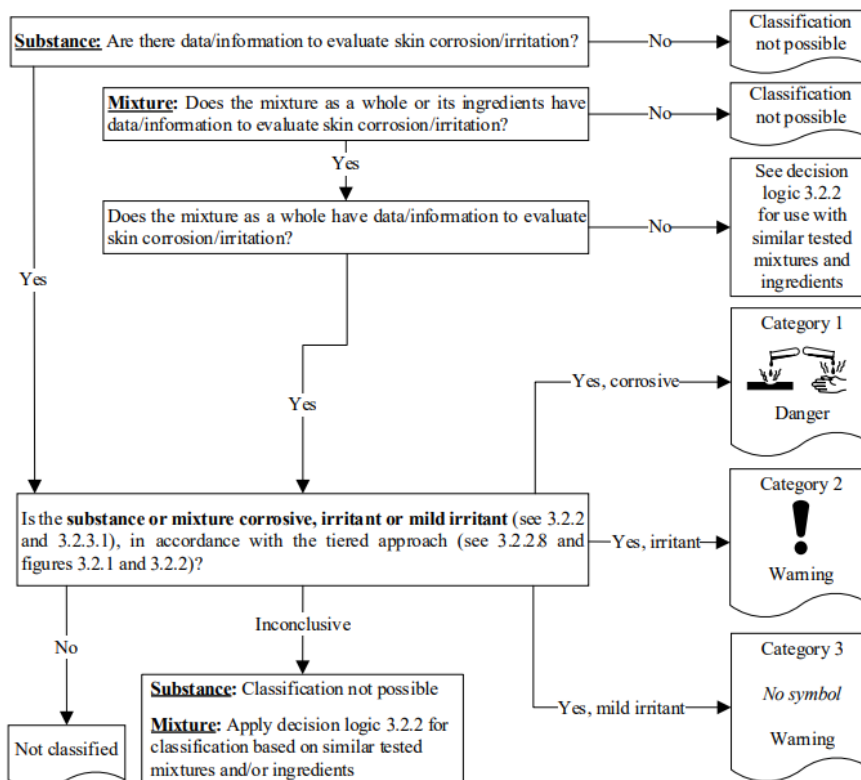




3.1.5.2 Decision logic 3.1.2 for acute toxicity (see criteria in 3.1.3.5 and 3.1.3.6)



3.2.5.1 *Decision logic 3.2.1 for skin corrosion/irritation*



3.2.5.2 Decision logic 3.2.2 for skin corrosion/irritation

Classification of mixtures on the basis of information/data on similar tested mixtures and/or ingredients

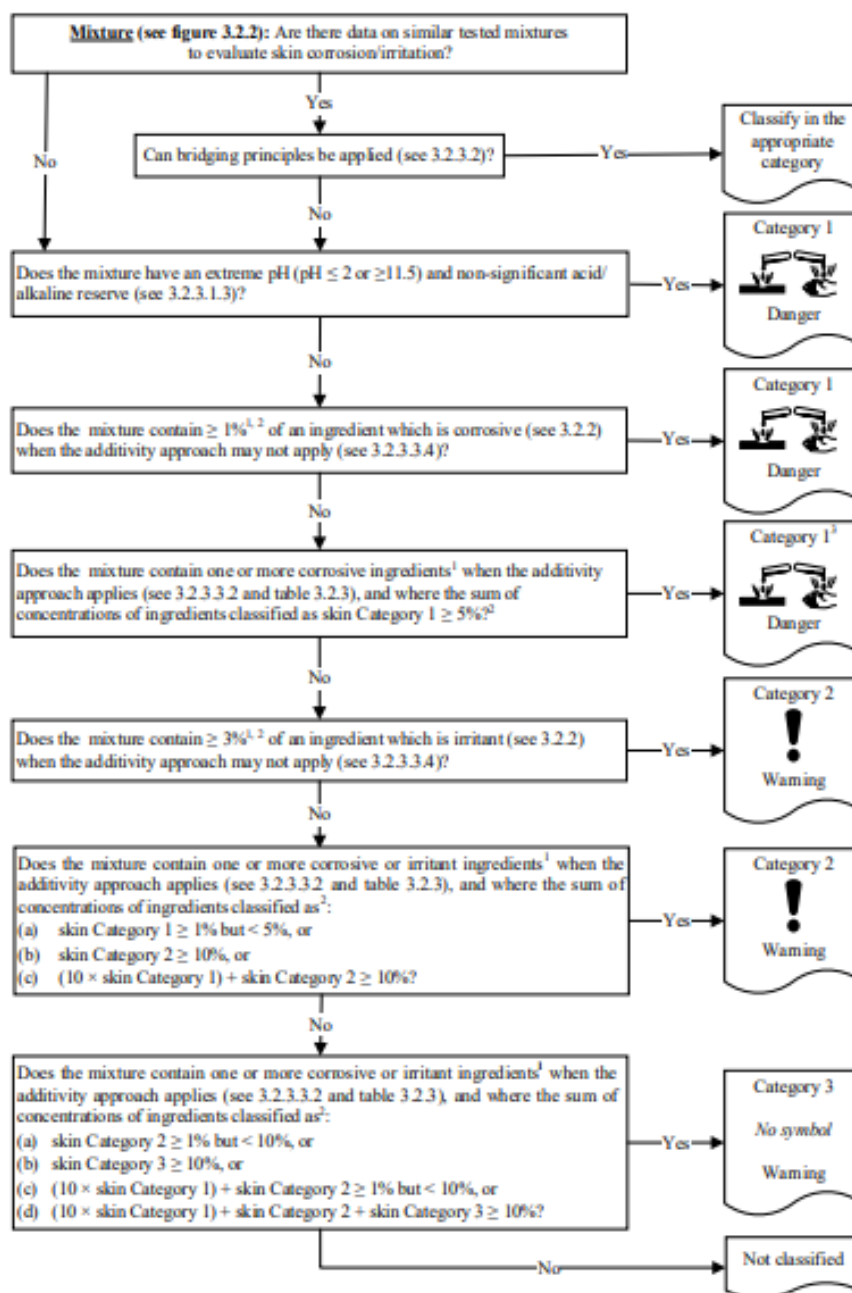
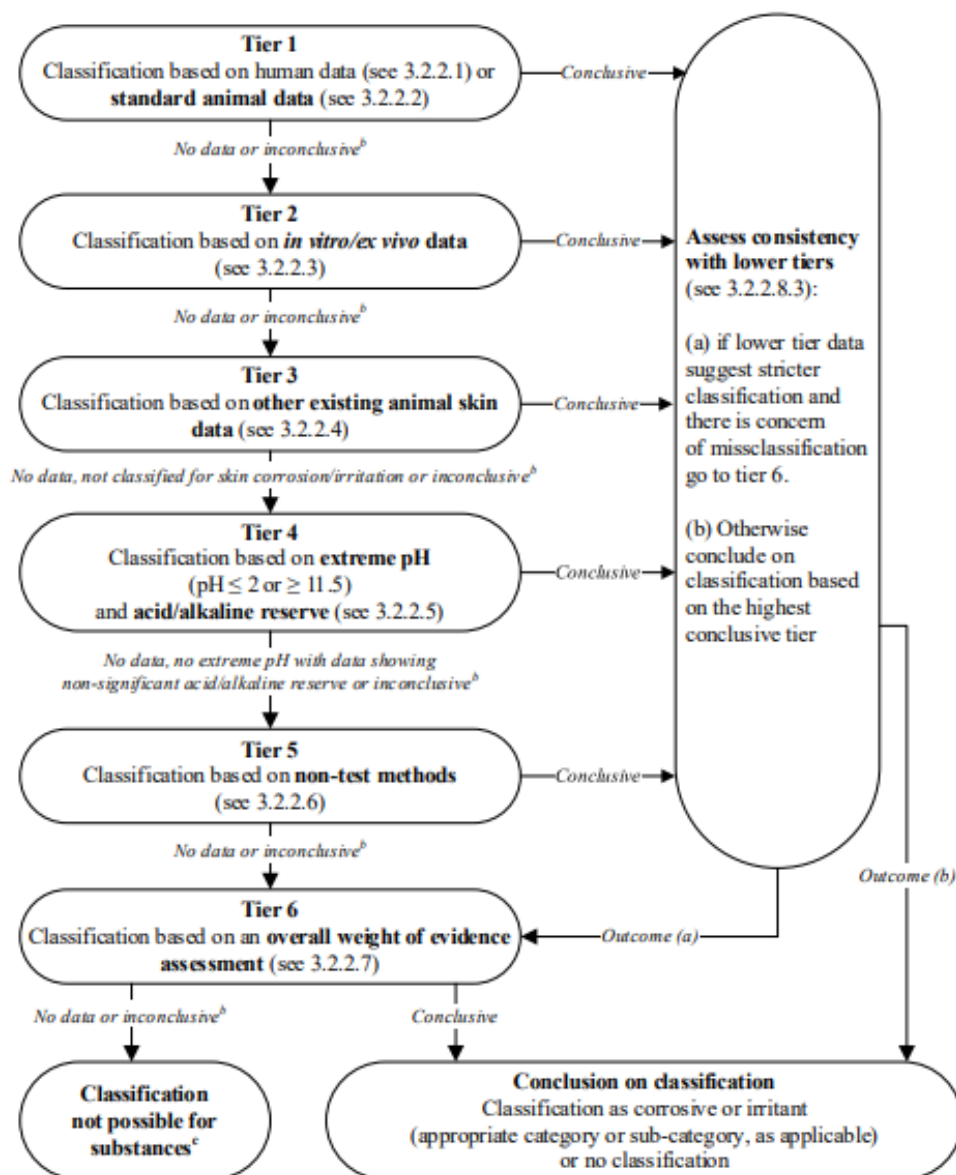


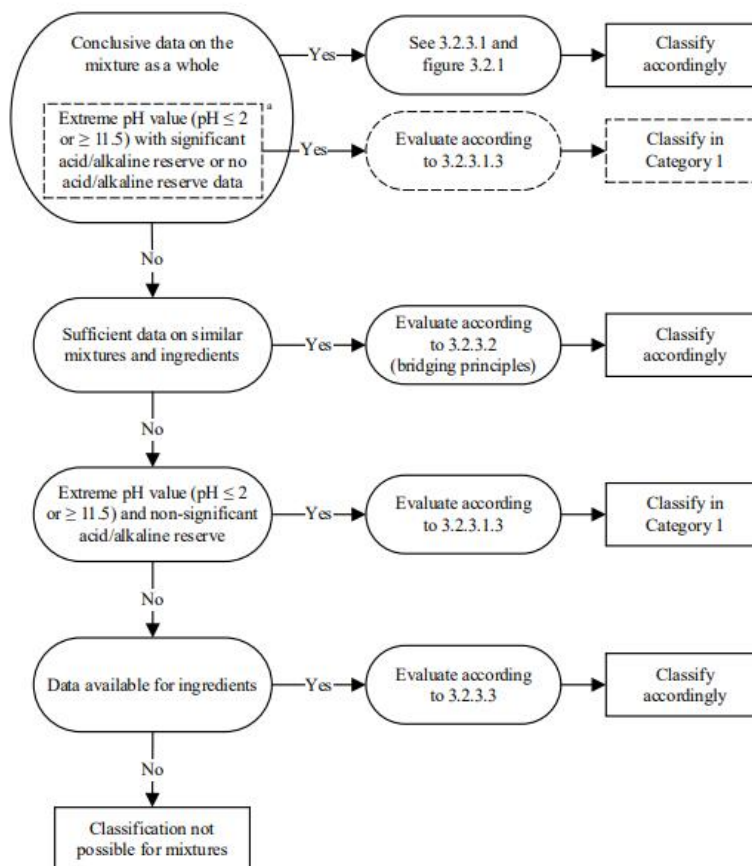
Figure 3.2.1: Application of the tiered approach for skin corrosion and irritation<sup>a</sup>



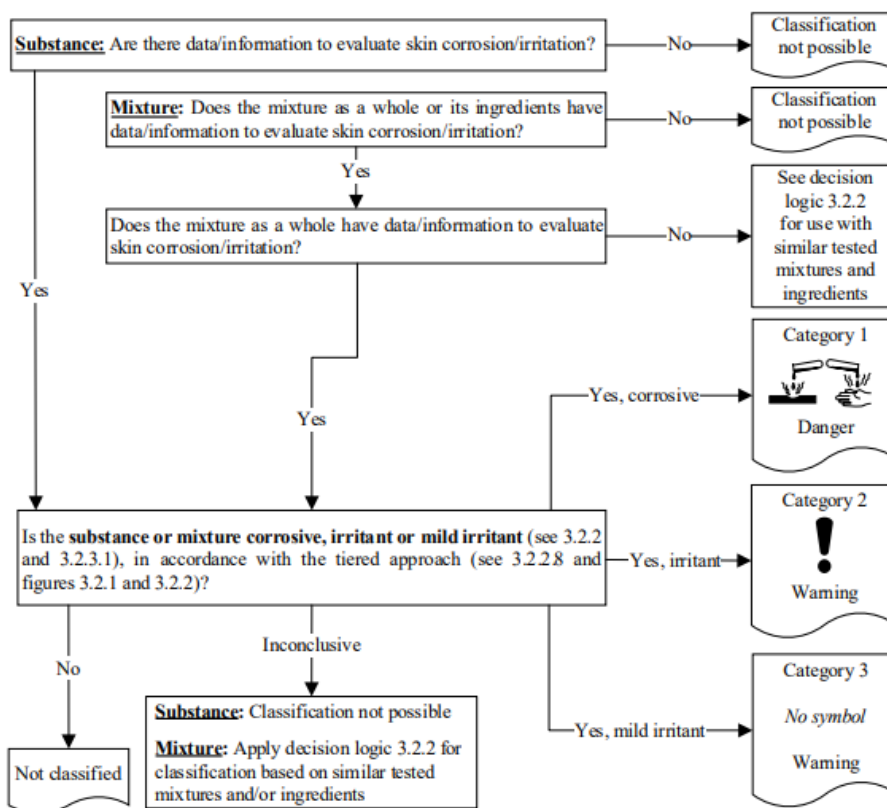
### 3.2.3 Classification criteria for mixtures

The approach to classification for skin corrosion/irritation is tiered and is dependent upon the amount of information available for the mixture itself and for its ingredients. The flow chart of figure 3.2.2 below outlines the process to be followed.

**Figure 3.2.2: Tiered approach to classification of mixtures for skin corrosion/irritation**



3.2.5.1 **Decision logic 3.2.1 for skin corrosion/irritation**



3.2.5.2 **Decision logic 3.2.2 for skin corrosion/irritation**

Classification of mixtures on the basis of information/data on similar tested mixtures and/or ingredients

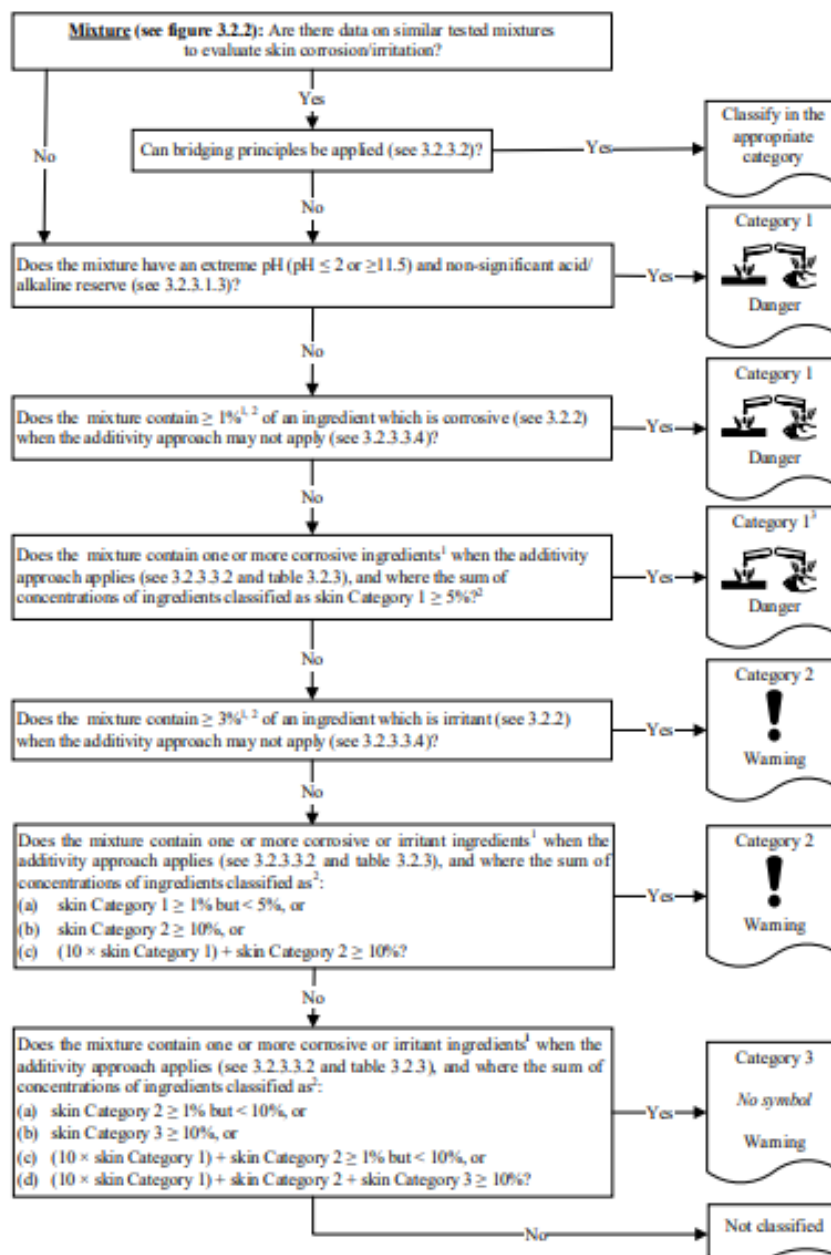
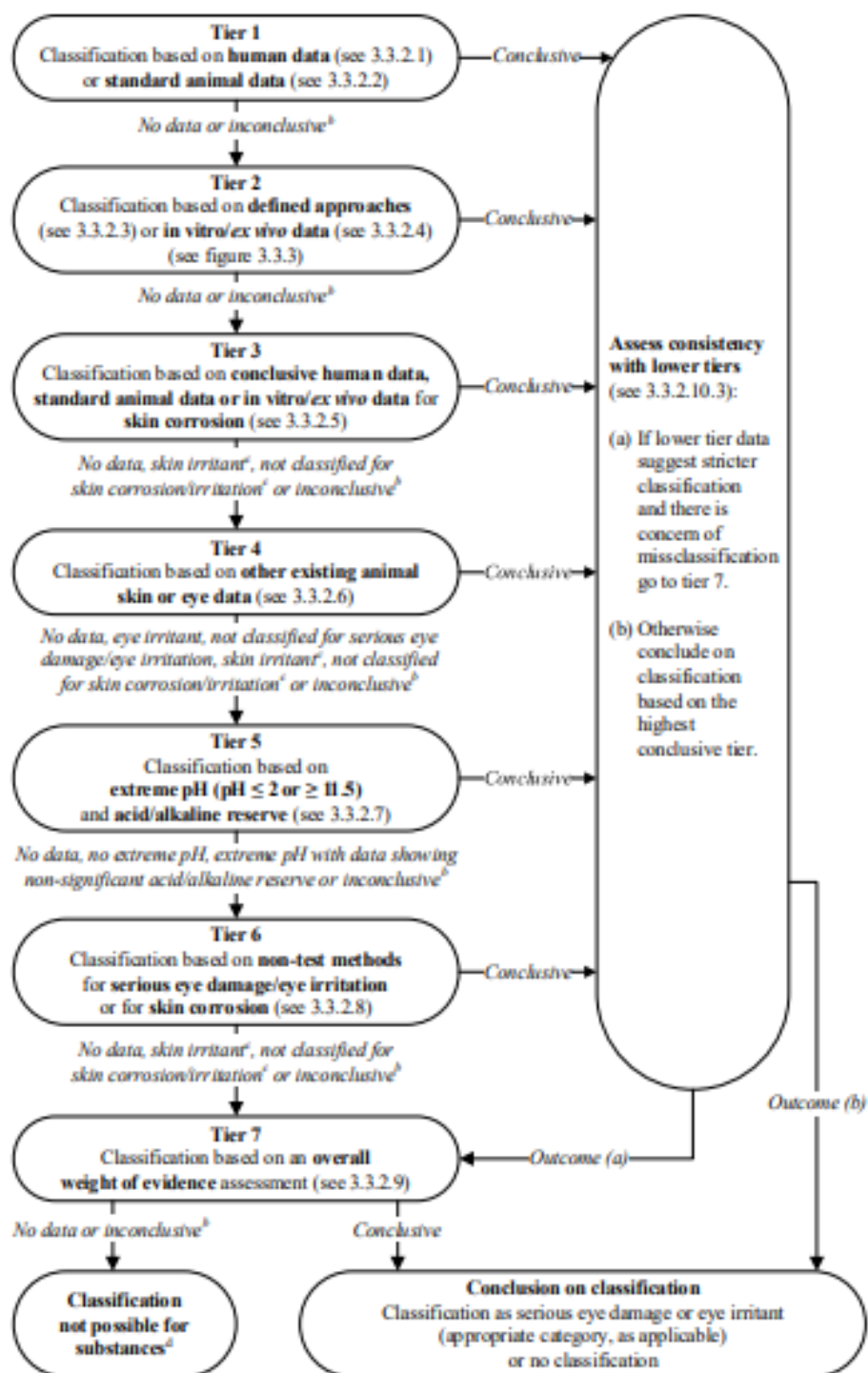
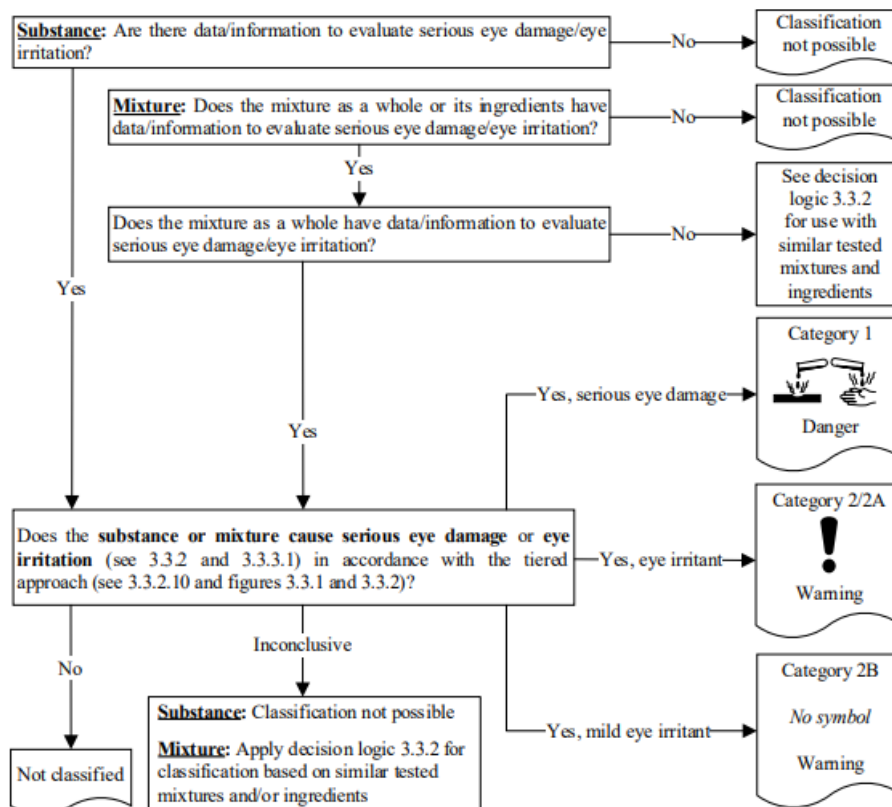


Figure 3.3.1: Application of the tiered approach for serious eye damage/eye irritation<sup>a</sup>

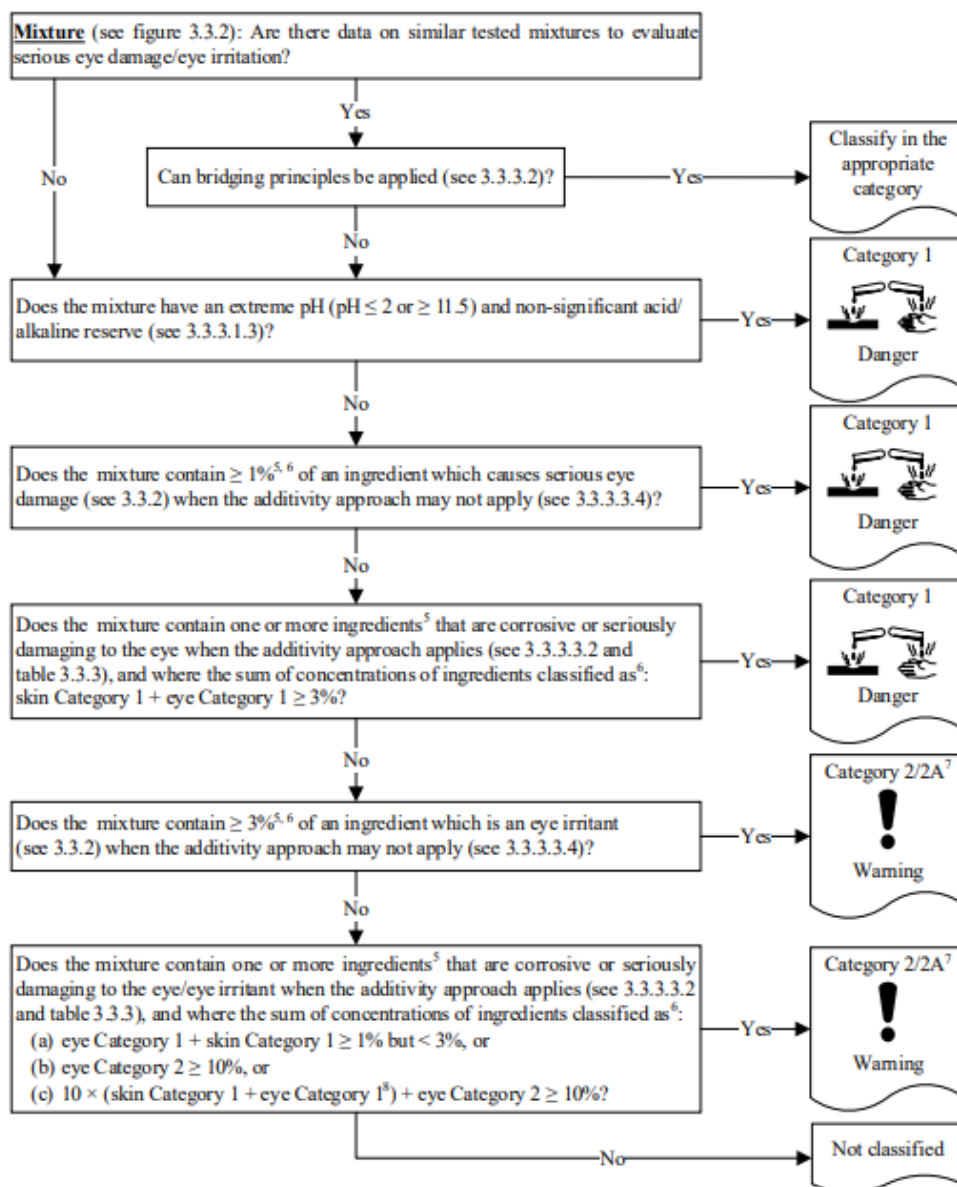


3.3.5.1 **Decision logic 3.3.1 for serious eye damage/eye irritation**



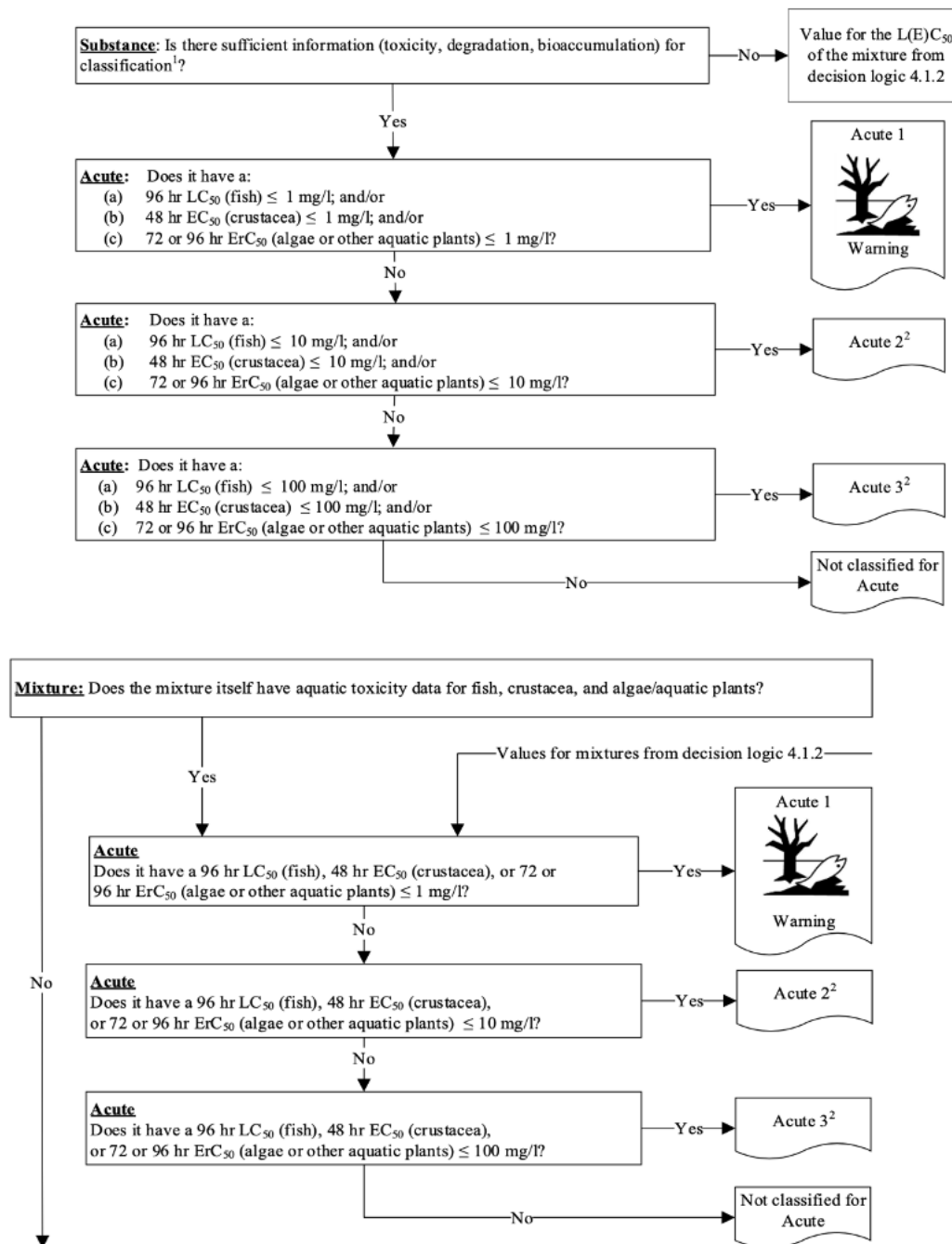
3.3.5.2 *Decision logic 3.3.2 for serious eye damage/eye irritation*

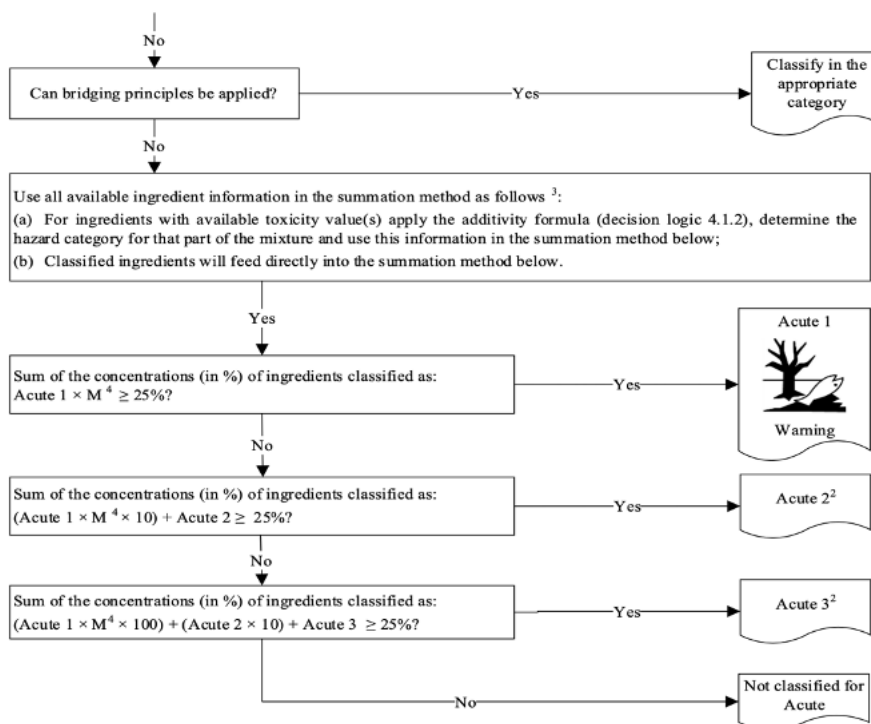
*Classification of mixtures on the basis of information/data on similar tested mixtures and ingredients*



## Annex 4: Decision logic for Environmental Hazards

### Annex 4: Decision logic for short term (acute) aquatic hazard for substances and mixtures hazardous to the aquatic environment



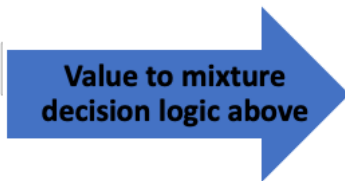


Apply the additivity formula:

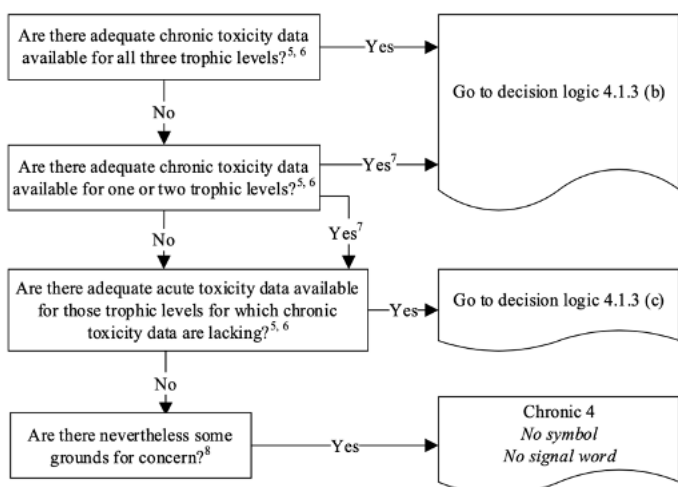
$$\frac{\sum C_i}{L(E)C_{50m}} = \sum \frac{C_i}{L(E)C_{50i}}$$

where:

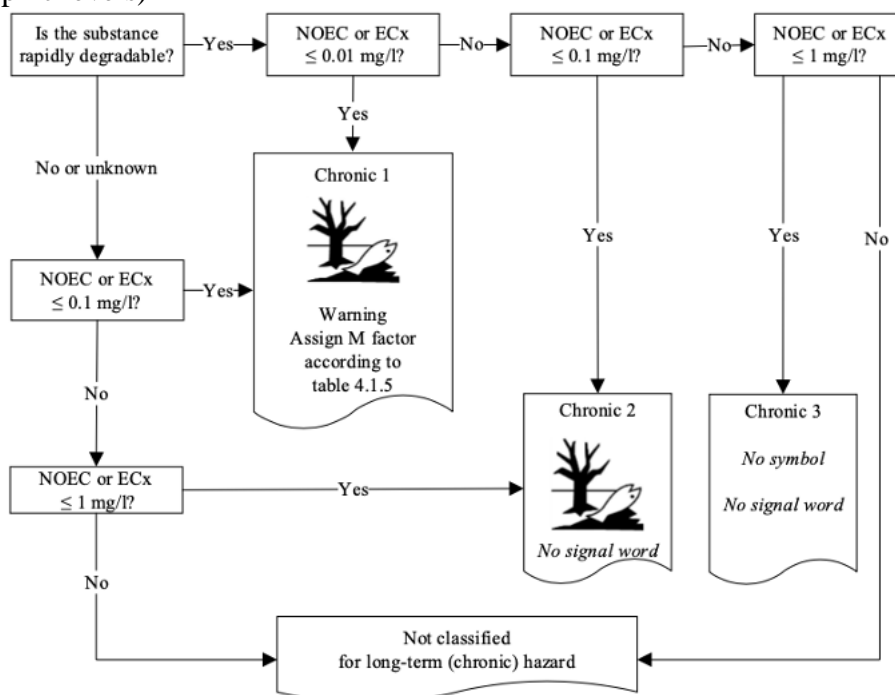
- $C_i$  = concentration of ingredient i (weight percentage)
- $L(E)C_{50i}$  = (mg/l)  $LC_{50}$  or  $EC_{50}$  for ingredient i
- $n$  = number of ingredients, and i is running from 1 to n
- $L(E)C_{50m}$  =  $L(E)C_{50}$  of the part of the mixture with test data



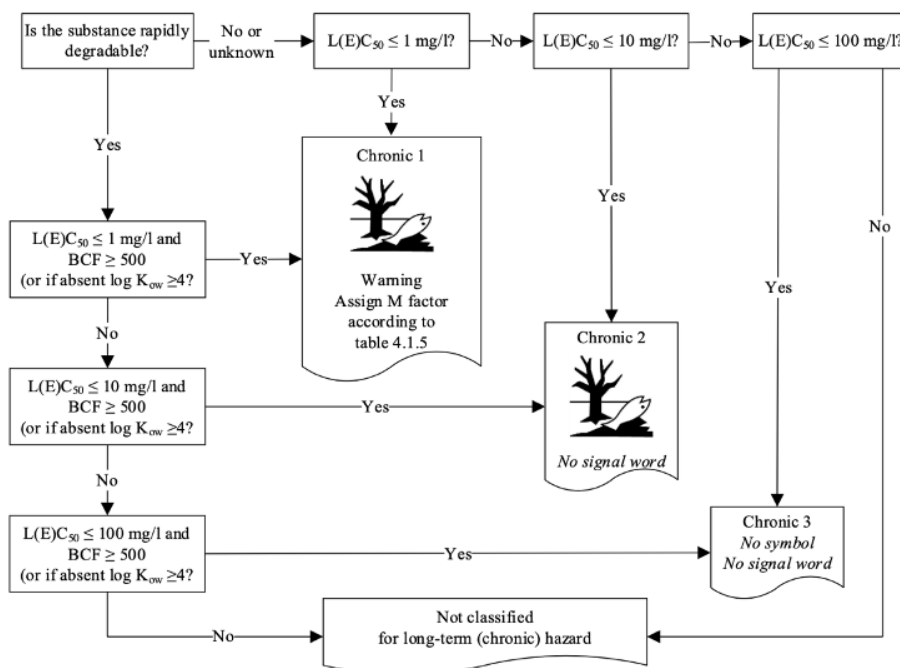
**Annex 4: Long term (chronic) aquatic hazard classification for substances**



Decision logic for substances (when adequate chronic toxicity data are available for all three trophic levels)



**Annex 4: Substances (when adequate chronic toxicity data not available for all three trophic levels)**



## Annex 4: Mixtures

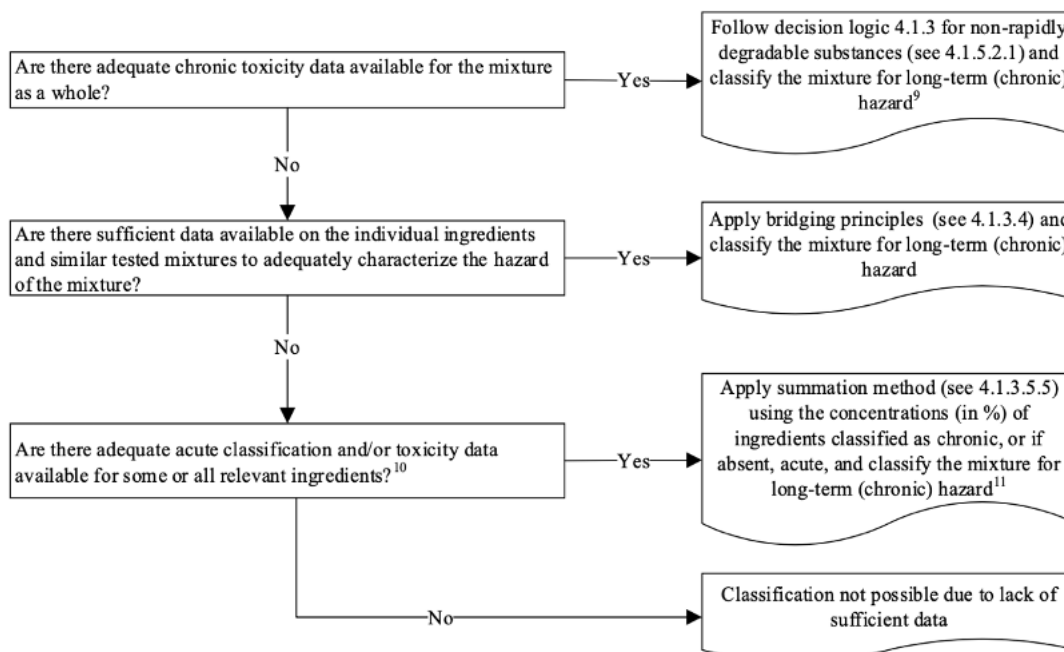
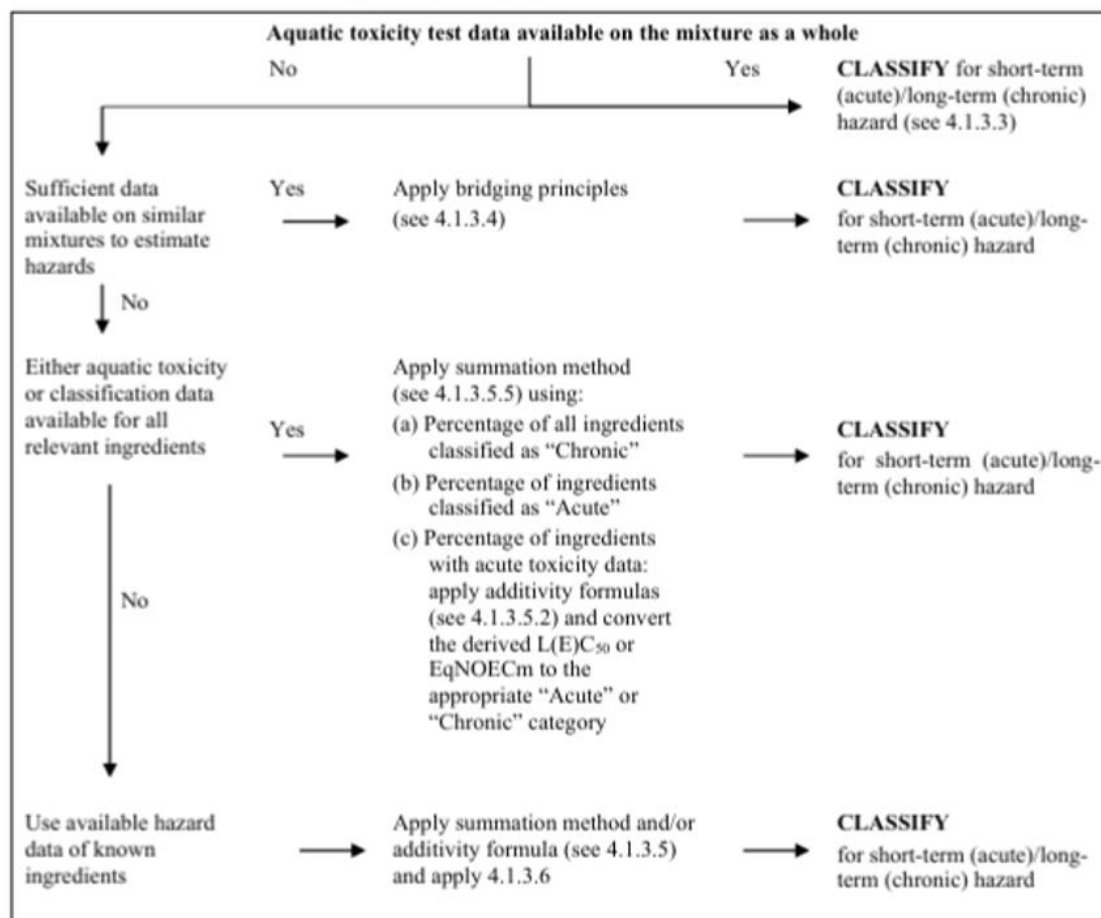


Figure 4.1.2: Tiered approach to classification of mixtures for short-term (acute) and long-term (chronic) aquatic environmental hazards



NOTE 1: The organisms fish, crustacea and algae are tested as surrogate species covering a range of trophic levels and taxa, and the test methods are highly standardized. Data on other organisms may also be considered, however, provided they represent equivalent species and test endpoints.

NOTE 2: When classifying substances as Acute 1 and/or Chronic 1, it is necessary at the same time to indicate an appropriate M factor (See 4.1.3.5.5.5. to apply the summation method

NOTE 3: Where the algal toxicity  $ErC_{50}$  [=  $EC_{50}$  (growth rate)] falls more than 100 times below the next most sensitive species and results in a classification based solely on this effect, consideration should be given to whether this toxicity is representative of the toxicity to aquatic plants. Where it can be shown that this is not the case, professional judgment should be used in deciding if classification should be applied. Classification should be based on the  $ErC_{50}$ . In circumstances where the basis of the  $EC_{50}$  is not specified and no  $ErC_{50}$  is recorded, classification should be based on the lowest  $EC_{50}$  available.

NOTE 4: Lack of rapid degradability is based on either a lack of ready biodegradability or other evidence of lack of rapid degradation. When no useful data on degradability are available, either

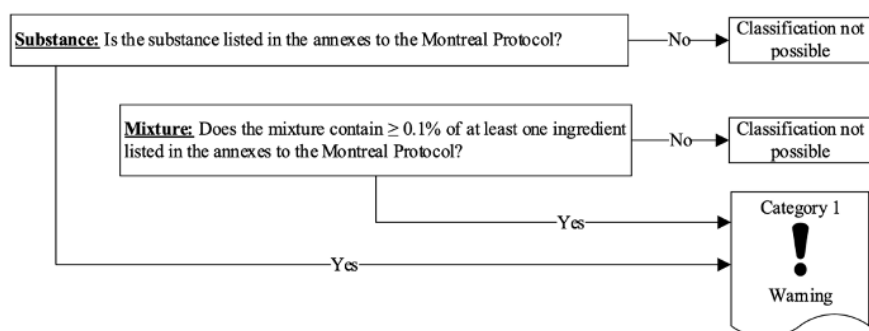
experimentally determined or estimated data, the substance should be regarded as not rapidly degradable.

NOTE 5: Potential to bioaccumulate, based on an experimentally derived BCF  $\geq 500$  or, if absent, a log Kow  $\geq 4$ , provided log Kow, provided

#### 4.2.4 Decision logic for substances and mixtures hazardous to the ozone layer

The decision logic which 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 4.2.1



### Multiplying factors for highly toxic ingredients of mixtures

Acute toxicity L(E)C <sub>50</sub> value	M factor	Chronic toxicity NOEC value	M factor	
			NRD <sup>a</sup> ingredients	RD <sup>b</sup> ingredients
0.1 < L(E)C <sub>50</sub> ≤ 1	1	0.01 < NOEC ≤ 0.1	1	-
0.01 < L(E)C <sub>50</sub> ≤ 0.1	10	0.001 < NOEC ≤ 0.01	10	1
0.001 < L(E)C <sub>50</sub> ≤ 0.01	100	0.0001 < NOEC ≤ 0.001	100	10
0.0001 < L(E)C <sub>50</sub> ≤ 0.001	1000	0.00001 < NOEC ≤ 0.0001	1000	100
0.00001 < L(E)C <sub>50</sub> ≤ 0.0001	10000	0.000001 < NOEC ≤ 0.00001	10000	1000
(continue in factor 10 intervals)		(continue in factor 10 intervals)		

<sup>a</sup> Non-rapidly degradable

<sup>b</sup> Rapidly degradable

### Annex 5: Safety Data Sheet

Safety Data Sheet (SDS), formerly referred to as Material Safety Data Sheet (MSDS) is a source of information about physical, health and environmental hazards, as well as advice on safety precautions. In addition, the SDS provides an important source of information for other target audiences in the GHS. So certain elements of information may be used by those involved with the transport of dangerous goods, emergency responders (including poison centers), those involved in the professional use of pesticides and consumers.

The aim is to ensure that the SDS which accompanies the product is consistent with the approved label. All SDS contains 16 sections that appear in the following order:

	<b>Section</b>	<b>Information</b>
1.	Identification of the substance or mixture and of the supplier	(a) GHS product identifier; (b) Other means of identification; (c) Recommended use of the chemical and restrictions on use; (d) Supplier's details (including name, address, phone number etc.); (e) Emergency phone number.
2.	Hazards identification	(a) GHS classification of the substance/mixture and any national or regional information; (b) GHS label elements, including precautionary statements. (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"); (c) Other hazards which do not result in classification (e.g. "dust explosion hazard") or are not covered by the GHS.
3.	Composition/ information on ingredients	<b><u>Substance</u></b> (a) Chemical identity; (b) Common name, synonyms, etc.; (c) CAS number and other unique identifiers; (d) Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance. <b><u>Mixture</u></b> The chemical identity and concentration or concentration ranges of all ingredients which are hazardous within the meaning of the GHS and are present above their cut-off levels. NOTE: For information on ingredients, the competent authority rules for CBI take priority over the rules for product identification
4.	First-aid measures	(a) Description of necessary measures, subdivided according to the different routes of exposure, i.e. inhalation, skin and eye contact and ingestion; (b) Most important symptoms/effects, acute and delayed. (c) Indication of immediate medical attention and special treatment needed, if necessary.
5.	Fire-fighting measures	(a) Suitable (and unsuitable) extinguishing media. (b) Specific hazards arising from the chemical (e.g. nature of any hazardous combustion products). (c) Special protective equipment and precautions for fire-fighters.
6.	Accidental release measures	(a) Personal precautions, protective equipment and emergency procedures. (b) Environmental precautions. (c) Methods and materials for containment and cleaning up.
7.	Handling and storage	(a) Precautions for safe handling. (b) Conditions for safe storage, including any incompatibilities.

	<b>Section</b>	<b>Information</b>
8.	Exposure controls/personal protection	(a) Control parameters e.g. occupational exposure limit values or biological limit values. (b) Appropriate engineering controls. (c) Individual protection measures, such as personal protective equipment.
9.	Physical and chemical properties	Physical state; Colour; Odour; Melting point/freezing point; Boiling point or initial boiling point and boiling range; Flammability; Lower and upper explosion limit/flammability limit; Flash point; Auto-ignition temperature; Decomposition temperature; Kinematic viscosity;
10.	Stability and reactivity	(a) Reactivity (b) Chemical stability; (c) Possibility of hazardous reactions; (d) Conditions to avoid (e.g. static discharge, shock or vibration); (e) Incompatible materials; (f) Hazardous decomposition products.
11.	Toxicological information	Concise but complete and comprehensible description of the various toxicological (health) effects and the available data used to identify those effects, including: (a) information on the likely routes of exposure (inhalation, ingestion, skin and eye contact); (b) Symptoms related to the physical, chemical and toxicological characteristics; (c) Delayed and immediate effects and also chronic effects from short and long term exposure; (d) Numerical measures of toxicity (such as acute toxicity estimates).
12.	Ecological information	(a) Ecotoxicity (aquatic and terrestrial, where available); (b) Persistence and degradability; (c) Bioaccumulative potential; (d) Mobility in soil; (e) Other adverse effects.
13.	Disposal considerations	Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.
14.	Transport information	(a) UN number; (b) UN proper shipping name; (c) Transport hazard class(es); (d) Packing group, if applicable; (e) Environmental hazards (e.g.: Marine pollutant (Yes/No)); (f) Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code); (g) Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises.
15.	Regulatory	Safety, health and environmental regulations specific for the product in

	<b>Section</b>	<b>Information</b>
	information	question.
16.	Other information including information on preparation and revision of the SDS	

Appendix 4 of the GHS Purple Book gives additional information regard required level of details for each of the sections.

## Annex 6: Sample Pesticide Label for Kenya

READ THE LABEL FOR BEFORE USING  
SOMA KIBANDIKO KABLA YA KUTUMIA

KEEP LOCKED OUT OF REACH OF CHILDREN  
WEKA IMEFUNGIWA MBALI NA WATOTO

**TRADE NAME 60% WP**  
Wettable Powder  
**INSECTICIDE/KIUA DUDU**

contact/systemic/protective/curative..... (include as appropriate) Insecticide for the control of pest (thrips) on crop (roses).....

Kiua dudu cha .....

Insert a photo of at least one pest in area of use

GUARANTEE (DHAMANA); Common name of ai 600g/kg

GROUP	1	INSECTICIDE
-------	---	-------------

COMMERCIAL AND AGRICULTURAL CLASS (KUNDI LA KILIMO NA BIASHARA)

REGISTRATION No (NAMBARI YA USAJILI): : PCPB(CR)0000

### DANGER/HATARI



### HAZARD STATEMENTS (HATHARI)

Fatal if swallowed

Very toxic to aquatic life with long lasting effects

Flammable

Toxic to bees

### PRECAUTIONARY STATEMENTS (TAHATHARI)

Do not contaminate water with the product or its container

NET CONTENT: 1Kg

**IN CASE OF POISONING CALL TOLL FREE EMERGENCY No. (PANAPOTOKEA MADHARA, PIGA NAMBARI YA DHARURA BILA MALIPO 0800720021/0800730030 (24HOURS/ SAA 24)**

**SHELF LIFE (MAISHA RAFUNDI):** Two (2) years from the date of manufacture when stored its original unopened container in cool, dry and well-ventilated place (Miaka 2 kutoka tarehe ya kutengenezwa kwenye kifaa chake halisi ambacho hakijafunguliwa pahali pakavu, tulivu na pasipo na joto jingi)

**Batch No. (Nambari ya Kifurushi):**

**Date of Manufacture (Tarehe ya Kutengenezwa):**

**Date of Expiry (Tumia Kabla ya):**

Manufactured by PN chemicals

Distributed by Eli chemicals

**GHS      Precautionary Pictograms**

**HAZARD STATEMENTS (HATHARI)**

Fatal if swallowed

Very toxic to aquatic life with long lasting effects

Flammable

Toxic to bees

**PRECAUTIONARY STATEMENTS (TAHATHARI)**

Do not contaminate water with the product or its container

**DESCRIPTION: trade name ,registered uses,**

**Brief description:** Chemical group, mode of action {Numbers representing the mode of action }

**Active ingredient belongs to (group No = IRAC/FRAC/HRAC)**

**Mixing instructions:** Half fill the spray tank with water. Add the required amount of PRODUCT NAME then fill the water to the required level and mix or agitate thoroughly to uniformity. Spray immediately after mixing.

**Directions for Use**

Crop	Pest	Application Rate /16L/20L /ha and spray volume	Timing & frequency of application

**Pre-harvest interval (PHI):**

**Re-entry interval (REI):**

**Resistance management:** PRODUCT NAME insecticide/fungicide/herbicide contains the active ingredient ACTIVE INGREDIENT NAME and is a Group IRAC/FRAC/HRAC NUMBER. Repetitive/continual use of this PRODUCT NAME can lead to pesticide resistance. It is recommended that this PRODUCT is alternated with a pest control product with a different MODE OF ACTION { **Alternative mode of action numbers??** } as well as adhere to good farming practices.

**STORAGE:** Store in the original tightly closed container in a cool, dry well-ventilated place under lock and key so that unauthorized persons do not have access. Keep away from food, drink and animal feeding stuffs. Keep in a dark place. **KEEP OUT OF REACH OF CHILDREN, UNAUTHORIZED PERSONS AND ANIMALS.**

#### **DISPOSAL:**

Triple rinse and puncture holes into the empty containers before disposal in **an approved collection site or a licensed disposal facility in accordance with the Environmental Management and Co-ordination Act and the Sustainable Waste Management Act (Cap. 387).**

Do not pour rinsate into any drain or on any site in close proximity to human or animal habitation, water sources, water ways or water bodies. **Do not reuse empty pesticide containers for any other purpose.**

**Accidental Release:** Keep people away from the spill area, Use personal protective equipment when cleaning up the spill, Do NOT wash away into sewer. Do NOT let this chemical enter the environment, Pour the contents of leaking container in empty container that originally held same product or put leaking container into a larger, clearly labelled, container, Contact {emergency phone number} in case of larger spills (**LIQUIDS**) Absorb liquid pesticides by covering the spill with absorbent materials, such as sawdust, clay or kitty litter, (**SOLIDS**) Sweep spilled substance gently into containers; if appropriate, moisten first to prevent dusting. **Dispose off in accordance with National and Regulation on hazardous chemical disposal.**

#### **FIRST AID INSTRUCTIONS**

**General advice:** If poisoning occurs, immediately contact a Doctor or Poisons Information Centre (Phone: **0800730030 OR 0800720021**), and follow the advice given. Show this Label to the Doctor.

**If in contact with the eye:**

**If in contact with the skin:**

**If inhaled:**

**If Ingested or swallowed:**

**SEEK MEDICAL ATTENTION IMMEDIATELY.**

#### **TOXICOLOGICAL INFORMATION**

- **Antidotes & remedial measures**
- **Symptoms of poisoning**
- **Ingredients that may affect treatment**
- **Notice to doctor**














**IN CASE OF POISONING CALL TOLL FREE EMERGENCY No. 0800720021/0800730030 (24hours)**

**NOTICE TO THE USER:** This pest control product is to be used only in accordance with the directions on this label. It is an offence under the Pest Control Products Act (Cap. 346) to use or store a pest control product under unsafe conditions.

**SELLERS GUARANTEE:** Seller's guarantee is limited to the terms set out on the label and subject thereto, the buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

**Note: All the above in English and Kiswahili**

### Annex 6.1 Precautionary Pictograms and Supplementary Hazard Symbols

Type	Pictogram and message	
Storage Pictograms		Keep locked away and out of reach of children
Activity pictograms	 When handling <b>Dry</b> concentrate	 When handling <b>Liquid</b> concentrate
Advice pictograms		Wear eye protection
		Wear respirator
		Wear boots
		Wear Overall
		Wear gloves
Warning pictograms		wash after use
		Dangerous/harmful to fish – do not contaminate lakes, rivers, ponds or streams
		Dangerous/Harmful to animals
Supplementary Hazard Symbol		Toxic to bees Very toxic to bees
		Do not use on animals