

(Garuda Emblem)
Notification of Ministry of Industry
Subject: Hazard Classification and Communication System of Hazardous Substances B.E. 2555 (2012)

By virtue of the third paragraph of Article 5, and Article 44(1) of the Hazardous Substance Act B.E. 2535, and Article 20(1) of the Hazardous Substance Act B.E. 2535 that has been amended by the Hazardous Substance Act (No.3) B.E.2551, which contains some provisions concerning the limitation of the person's rights and freedoms that can be done by the provisions of Section 29 combined with Section 32, Section 33, Section 41, Section 43 and Section 45 of the Constitution of the Kingdom of Thailand, the Minister of Industry, approved by the Hazardous Substance Committee, hereby issues the notification as follows:

Article 1 In this Notification,

“Hazardous substance” means hazardous substance under responsibility of Department of Industrial Works, excluding chemical wastes and used electrical and electronic equipment as mentioned in the Notification of Ministry of Industry regarding List of Hazardous Substance, which is issued under the second paragraph of the Article 18 of the Hazardous Substance Act B.E. 2535.

“Substance” means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

“Mixture” means a mixture or a solution composed of two or more substances in which they do not react.

Article 2 Producer or importer of hazardous substance, which is defined as substance and mixture, shall follow the requirement on hazard classification and communication system of hazardous substance attached with this Notification as follows:

- 2.1 Identify the 16 classes of physical hazard, 10 classes of health hazard, and 2 classes of environmental hazard.
- 2.2 Labeling
- 2.3 Prepare a safety data sheet

In this regard, the requirement shall be implemented completely, within 1 year for substance and 5 years for a mixture, since the effective date of this Notification.

Article 3 For exporting of hazardous substance, hazard classification, labeling and a safety data sheet according to the requirement on hazard classification and communication system of hazardous substance are required, except there are other specific requirements from the partner country.

Article 4 Producer, importer, exporter and possessor of hazardous substance shall have the duty to communicate the hazard of hazardous substance in the form of labeling and a safety data sheet, which is

prepared by producer or importer of such hazardous substance as mentioned in Article 2 as the case maybe, for the sake of the safety operation of the substance of other relevant persons.

This shall, thus, enter into force on the day following the date of its publication in the Government Gazette.

Announced on the 1st February B.E. 2555 (2012)
(M.R. Phongsawat Svastiwat)
Minister of Industry

(Published in the Government Gazette, Volume 129, Special Part 48Ngor, dated 12th March B.E. 2555(2012))

Requirement on hazard classification and communication of hazardous substance

Attached with

The Notification of Ministry of Industry

**Subject: Hazard Classification and Communication System of Hazardous Substances B.E.
2555 (2012)**

Requirement on hazard classification and communication of hazardous substance

1. Hazard classification and communication system of hazardous substance

This shall refer to the Globally Harmonized System of Classification and Labeling of Chemicals (GHS), third revised edition, United Nations, New York and Geneva, 2009.

2. Definition

“Hazards” means hazard of hazardous substance, which is categorized into 3 groups – Physical hazards, Health hazards, and Environmental hazards.

“Class” means classification of hazard in each group into class, i.e. physical hazard is classified to 16 classes, health hazard 10 classes, and environmental hazard 2 classes.

“Division, Category, or Type” means the division of criteria within the hazard class by its severity, hazard, or toxicity.

“Label” means written, symbolic or graphic information or others relevant that is affixed to a container or packaging of a hazardous product.

“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. The Signal word are “Danger” and “Warning”.

“Hazard statements” means a statement assigned to describe the nature of the hazards of a hazardous product, including, where appropriate, the degree of hazard.

“Precautionary statements and pictograms” means a phrase or pictogram that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous product, or improper storage or handling of a hazardous product.

“Safety Data Sheet-SDS” means a safety data sheet of hazardous substance.

3. Hazard classification and communication system of hazardous substance is composed of:

3.1 Hazard classification

Hazard classification is used to identify hazard characteristics of hazardous substance, which is classified into 3 groups:

3.1.1 Physical hazard

Physical hazard is classified into 16 classes:

- (1) Explosives
- (2) Flammable gases
- (3) Flammable aerosols

- (4) Oxidizing gases
- (5) Gases under pressure
- (6) Flammable liquids
- (7) Flammable solids
- (8) Self-reactive substances and mixtures
- (9) Pyrophoric liquids
- (10) Pyrophoric solids
- (11) Self-heating substances and mixtures
- (12) Substances and mixtures, which in contact with water, emit flammable gases
- (13) Oxidizing liquids
- (14) Oxidizing solids
- (15) Organic peroxides
- (16) Corrosive to metals

3.1.2 Health hazard

Health hazard is classified into 10 classes:

- (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 toxicity
- (8) Specific target organ toxicity-single exposure
- (9) Specific target organ toxicity-repeated exposure
- (10) Aspiration hazard

3.1.3 Environmental hazard

Environmental hazard is classified into 2 classes:

- (1) Hazard to the aquatic environment
- (2) Hazard to the ozone layer

Hazard classification of hazardous substance mentioned in 3.1.1, 3.1.2 and 3.1.3 shall be classified to category, division or type by its severity or toxicity according to classification criteria of substance or mixture shown in Table 1.

3.2 Hazard communication is composed of:

3.2.1 Labeling

Label affixed to a container of hazardous substance shall have an appropriate size with such container and shall be clearly noticed. A label shall comprise the following label elements as a minimum requirement:

- (1) Pictograms – a pictogram shall be prepared in an appropriate size to a label and shall be made in black and placed on a white background within a red square frame set an angle of 45° on its point (a diamond shaped) as shown in Table 1.

(2) Signal word

As shown in Table 1

(3) Hazard statements

As shown in Table 1

(4) Precautionary statements and pictograms – it shall be composed of phrases describing methods of prevention, storage, disposal and treatment in case of leakage, exposure or accident.

(5) Product identifier – it shall be consistent with a product identifier prescribed in a safety data sheet and it shall be displayed with common names or IUPAC names or trade names.

If a hazardous substance is a substance or a mixture listed under the UN recommendations on the transport of dangerous goods, a UN proper shipping name shall be identified at a container or package used during the transport.

(6) Supplier identification – it shall identify name, address and telephone number of a manufacturer or a supplier of hazardous substance on a label or it shall identify an emergency telephone number.






3.2.2 Safety Data Sheet – SDS



SDS is composed of 16 items of data listed in order as shown in Table 2.

Table 1: Hazard Classification Criteria for Substance or Mixture and Hazard Communication Elements (Summary)


1.1 Physical hazard classification criteria and label elements of hazard communication

1.1.1 Explosives



Hazard Category	Criteria	Hazard Communication Element	
Unstable explosives	According to the results in a test of the Part I of the Manual of Test and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Danger
		Hazard statement	Unstable explosive
Division 1.1	According to the results in a test of the Part I of the Manual of Test and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Danger
		Hazard statement	Explosive, mass explosion hazard
Division 1.2	According to the results in a test of the Part I of the Manual of Test and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Danger
		Hazard statement	Explosive, severe projection hazard
Division 1.3	According to the results in a test of the Part I of the Manual of Test and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Danger
		Hazard statement	Explosive, fire, blast or projection hazard
Division 1.4	According to the results in a test of the Part I of the Manual of Test and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Warning
		Hazard statement	Fire or projection hazard

Hazard Category	Criteria	Hazard Communication Element	
Division 1.5	According to the results in a test of the Part I of the Manual of Test and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Danger
		Hazard statement	May mass explode in fire
Division 1.6	According to the results in a test of the Part I of the Manual of Test and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	No Signal word
		Hazard statement	No hazard statement


1.1.2 Flammable gases

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





1.1.3 Flammable aerosols

Hazard Category	Criteria	Hazard Communication Element	
1	It is considered on the basis of: 1. its ingredients and its chemical heat of combustion, and 2. if applicable, of the results of the foam test (for foam aerosols), or 3. of the ignition distance test and enclosed space test (for spray aerosols)	Symbol	
		Signal word	Danger
		Hazard statement	Extremely flammable aerosols
2	It is considered on the basis of: 1. its ingredients and its chemical heat of combustion, and 2. if applicable, of the results of the foam test, or 3. of the ignition distance test and enclosed space test	Symbol	
		Signal word	Warning
		Hazard statement	Flammable aerosols




1.1.4 Oxidizing gases

Hazard Category	Criteria	Hazard Communication Element	
1	Any gas which may, generally providing oxygen, cause or contribute to the combustion of other material more than air does.	Symbol	
		Signal word	Danger
		Hazard statement	Oxidizer, may cause or intensify fire


1.1.5 Gases under pressure


Hazard Category	Criteria	Hazard Communication Element	
Compressed gas	A gas, which when packaged under pressure is entirely gaseous at -50 °C; including all gases with a critical temperature \leq -50 °C.	Symbol	
		Signal word	Warning
		Hazard statement	Contains gas under pressure; may explode if heated
Liquefied gas	A gas, which when packaged under pressure is partially liquid at temperature above -50°C. A distinction is made between: (1) High pressure liquefied gas – a gas with a critical temperature between -50 °C and 65 °C, and (2) Low pressure liquefied gas – a gas with a critical temperature above 65 °C.	Symbol	
		Signal word	Warning
		Hazard statement	Contains gas under pressure; may explode if heated
Refrigerated liquefied gas	A gas, which when packaged is made partially liquid because of its low temperature.	Symbol	
		Signal word	Warning
		Hazard statement	Contains refrigerated gas; may cause cryogenic burns or injury
Dissolved gas	A gas, which when packaged under pressure, is dissolves in a liquid phase solvent.	Symbol	
		Signal word	Warning
		Hazard statement	Contains gas under pressure; may explode if heated

1.1.6 Flammable liquids




Hazard Category	Criteria	Hazard Communication Element	
1	Flash point < 23 °C and initial boiling point ≤ 35 °C.	Symbol	
		Signal word	Danger
		Hazard statement	Extremely flammable liquid and vapour
2	Flash point < 23 °C and initial boiling point > 35 °C.	Symbol	
		Signal word	Danger
		Hazard statement	Highly flammable liquid and vapour
3	Flash point ≥ 23 °C and ≤ 60 °C.	Symbol	
		Signal word	Warning
		Hazard statement	Flammable liquid and vapour
4	Flash point ≥ 60 °C and ≤ 93 °C.	Symbol	No symbol
		Signal word	Warning
		Hazard statement	Combustible liquid


1.1.7 Flammable solids

Hazard Category	Criteria	Hazard Communication Element	
1	Burning rate test: 1. Substances and mixtures other than metal powders: 1.1 wetted zone does not stop fire; and 1.2 burning time < 45 s or burning rate > 2.2 mm/s 2. Metal powders: Burning time ≤ 5 min	Symbol	
		Signal word	Danger
		Hazard statement	Flammable solid


Hazard Category	Criteria	Hazard Communication Element	
2	Burning rate test: 1. Substances and mixtures other than metal powders: 1.1 wetted zone stop the fire for at least 4 min; and 1.2 burning time < 45 s or burning rate > 2.2 mm/s 2. Metal powders: Burning time > 5 min and < 10 min	Symbol	
		Signal word	Warning
		Hazard statement	Flammable solid

1.1.8 Self-reactive substances and mixtures


Hazard Category	Criteria	Hazard Communication Element	
Type A	According to the results of tests in Part II of the Manual of Tests and Criteria, UN Recommendations of the Transport of Dangerous Goods.	Symbol	
		Signal word	Danger
		Hazard statement	Heating may cause an explosion
Type B	According to the results of tests in Part II of the Manual of Tests and Criteria, UN Recommendations of the Transport of Dangerous Goods.	Symbol	
		Signal word	Danger
		Hazard statement	Heating may cause a fire or an explosion
Type C and D	According to the results of tests in Part II of the Manual of Tests and Criteria, UN Recommendations of the Transport of Dangerous Goods.	Symbol	
		Signal word	Danger
		Hazard statement	Heating may cause a fire

Hazard Category	Criteria	Hazard Communication Element	
Type E and F	According to the results of tests in Part II of the Manual of Tests and Criteria, UN Recommendations of the Transport of Dangerous Goods.	Symbol	
		Signal word	Warning
		Hazard statement	Heating may cause a fire
Type G	According to the results of tests in Part II of the Manual of Tests and Criteria, UN Recommendations of the Transport of Dangerous Goods.	Symbol	There are no label elements allocated to this hazard category
		Signal word	
		Hazard statement	



1.1.9 Pyrophoric liquids

Hazard Category	Criteria	Hazard Communication Element	
1	1. The liquid ignites within 5 min when added to an inert carrier and exposed to air, or 2. It ignites or chars a filter paper when contact with air within 5 min.	Symbol	
		Signal word	Danger
		Hazard statement	Catches fire spontaneously if exposed to air




1.1.10 Pyrophoric solids

Hazard Category	Criteria	Hazard Communication Element	
1	The solid ignites within 5 min of coming into contact with air.	Symbol	
		Signal word	Danger
		Hazard statement	Catches fire spontaneously if exposed to air




1.1.11 Self-heating substances and mixtures

Hazard Category	Criteria	Hazard Communication Element	
1	A positive result is obtained in a test using 25 mm sample cube at 140 °C.	Symbol	
		Signal word	Danger
		Hazard statement	Self-heating; may catch fire
2	<p>(a) a positive result is obtained in a test using 100 mm sample cube at 140 °C, and a negative result is obtained in a test using 25 mm sample cube at 140 °C, and the substance or mixture is to be packed in packages with a volume 3 m^3; or</p> <p>(b) a positive result is obtained in a test using 100 mm sample cube at 140 °C, and a negative result is obtained in a test using 25 mm sample cube at 140 °C, a positive result is obtained in a test using 100 mm sample cube at 120 °C and the substance or mixture is to be packed in packages with a volume > 450 liters; or</p> <p>(c) a positive result is obtained in a test using 100 mm sample cube at 140 °C, and a negative result is obtained in a test using 25 mm sample cube at 140 °C, a positive result is obtained in a test using 100 mm sample cube at 100 °C</p>	Symbol	
		Signal word	Warning
		Hazard statement	Self-heating in large quantities; may catch fire




1.1.12 Substances and mixtures, which in contact with water, emit flammable gases

Hazard Category	Criteria	Hazard Communication Element	
1	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 ≥ 10 liters per kilogram of substance over any one minute.	Symbol	
		Signal word	Danger
		Hazard statement	In contact with water releases flammable gas which may ignite spontaneously
2	Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is ≥ 20 liters per kilogram of substance per hour, and which does not meet the criteria in Category 1	Symbol	
		Signal word	Danger
		Hazard statement	In contact with water releases flammable gas
3	Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is ≥ 1 liter per kilogram of substance per hour, and which does not meet the criteria in Category 1 and 2	Symbol	
		Signal word	Warning
		Hazard statement	In contact with water releases flammable gas





1.1.13 Oxidizing liquids

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


1.1.14 Oxidizing solids

Hazard Category	Criteria	Hazard Communication Element	
1	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	Symbol	
		Signal word	Danger
		Hazard statement	May cause fire or explosion; strong oxidizer
2	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 2:3 mixture, by mass, of potassium bromate and cellulose; and it does not meet the criteria of Category 1	Symbol	
		Signal word	Danger
		Hazard statement	May intensify fire; oxidizer
3	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 3:7 mixture, by mass, of potassium bromate and cellulose; and it does not meet the criteria of Category 1 and 2	Symbol	
		Signal word	Warning
		Hazard statement	May intensify fire; oxidizer

1.1.15 Organic peroxides



Hazard Category	Criteria	Hazard Communication Element	
Type A	According to the results of test series A to H in the Part II of the Manual of Tests and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Danger
		Hazard statement	Heating may cause an explosion
Type B	According to the results of test series A to H in the Part II of the Manual of Tests and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Danger
		Hazard statement	Heating may cause a fire or an explosion
Type C and D	According to the results of test series A to H in the Part II of the Manual of Tests and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Danger
		Hazard statement	Heating may cause a fire
Type E and F	According to the results of test series A to H in the Part II of the Manual of Tests and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol	
		Signal word	Warning
		Hazard statement	Heating may cause a fire
Type G	According to the results of test series A to H in the Part II of the Manual of Tests and Criteria, UN Recommendations on the Transport of Dangerous Goods	Symbol Signal word Hazard statement	There are no label elements allocated to this hazard category



1.1.16 Corrosive to metals

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


1.2 Health hazard classification criteria and label elements of hazard communication


1.2.1 Acute toxicity

Hazard Category	Criteria	Hazard Communication Element	
1	1. Oral LD ₅₀ ≤ 5 mg/kg bodyweight; or 2. Dermal LD ₅₀ ≤ 50 mg/kg bodyweight; or 3. Inhalation (gas) LC ₅₀ ≤ 100 ppm; or 4. Inhalation (vapour) LC ₅₀ ≤ 0.5 mg/l; or 5. Inhalation (dust, mist) LC ₅₀ ≤ 0.05 mg/l	Symbol	
		Signal word	Danger
		Hazard statement	Fatal if swallowed (oral) Fatal in contact with skin (dermal) Fatal if inhaled (gas, vapour, dust, mist)
2	1. Oral LD ₅₀ > 5 but ≤ 50 mg/kg bodyweight; or 2. Dermal LD ₅₀ > 50 but ≤ 200 mg/kg bodyweight; or 3. Inhalation (gas) LC ₅₀ > 100 but ≤ 500 ppm; or 4. Inhalation (vapour) LC ₅₀ > 0.5 but ≤ 2 mg/l; or 5. Inhalation (dust, mist) LC ₅₀ > 0.05 but ≤ 0.5 mg/l	Symbol	
		Signal word	Danger
		Hazard statement	Fatal if swallowed (oral) Fatal in contact with skin (dermal) Fatal if inhaled (gas, vapour, dust, mist)

Hazard Category	Criteria	Hazard Communication Element	
3	1. Oral LD ₅₀ > 50 but ≤ 300 mg/kg bodyweight; or 2. Dermal LD ₅₀ > 200 but ≤ 1,000 mg/kg bodyweight; or 3. Inhalation (gas) LC ₅₀ > 500 but ≤ 2,500 ppm; or 4. Inhalation (vapour) LC ₅₀ > 2.0 but ≤ 10.0 mg/l; or 5. Inhalation (dust, mist) LC ₅₀ > 0.5 but ≤ 1.0 mg/l	Symbol	
		Signal word	Danger
		Hazard statement	Toxic if swallowed (oral) Toxic in contact with skin (dermal) Toxic if inhaled (gas, vapour, dust, mist)
4	1. Oral LD ₅₀ > 300 but ≤ 2,000 mg/kg bodyweight; or 2. Dermal LD ₅₀ > 1,000 but ≤ 2,000 mg/kg bodyweight; or 3. Inhalation (gas) LC ₅₀ > 2,500 but ≤ 20,000 ppm; or 4. Inhalation (vapour) LC ₅₀ > 10.0 but ≤ 20.0 mg/l; or 5. Inhalation (dust, mist) LC ₅₀ > 1.0 but ≤ 5.0 mg/l	Symbol	
		Signal word	Warning
		Hazard statement	Harmful if swallowed (oral) Harmful in contact with skin (dermal) Harmful if inhaled (gas, vapour, dust, mist)
5	1. Oral or dermal LD ₅₀ > 2,000 but ≤ 5,000 mg/kg bodyweight; or 2. Inhalation (gas, vapour, dust, mist) LC ₅₀ in equivalent range or the oral and dermal LD ₅₀ (i.e. > 2,000 but ≤ 5,000 mg/kg bodyweight) 3. See also the additional criteria: 3.1 Indication of significant toxicity effects in humans; 3.2 Any mortality in Category 4; 3.3 Significant clinical signs in Category 4; 3.4 Indication from other studies	Symbol	No symbol
		Signal word	Warning
		Hazard statement	May be harmful if swallowed (oral) May be harmful in contact with skin (dermal) May be harmful if inhaled (gas, vapour, dust, mist)


1.2.2 Skin corrosion/irritation


Hazard Category	Criteria	Hazard Communication Element	
1 Corrosive	<p>1. For substances and tested mixtures</p> <p>(a) Human experience showing irreversible damage to the skin; or</p> <p>(b) Structure activity relationship to a substance or mixture already classified as corrosive; or</p> <p>(c) pH</p> <p>Extreme acidity, $\text{pH} \leq 2$</p> <p>Extreme alkalinity, $\text{pH} \geq 11.5$</p> <p>Including acid/alkali reserve capacity; or</p> <p>(d) Positive results in a valid and accepted in vitro skin corrosion test; or</p> <p>(e) Animal experience or test data that indicate that the substance/mixture causes irreversible damage to the skin following of exposure of up to 4 hr.</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply,</p> <p>(a) For mixtures where the concentration of the ingredients can be added, classify in Category 1- if the sum of the concentrations of Category 1 ingredients is $\geq 5\%$; or</p> <p>(b) For mixtures where the concentration of the ingredients cannot be added, classify in Category 1- if the mixture contains $\geq 1\%$ of a Category 1 ingredient</p>	Symbol	
		Signal word	Danger
		Hazard statement	Causes severe skin burn and eye damage

Hazard Category	Criteria	Hazard Communication Element	
<p>2 Irritant</p>	<p>1. For substances and tested mixtures (a) Human experience or data showing reversible damage to the skin following exposure of up to 4 hr ; or (b) Structure activity relationship to a substance or mixture already classified as an irritant; or (c) Positive results in a valid and accepted in vitro skin irritation test; or (d) Animal experience or test data that indicate that the substance/mixture causes reversible damage to the skin following of exposure of up to 4 hr., mean value of ≥ 2.3 but ≤ 4.0 for erythema/eschar, or oedema, or inflammation that persist to the end of the observation period, in 2 of 3 tested animals 2. If data of the complete mixture are not available, apply bridging principles. 3. If bridging principles do not apply, (a) For mixtures where the concentration of the ingredients can be added, classify in Category 2; if (a1) the sum of the concentrations of Category 1 ingredients is $\geq 1\%$ but $< 5\%$; or (a2) the sum of the concentrations of Category 2 ingredients is $\geq 10\%$; or (a3) if $[10 \times \text{sum of the concentrations of Category 1 ingredients}] + [\text{sum of the concentrations of Category 2 ingredients}]$ is $\geq 10\%$; or (b) For mixtures where the concentration of the ingredients cannot be added, classify in Category 2- if the mixture contains $\geq 3\%$ of a Category 2 ingredient</p>	Symbol	
		Signal word	Warning
		Hazard statement	Causes skin irritation

Hazard Category	Criteria	Hazard Communication Element	
<p>3 Mild irritant</p>	<p>1. For substances and tested mixtures (a) Animal experience or test data that indicate that the substance/mixture causes reversible damage to the skin following exposure of up to 4 hr, mean value of ≥ 1.5 but < 2.3 for erythema/eschar in 2 of 3 tested animals</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply, (a) For mixtures where the concentration of the ingredients can be added, classify in Category 3; if (a1) the sum of the concentrations of Category 2 ingredients is $\geq 1\%$ but $< 10\%$; or (a2) the sum of the concentrations of Category 3 ingredients is $\geq 10\%$; or (a3) if $[10 \times \text{sum of the concentrations of Category 1 ingredients}] + [\text{sum of the concentrations of Category 2 ingredients}] \geq 1\%$ or $< 10\%$; or (a4) if $[10 \times \text{sum of the concentrations of Category 1 ingredients}] + [\text{sum of the concentrations of Category 2 ingredients}] + [\text{sum of the concentrations of Category 3 ingredients}] \geq 10$</p> <p>(b) For mixtures where the concentration of the ingredients cannot be added, classify in Category 3- if the mixture contains $\geq 3\%$ of a Category 3 ingredient</p>	Symbol	No symbol
		Signal word	Warning
		Hazard statement	Causes mild skin irritation

1.2.3 Serious eye damage/eye irritation



Hazard Category	Criteria	Hazard Communication Element	
<p>1 Irreversible effects</p>	<p>1. For substances and tested mixtures</p> <p>(a) Classification as corrosive to skin</p> <p>(b) Human experience or data showing damage to the eye which is not fully reversible within 21 days;</p> <p>(c) Structure activity relationship to a substance or mixture already classified as corrosive</p> <p>(d) pH</p> <p> Extreme acidity, $\text{pH} \leq 2$</p> <p> Extreme alkalinity, $\text{pH} \geq 11.5$</p> <p> Including buffering capacity</p> <p>(e) Positive results in a valid and accepted in vitro test to assess serious damage to eye; or</p> <p>(f) Animal experience or test data that the substance or mixture produces either:</p> <p> (f1) in at least one animal, effects on the cornea, iris or conjunctiva that are not expected to reverse or have not reversed; or</p> <p> (f2) in at least 2 of 3 tested animals a positive response of corneal opacity is ≥ 3 and/or iritis > 1.5</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply,</p> <p> (a) For mixtures where the concentration of the ingredients can be added, classify in Category 1- if the sum of the concentrations of skin and/or eye of Category 1 ingredients is $\geq 3\%$; or</p> <p> (b) For mixtures where the concentration of the ingredients cannot be added, classify in Category 1- if the mixture contains $\geq 1\%$ of a skin and/or eye Category 1 ingredient</p>	Symbol	
		Signal word	Danger
		Hazard statement	Causes serious eye damage


Hazard Category	Criteria	Hazard Communication Element	
2A Irritant	<p>1. For substances and tested mixtures</p> <p>(a) Classification as severe skin irritant</p> <p>(b) Human experience or data showing damage to the eye which is not fully reversible within 21 days;</p> <p>(c) Structure activity relationship to a substance or mixture already classified as an eye irritant</p> <p>(d) Positive results in a valid and accepted in vitro test to assess serious damage to eye; or</p> <p>(e) Animal experience or test data that the substance or mixture produces a positive response in at least 2 of 3 tested animals of: corneal ≥ 1, iritis ≥ 1, or conjunctival edema (chemosis) ≥ 2</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply,</p> <p>(a) For mixtures where the concentration of the ingredients can be added, classify in Category 2A; if</p> <p>(a1) the sum of the concentrations of skin and/or eye Category 1 ingredients is $\geq 1\%$ but $< 3\%$; or</p> <p>(a2) the sum of the concentrations of eye Category 2/2A ingredients is $\geq 10\%$; or</p> <p>(a3) if $[10 \times \text{sum of the concentrations of skin and/or eye Category 1 ingredients}] + [\text{sum of the concentrations of eye Category 2A/2B ingredients}] \geq 10\%$; or</p> <p>(b) For mixtures where the concentration of the ingredients cannot be added, classify in Category 2A- if the mixture contains $\geq 3\%$ of an eye Category 2 ingredient</p>	Symbol	
		Signal word	Warning
		Hazard statement	Causes serious eye irritation

Hazard Category	Criteria	Hazard Communication Element	
2B Mild irritant	<p>1. For substances and tested mixtures</p> <p>(a) Human experience or data showing production of mild eye irritation</p> <p>(b) Data indicates that the lesions are fully reversible within 7 days</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply,</p> <p>(a) For mixtures where the concentration of the ingredients can be added, classify in Category 2B; if</p> <p>(a1) the sum of the concentrations of skin and/or eye Category 1 ingredients is $\geq 1\%$ but $< 3\%$; or</p> <p>(a2) the sum of the concentrations of eye Category 2 ingredients is $\geq 10\%$; or</p> <p>(a3) if $[10 \times \text{sum of the concentrations of skin and/or eye Category 1 ingredients}] + [\text{sum of the concentrations of eye Category 2 ingredients}] \geq 10\%$; or</p> <p>(b) For mixtures where the concentration of the ingredients cannot be added, classify in Category 2B- if the mixture contains $\geq 3\%$ of an eye Category 2 ingredient</p>	Symbol	No symbol
		Signal word	Warning
		Hazard statement	Causes mild eye irritation


1.2.4 Respiratory or skin sensitization



1.2.4(a) Respiratory sensitizer

Hazard Category	Criteria	Hazard Communication Element	
1	<p>1. For substances and tested mixtures</p> <p>(a) If there is evidence in human that the substance can lead to specific respiratory hypersensitivity, and/or</p> <p>(b) If there are positive results from an appropriate animal test</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply, classify the mixture as respiratory sensitizer if it contains at least one ingredient classified as respiratory sensitizer at the following concentration:</p> <p>(a) solids or liquids, $\geq 1\%$ w/w</p> <p>(b) gases, $\geq 0.2\%$ v/v</p>	Symbol	
		Signal word	Danger
		Hazard statement	May cause allergy or asthmatic symptoms or breathing difficulties if inhaled
1A (where data is sufficient and where required by a competent authority)	<p>1. For substances and tested mixtures</p> <p>Showing a high frequency of occurrence in humans; or a probability of occurrence of a high sensitization rate in humans based on animal or other test. Severity of reaction may also be considered.</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply, classify the mixture as respiratory sensitizer if it contains at least one ingredient classified as sub-category 1A at the following concentration:</p> <p>(a) solids or liquids, $\geq 0.1\%$ w/w</p> <p>(b) gases, $\geq 0.1\%$ v/v</p>	Symbol	
		Signal word	Danger
		Hazard statement	May cause allergy or asthmatic symptoms or breathing difficulties if inhaled



Hazard Category	Criteria	Hazard Communication Element	
1B (where data is sufficient and where required by a competent authority)	1. For substances and tested mixtures Showing a low to moderate frequency of occurrence in humans; or a probability of occurrence of a low to moderate sensitization rate in humans based on animal or other test. Severity of reaction may also be considered. 2. If data of the complete mixture are not available, apply bridging principles. 3. If bridging principles do not apply, classify the mixture as respiratory sensitizer if it contains at least one ingredient classified as sub-category 1B at the following concentration: (a) solids or liquids, $\geq 1\%$ w/w (b) gases, $\geq 0.2\%$ v/v	Symbol	
		Signal word	Danger
		Hazard statement	May cause allergy or asthmatic symptoms or breathing difficulties if inhaled

1.2.4 (b) Skin sensitizer



Hazard Category	Criteria	Hazard Communication Element	
1	1. For substances and tested mixtures (a) If there is evidence in human that the individual substance can lead to sensitization by skin contact in a substantial number of persons; or (b) If there are positive results from an appropriate animal test 2. If data of the complete mixture are not available, apply bridging principles. 3. If bridging principles do not apply, classify the mixture as skin sensitizer if it contains at least one ingredient classified as skin sensitizer at the following concentration: $\geq 1.0\%$ (solids, liquids, gases)	Symbol	
		Signal word	Warning
		Hazard statement	May cause an allergic skin reaction

Hazard Category	Criteria	Hazard Communication Element	
<p>1A (where data is sufficient and where required by a competent authority)</p>	<p>1. For substances and tested mixtures Showing a high frequency of occurrence in humans and/or a high potency in animals, which can be presumed to have potential to produce significant sensitization in humans. Severity of reaction may also be considered.</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply, classify the mixture as skin sensitizer if it contains at least one ingredient classified as sub-category 1A at a concentration $\geq 0.1\%$</p>	Symbol	
		Signal word	Warning
		Hazard statement	May cause an allergic skin reaction
<p>1B (where data is sufficient and where required by a competent authority)</p>	<p>1. For substances and tested mixtures Showing a low to moderate frequency of occurrence in humans and/or a low to moderate potency in animals, which can be presumed to have potential to produce significant sensitization in humans.</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply, classify the mixture as skin sensitizer if it contains at least one ingredient classified as sub-category 1B at a concentration $\geq 1.0\%$</p>	Symbol	
		Signal word	Warning
		Hazard statement	May cause an allergic skin reaction



1.2.5 Germ cell mutagenicity

Hazard Category	Criteria	Hazard Communication Element	
<p>1 (Both 1A and 1B)</p>	<p>1. For substances and tested mixtures (a) Known to introduce heritable mutations in germ cells of humans; or (b) Regarded as if they induce heritable mutations in germ cells of humans</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 1 if it contains at least one ingredient classified in category 1 at a concentration $\geq 0.1\%$</p>	Symbol	
		Signal word	Danger
		Hazard statement	May cause genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)
<p>2</p>	<p>1. For substances and tested mixtures Which cause concerns to humans owing to the possibility that they may be induce heritable mutations in germ cells of humans</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply, classify the mixture in Category 2 if it contains at least one ingredient classified in category 2 at a concentration $\geq 1.0\%$</p>	Symbol	
		Signal word	Warning
		Hazard statement	Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)

1.2.6 Carcinogenicity

Hazard Category	Criteria	Hazard Communication Element	
<p>1 (Both 1A and 1B)</p>	<p>1. For substances and tested mixtures (a) Know to have carcinogenic potential for humans (b) Presumed to have carcinogenic potential for humans</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 1 if it contains at least one ingredient classified in category 1 at a concentration $\geq 0.1\%$</p>	Symbol	
		Signal word	Danger
		Hazard statement	May cause cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)
<p>2</p>	<p>1. For substances and tested mixtures Suspected human carcinogenic</p> <p>2. If data of the complete mixture are not available, apply bridging principles.</p> <p>3. If bridging principles do not apply, classify the mixture in Category 2 if it contains at least one ingredient classified in category 2 at a concentration $\geq 1.0\%$</p>	Symbol	
		Signal word	Warning
		Hazard statement	Suspected of causing cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)


1.2.7 Reproductive Toxicity
1.2.7 (a) Toxic to reproduction



Hazard Category	Criteria	Hazard Communication Element	
<p>1 (Both 1A and 1B)</p>	<p>1. For substances and tested mixtures (a) Know human reproductive toxicant (b) Presumed human reproductive toxicant</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 1 if it contains at least one ingredient classified in category 1 at a concentration $\geq 0.3\%$</p>	Symbol	
		Signal word	Danger
		Hazard statement	<p>May damage fertility or the unborn child (state specific if known and state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)</p>
<p>2</p>	<p>1. For substances and tested mixtures Suspected human reproductive toxicant</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 2 if it contains at least one ingredient classified in category 2 at a concentration $\geq 3.0\%$</p>	Symbol	
		Signal word	Warning
		Hazard statement	<p>Suspected of damaging fertility or the unborn child (state specific if known and state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)</p>

1.2.7 (b) Effects on or via lactation



Hazard Category	Criteria	Hazard Communication Element	
Additional category for effects on or via lactation	<p>1. For substances and tested mixtures Substances or mixtures which cause concern for the health of breast-fed children.</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in this category if it contains at least one ingredient classified in this category at a concentration $\geq 0.3\%$</p>	Symbol	No symbol
		Signal word	No signal word
		Hazard statement	May cause harm to breast-fed children

1.2.8 Specific target organ toxicity following single exposure



Hazard Category	Criteria	Hazard Communication Element	
1	<p>1. For substances and tested mixtures Reliable evidence on the substance or mixture (including bridging principles) of an adverse effect on specific organs or systems in humans or animals. May use guidance values in Category 1 criteria for as part of weight of evidence evaluation. May be named for specific organ or system affected.</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 1 if it contains at least one ingredient classified in Category 1 at a concentration $\geq 10\%$</p>	Symbol	
		Signal word	Danger
		Hazard statement	Causes damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)

Hazard Category	Criteria	Hazard Communication Element	
2	<p>1. For substances and tested mixtures Reliable evidence on the substance or mixture (including bridging principles) of an adverse effect on specific organs or systems from animal studies or humans considering weight of evidence or guidance values in Category 2 criteria for as part of weight of evidence evaluation. May be named for specific organ or system affected.</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 2: (a) if it contains at least one ingredient classified in Category 1 at a concentration $\geq 1\%$ but $< 10\%$; or (b) if it contains at least one ingredient classified in Category 2 at a concentration $\geq 10\%$</p>	Symbol	
		Signal word	Warning
		Hazard statement	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)
3	<p>(a) Respiratory tract irritation Evidence on the substance or mixture of transient irritant effects on respiratory tract in humans; or</p> <p>(b) Narcotic effects Evidence on the substance or mixture of transient narcotic effects from animal studies and in humans</p>	Symbol	
		Signal word	Warning
		Hazard statement	May cause respiratory irritation or drowsiness or dizziness

1.2.9 Specific target organ toxicity following repeated exposure


Hazard Category	Criteria	Hazard Communication Element	
1	<p>1. For substances and tested mixtures Reliable evidence on the substance or mixture (including bridging principles) of an adverse effect on specific organs or systems in humans or animals. May use guidance values in Category 1 criteria for as part of weight of evidence evaluation. May be named for specific organ or system affected.</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 1 - if it contains at least one ingredient classified in Category 1 at a concentration $\geq 10\%$</p>	Symbol	
		Signal word	Danger
		Hazard statement	Causes damage to organs (or state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)
2	<p>1. For substances and tested mixtures Reliable evidence on the substance or mixture (including bridging principles) of an adverse effect on specific organs or systems in humans or animals. May use guidance values in Category 2 criteria for as part of weight of evidence evaluation. May be named for specific organ or system affected.</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 2: (a) if it contains at least one ingredient classified in Category 1 at a concentration $\geq 1\%$ but $< 10\%$; or (b) if it contains at least one ingredient classified in Category 2 at a concentration $\geq 10\%$</p>	Symbol	
		Signal word	Danger
		Hazard statement	May cause damage to organs (or state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)

1.2.10 Aspiration hazard

Hazard Category	Criteria	Hazard Communication Element	
1	<p>1. For substances and tested mixtures</p> <p>(a) Practical experience from reliable and good quality human evidence showing human aspiration toxicity including chemical pneumonia, varying degree of pulmonary injury or death following aspiration</p> <p>(a) Hydrocarbon with a kinematic viscosity $\leq 20.5 \text{ mm}^2/\text{s}$, measured at 40°C</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category 1:</p> <p>(a) if it contains at least one ingredient classified in Category 1 and having a kinetic viscosity $\leq 20.5 \text{ mm}^2/\text{s}$ measured at 40°C at a concentration $\geq 10\%$</p> <p>(b) for mixtures which separate into two or more distinct layers, if at least one layer contains one ingredient classified in Category 1 and having a kinetic viscosity $\leq 20.5 \text{ mm}^2/\text{s}$ measured at 40°C, at a concentration $\geq 10\%$</p>	Symbol	
		Signal word	Danger
		Hazard statement	May be fatal if swallowed and enters airways
2	<p>1. For substances and tested mixtures</p> <p>Substances and mixtures other than those classified in Category 1 which, on the basis of animal studies and expert judgment are presumed to cause human aspiration toxicity and have a kinematic viscosity $\leq 14 \text{ mm}^2/\text{s}$ measured at 40°C</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, classify the mixture in Category :</p> <p>(a) if it contains at least one ingredient classified in Category 2 and having a kinematic viscosity $\leq 14 \text{ mm}^2/\text{s}$ measured at 40°C at a concentration $\geq 10\%$</p> <p>(b) for mixtures which separate into two or more distinct layers, if at least one layer contains one ingredient classified in Category 2 and having a kinematic viscosity $\leq 14 \text{ mm}^2/\text{s}$ measured at 40°C, at a concentration $\geq 10\%$</p>	Symbol	
		Signal word	Warning
		Hazard statement	May be harmful if swallowed and enters airways

1.3 Environmental hazard classification criteria and label elements of hazard communication



1.3.1 (a) Acute hazards to the aquatic environment

Hazard Category	Criteria	Hazard Communication Element	
1	<p>1. For substances and tested mixtures LC_{50} or EC_{50} is ≤ 1 mg/l Where L(E)C_{50} is either 96hr LC_{50} (for fish) 48hr EC_{50} (for crustacean) 72 or 96 hr ErC_{50} (for algae or other aquatic plants)</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, (a) for mixtures with classified ingredients, apply the summation method and classify in Acute 1 if: [(Sum of concentrations of Acute 1 ingredients) x M] is $\geq 25\%$</p> <p>(b) for mixtures with tested ingredients, apply the additivity formula and classify in Acute 1 if: LC_{50} or EC_{50} is ≤ 1 mg/l</p> <p>(c) for mixtures with both classified and tested ingredients, apply the combined additivity formula and summation method and classify in Acute 1 if: [(Sum of concentrations of Acute 1 ingredients) x M] is $\geq 25\%$</p> <p>4. For mixtures with no usable information for one or more relevant ingredients, classify using the available information and add the statement identifying percentage of the mixtures consists of ingredient(s) of unknown hazards to the aquatic environment</p>	Symbol	
		Signal word	Warning
		Hazard statement	Very toxic to aquatic life

Hazard Category	Criteria	Hazard Communication Element	
		Symbol	No symbol
2	<p>1. For substances and tested mixtures LC_{50} or EC_{50} is > 1 mg/l but ≤ 10 mg/l Where L(E)C_{50} is either 96hr LC_{50} (for fish) 48hr EC_{50} (for crustacean) 72 or 96 hr ErC_{50} (for algae or other aquatic plants)</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, (a) for mixtures with classified ingredients, apply the summation method and classify in Acute 2 if: [(Sum of concentrations of Acute 1 ingredients $\times M \times 10$) + (sum of concentration of Acute 2 ingredients)] is $\geq 25\%$</p> <p>(b) for mixtures with tested ingredients, apply the additivity formula and classify in Acute 2 if: LC_{50} or EC_{50} is > 1 mg/l but ≤ 10 mg/l</p> <p>(c) for mixtures with both classified and tested ingredients, apply the combined additivity formula and summation method and classify in Acute 2 if: [(Sum of concentrations of Acute 1 ingredients $\times M \times 10$) + (sum of concentration of Acute 2 ingredients)] is $\geq 25\%$</p> <p>4. For mixtures with no usable information for one or more relevant ingredients, classify using the available information and add the statement identifying percentage of the mixtures consists of ingredient(s) of unknown hazards to the aquatic environment</p>	Signal word	No signal word
		Hazard statement	Toxic to aquatic life

Hazard Category	Criteria	Hazard Communication Element	
		Symbol	No symbol
3	<p>1. For substances and tested mixtures LC_{50} or EC_{50} is > 10 mg/l but ≤ 100 mg/l Where $L(E)C_{50}$ is either 96hr LC_{50} (for fish) 48hr EC_{50} (for crustacean) 72 or 96 hr ErC_{50} (for algae or other aquatic plants)</p> <p>2. If data of the complete mixture are not available, apply bridging principles</p> <p>3. If bridging principles do not apply, (a) for mixtures with classified ingredients, apply the summation method and classify in Acute 3 if: [(Sum of concentrations of Acute 1 ingredients x M x100) + (sum of concentration of Acute 2 ingredients x 10) + (sum of concentration of Acute 3 ingredients)] is $\geq 25\%$</p> <p>(b) for mixtures with tested ingredients, apply the additivity formula and classify in Acute 3 if: LC_{50} or EC_{50} is > 10 mg/l</p> <p>(c) for mixtures with both classified and tested ingredients, apply the combined additivity formula and summation method and classify in Acute 3 if: [(Sum of concentrations of Acute 1 ingredients x M x100) + (sum of concentration of Acute 2 ingredients x 10) + (sum of concentration of Acute 3 ingredients)] is $\geq 25\%$</p> <p>4. For mixtures with no usable information for one or more relevant ingredients, classify using the available information and add the statement identifying percentage of the mixtures consists of ingredient(s) of unknown hazards to the aquatic environment</p>	Signal word	No signal word
		Hazard statement	Harmful to aquatic life

1.3.1 (b) Long-term hazards to the aquatic environment

Hazard Category	Criteria	Hazard Communication Element	
1	1. For substances rapidly degradable (a) NOEC is ≤ 0.01 mg/l , and (b) L(E)C ₅₀ ≤ 1 mg/l and BCF is ≥ 500 (or log K _{ow} ≥ 4)	Symbol	
	2. For substances non-rapidly degradable	Signal word	Warning
	(a) NOEC is ≤ 0.1 mg/l , and (b) L(E)C ₅₀ ≤ 1 mg/l 3. For mixtures, apply bridging principles 4. If bridging principles do not apply, classify in Chronic 1 if: [(Sum of concentrations of Chronic 1 ingredients) x M] is $\geq 25\%$ 5. For mixtures with no usable information for one or more relevant ingredients, classify using the available information and add the statement identifying percentage of the mixtures consists of ingredient(s) of unknown hazards to the aquatic environment	Hazard statement	Very toxic to aquatic life with with long lasting effects
2	1. For substances rapidly degradable (a) NOEC is > 0.01 mg/l but ≤ 0.1 mg/l , and (b) L(E)C ₅₀ is > 1 mg/l but ≤ 10 mg/l and BCF is ≥ 500 (or log K _{ow} ≥ 4) 2. For substances non-rapidly degradable (a) NOEC is > 0.1 mg/l but ≤ 1 mg/l , and (b) L(E)C ₅₀ is > 1 mg/l but ≤ 10 mg/l 3. For mixtures, apply bridging principles	Symbol	

Hazard Category	Criteria	Hazard Communication Element	
	<p>4. If bridging principles do not apply, classify in Chronic 2 if: [(Sum of concentrations of Chronic 1 ingredients) x M x 10] + (sum of concentrations of Chronic 2 ingredients)] is $\geq 25\%$</p> <p>5. For mixtures with no usable information for one or more relevant ingredients, classify using the available information and add the statement identifying percentage of the mixtures consists of ingredient(s) of unknown hazards to the aquatic environment</p>		
		Signal word	No signal word
		Hazard statement	Toxic to aquatic life with with long lasting effects
3	<p>1. For substances rapidly degradable (a) NOEC is > 0.1 mg/l but ≤ 1 mg/l , and (b) L(E)C₅₀ is > 10 mg/l but ≤ 100 mg/l and BCF is ≥ 500 (or $\log K_{ow} \geq 4$)</p> <p>2. For substances non-rapidly degradable L(E)C₅₀ is > 10 mg/l but ≤ 100 mg/l, and</p> <p>3. For mixtures, apply bridging principles</p> <p>4. If bridging principles do not apply, classify in Chronic 3 if: [(Sum of concentrations of Chronic 1 ingredients) x M x 100] + (sum of concentrations of Chronic 2 ingredients x 10)] + (sum of concentrations of Chronic 3 ingredients)] is $\geq 25\%$</p> <p>5. For mixtures with no usable information for one or more relevant ingredients, classify using the available information and add the statement identifying percentage of the mixtures consists of ingredient(s) of unknown hazards to the aquatic environment</p>	Symbol	No symbol
		Signal word	No signal word
		Hazard statement	Harmful to aquatic life with with long lasting effects

Hazard Category	Criteria	Hazard Communication Element	
4	<p>1. For substances and tested mixtures</p> <p>(a) Poorly soluble and no acute toxicity is observed up the water solubility</p> <p>(b) Lack the potential of rapidly biodegradable and have the potential to bioaccumulate (BCF is ≥ 500 or, if absent, $\log K_{ow} \geq 4$) unless Chronic NOECs is > 1 mg/l</p> <p>2. For mixtures, apply bridging principles</p> <p>3. If bridging principles do not apply, classify in Chronic 4 if: [(Sum of concentrations of Chronic 1 ingredients) + (Sum of concentrations of Chronic 2 ingredients) + (Sum of concentrations of Chronic 3 ingredients) + (Sum of concentrations of Chronic 4 ingredients)] is $\geq 25\%$</p> <p>5. For mixtures with no usable information for one or more relevant ingredients, classify using the available information and add the statement identifying percentage of the mixtures consists of ingredient(s) of unknown hazards to the aquatic environment</p>	Symbol	No symbol
		Signal word	No signal word
		Hazard statement	May cause long lasting harmful to aquatic life

1.3.2 Hazard to the ozone layer


Hazard Category	Criteria	Hazard Communication Element	
1	<p>1. For substances</p> <p>Any of the controlled substances listed in the Annexes to the Montreal Protocol</p> <p>2. For mixtures</p> <p>Any mixture containing at least on ingredient listed in the Annexes to the Montreal Protocol, at a concentration $\geq 0.1\%$</p>	Symbol	
		Signal word	Warning
		Hazard statement	Harms public health and the environment by destroying ozone in the upper atmosphere

Table 2 Information in the Safety Data Sheet

No.	Heading	Information
1	Identification of the substance or mixture and of the supplier	1.1 GHS product identifier 1.2 Other means of identification 1.3 Recommendations and restrictions on use of the substance or mixture 1.4 Supplier's details (i.e. name, address, phone number(s)) 1.5 Emergency phone number
2	Hazards identification	2.1 GHS Classification of the substance or mixture, and national or regional information 2.2 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" 2.3 Other hazards which do not result in GHS classification e.g. dust explosion hazard, or which are not covered by GHS classification
3	Composition/information on ingredients	3.1 Substance 3.1.1 Chemical identity 3.1.2 Common name and synonym (if available) 3.1.3 CAS number and other unique identifiers for the substance 3.1.4 Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance 3.2 Mixture 3.2.1 Chemical identity 3.2.2 Concentration or concentration range of all hazardous ingredients, which are present above their cut-off levels Note: The ingredient information provided should be based on the requirement on Confidential Business Information-CBI which is prescribed by the government agency.
4	First-aid measures	4.1 Description of necessary first-aid measures divided by relevant routes of exposure i.e. inhalation, skin, eye, and ingestion 4.2 Most important symptoms/effects, acute and delayed 4.3 Indication of immediate medical attention and special treatment needed, if necessary
5	Fire-fighting measures	5.1 Inappropriate and suitable fire extinguishing media 5.2 Specific hazards arising from the chemical e.g. hazardous combustion products that form when the substance or mixture burns 5.3 Special protective equipment and actions for fire-fighters
6	Accidental release measures	6.1 Personal precaution, protective equipment and emergency procedure 6.2 Environmental precautions 6.3 Methods and materials for containment and cleaning up

Table 2 Information in the Safety Data Sheet

No.	Heading	Information
7	Handling and storage	7.1 Precaution for safe handling and storage 7.2 Conditions for safe storage including any incompatibilities
8	Exposure controls/personal protection	8.1 Control parameters e.g. occupational exposure limit values, biological limit values 8.2 Appropriate engineering controls 8.3 Individual protection measures e.g. personal protective equipment
9	Physical and chemical properties	9.1 Appearance (physical state, color, etc) 9.2 Odor 9.3 Odor threshold limit 9.4 pH 9.5 Melting point/freezing point 9.6 Initial boiling point and boiling range 9.7 Flash point 9.8 Evaporation rate 9.9 Flammability (solid, gas) 9.10 Upper/lower flammability or explosive limits 9.11 Vapor pressure 9.12 Vapor density 9.13 Relative density 9.14 Solubility 9.15 Partition coefficient: n-octanol/water 9.16 Auto-ignition temperature 9.17 Decomposition temperature 9.18 Viscosity
10	Stability and reactivity	10.1 Reactivity 10.2 Chemical stability 10.3 Possibility of hazardous reactions 10.4 Conditions to avoid 10.5 Incompatible materials 10.6 Hazardous decomposition products

Table 2 Information in the Safety Data Sheet

No.	Heading	Information
11	Toxicological information	A concise but complete and comprehensive description of the various toxicological (health) effects, and the available data used to identify those effects, including: 11.1 Information of the likely routes of exposure 11.2 Symptoms related to physical, chemical and toxicological characteristics 11.3 Delayed and immediate effects and also chronic effects from short- and long-term exposure 11.4 Numerical measures of toxicity e.g. acute toxicity estimates
12	Ecological information	12.1 Toxicity (aquatic and terrestrial) 12.2 Persistence and degradability 12.3 Bioaccumulative potential 12.4 Mobility in soil 12.5 Other adverse effects
13	Disposal considerations	Description on waste residue and safety transfer method, including appropriate disposal methods of waste residues and contaminated packaging
14	Transport information	14.1 UN number 14.2 UN proper shipping name 14.3 Transport hazard class 14.4 Packing group, if applicable 14.5 Marine pollutant 14.6 Transport in bulk according to Annex II of MARPOL 73/78 and IBC Code 14.7 Special precautions for users, which a user needs to be aware of or needs to comply with in connection with transport either inside or outside the business site.
15	Regulatory information	Safety, health and environmental regulatory information specific for the product in question
16	Other information	