Code of Practice for the Introduction of the Global Harmonized system (GHS) in Gulf Cooperation Council (GCC) countries

A common and consistent way of communicating hazards of chemicals up and down the supply chain– chemicals being supplied into, chemicals being produced and chemicals being used in the GCC.

Introducing GHS: a system for harmonizing hazard classification criteria and chemical hazard communication elements worldwide

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1. INTRODUCTION AND PURPOSE

The Earth Summit held in Rio de Janeiro in 1992 introduced for the first time GHS as a result of Agenda 21 on environmentally sound management of chemicals concerning harmonization of classification and labelling of chemicals. The World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002 went further recognizing the need for harmonizing at a global level how information about the hazardous properties of chemicals are determined and how information about these hazards are passed along the supply chain.

Acknowledging that the protection of human health and environment during the handling, transport and use of chemical should be based on solid scientific principles; and to facilitate trade in a continuously expanding international market, the United Nations (UN) has developed a Globally Harmonized System (GHS) [1] on classification and labelling, with the idea that that existing systems should be harmonized to address classification and labelling of chemicals in all sectors (workplace, consumer, transport). In its plan of Implementation (para 22.(c)) WSSD encouraged countries to implement the new GHS as soon as possible.

In the first edition of GHS, it was anticipated that once fully implemented, the GHS will enhance the protection of human health and the environment by providing a system for hazard communication that is comprehensible throughout the world; provide a recognized framework for those countries without an existing system; reduce the need for testing and evaluation of chemicals; and facilitate trade in chemicals whose hazards have been properly assessed and identified on an international basis.

The UN GHS is not a formal treaty, but instead is a non-legally binding international agreement. It becomes binding only when the country, or confederation of countries, has implemented GHS in their local legal systems. The UN GHS allows for significant flexibility with respect which hazard classes/categories to adopt in the country implementations and it gives to the competent authorities the freedom to establish appropriate mechanism (in accordance with national law and practice) for the implementation of specific provisions. Table A.1 in the Annex to this Code of Practice provides an overview of the differences per regions/countries. The implementation of the GHS around the World is a dynamic process and is available from the United Nations Economic Commission from Europe (UNECE) [2].

The UN GHS evolves adapting to the technical and scientific developments and as needs arise and experience is gained in its implementation. The first edition of the GHS, which was intended to serve as the initial basis for the global implementation of the system, was adopted in December 2002 and published in 2003. Since then, the GHS has been updated, revised and improved regularly following biennial work program. The last revision is rev.6 that was published in 2015.

Although it would be desirable that country implementation follows the GHS timeline, there are factors like the availability of resources that may have an impact on this process. As a result, countries do not necessarily adopt the same revisions at the same time and this can have consequences for international chemicals trade. The European Union has established a very solid process to remain aligned with the revisions to the GHS. The following table shows the latest revision to GHS adopted in the some major countries

Country	UN GHS Revision adopted
EU [4]	Rev. 5 (2013)
USA [5]	Rev. 3 (2009)
China[6]	Rev. 4 (2011)
Russia [7]	Rev. 4 (2011)
Japan [8]	Rev. 4 (2011)
Brazil [9]	Rev. 3 (2009)
Canada [10]	Rev. 5 (2013)
Australia [11]	Rev. 3 (2009)

In the European Union, the UN GHS was implemented with the publication of the European Regulation (EC) No 1272/2008, which is also known by its abbreviated form, CLP Regulation [3]. It entered into force on 20 January 2009 and is now legally binding in all member states of the European Union and also in the countries of the European Economic Area (EEA) (Norway, Iceland and Liechtenstein). The CLP Regulation applies the general principles of the GHS. The hazard classes/categories implemented as per the building block approach were chosen to keep consistency with the previous European regulatory system while ensuring the same level protection. CLP also retains a few aspects of the previous EU system, where these do no contradict the GHS, to maintain existing EU standards.

Since 2015, a number of chemical suppliers to the GCC and chemical producers in the GCC have started creating and supplying safety datasheets and labels for their chemicals using the GHS. Due to a lack of local regulation on the adoption of the GHS, the GHS classifications being supplied are self-assessments - not consistent. For example, some are supplying

documents compliant with the EU regulation (CLP) and some are supplying documents compliant with the former American (OSHA) regulation. To eliminate this hazard classification inconsistency and therefore simplify chemical hazard communication up and down the supply chain and inside GCC companies, the Gulf Petrochemicals and Chemicals Association (GPCA) have agreed to adopt this Code of Practice. In its simplest form, this code is compliant with

1.1 Existing GCC country SDS, Label and Hazard communication legislation and standards.
1.2 The UN Globally Harmonized System (GHS) [1] on classification and labelling.
1.3 The European Regulation (EC) No 1272/2008 - CLP Regulation [3].

2. SCOPE

The GHS aims to harmonize the following two elements: 1) the criteria for classifying substances and mixtures in accordance to their health, environmental and physical hazards; and 2) the hazard communication elements, including requirements for safety data sheets and labels.
Since all chemical products placed on the market are made in a workplace, handled during storage, shipment and transport by workers, the UN GHS text does not provide exemptions from the scope of the GHS for any particular type of chemical product. This Code of Practice shall not apply to radioactive substances and mixtures, non-isolated intermediates, substances and mixtures for scientific research and development. It shall not apply to substances and mixtures in the forms of medicinal and veterinary products, cosmetic products, food or feeding stuffs. This Code of Practice shall not be applied to articles, as defined in the table given in the section Definitions.

Target audiences for this standard include consumers, workers, transport workers, and emergency responders using chemicals in and/or supplying chemicals into the GCC.

3. DEFINITIONS

For the purpose of this Code of Practice, the definitions as laid down the Table below apply. A comprehensive list of definitions and abbreviations is provided in Chapter 1.2 of GHS (Rev.6) (2015). When this Code of Practice refers to provisions as implemented in the CLP Regulation, the definitions provided in Article 2 of CLP.

Term	Meaning	Example
Substance	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 compositions.	Methyl isocyanate
Mixture	A mixture or solution composed of two or more substances in which they do not react	Formulation used in coating industry
Article	An object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition	A cartridge
Non-isolated intermediate	An intermediate that during synthesis is not intentionally removed from the equipment in which the synthesis takes place.	Phosgene in isocyanate production
Hazard class	The nature of the physical, health or environmental hazard	Oral acute toxicity
Hazard Category	The division of criteria within each hazard class	Oral acute toxicity is divided into four hazard categories according to this Code of Practice
Hazard pictogram	A graphical composition that may include a symbol plus other graphic elements, such as a border, background pattern or color that is intended to convey specific information	
Signal word	A word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label	'Danger' and 'Warning'

Hazard statement	A phrase assigned to a hazard class and category that describes the nature of the hazards of a hazardous product, including, where appropriate, the degree of hazard	May cause respiratory irritation (H335)
Precautionary statement	A phrase (and/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	Do not allow contact with air (P222)

4. CORRELATION OF GHS TO TRANSPORT OF DANGEROUS GOODS

It has been recognized that transport regulations could be referred to as model for the harmonization. With the first edition of Transport Regulations in 1956 with the title "Recommendations on the Transport of Dangerous Goods" the harmonization among the different modes of transport has been achieved. In 2015 the latest amended Model Regulation (Revision No 19) was published. UN Model Regulations has two parts, *Recommendations on the Transport of Dangerous Goods* and the *Manual of Tests and Criteria*.

The *Recommendations on the Transport of Dangerous Goods* [12] of United Nations (the so called Orange book) is implemented through other UN Bodies and National Governments into Modal Regulations such as (the list is not comprehensive):

- IM, International Maritime Dangerous Goods Code (IMDG Code) [13] ;
- ICAO – Technical Instructions for The Safe Transport of Dangerous Goods by Air (TI) [14];
- ECE – European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN 2015) [15];
- ECE – European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR 2015) [16];
- Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) [17].

It is important to notice that in GCC countries from January 2016, a GPCA (Gulf Petrochemicals and Chemicals Association) task force [18] was established to develop a framework of requirements for transport of dangerous goods based on the European Agreement concerning the International Carriage of Dangerous Goods by Road [19].

GHS has borrowed from the transport regulations the criteria for classification of substances which are characterized by physical hazards, and there are very few differences between the two systems.

With respect to the health hazards, transport regulations takes into considerations only the hazards which might result in immediate and serious effects, i.e. serious acute toxicity and corrosive effects. Hazards more related to chronic exposure such as germ cell mutagenicity, carcinogenicity, reproductive toxicity, etc., are not considered. As an example, for acute toxicity by oral, dermal and inhalation routes, the GHS categories 1–3 are equivalent to packing groups I–III.

With respect the environmental hazards (looking to the substances hazardous to the aquatic environment), one main difference among GHS and transport regulations is that only Category acute 1, chronic 1 and chronic 2 are covered by transport regulations.

Overall there are 30 hazard classes in GHS (rev. 6) and 9 dangerous good classes. The nine classes, some with divisions, are shown in the Table below. The "corresponding" classes and categories of GHS are given in section 6 of this document.

UN Class	Dangerous Goods	Division	Classification
1	Explosives	1.1-1.6	Explosives
2	Gases	2.1	Flammable gas
		2.2	Non-flammable, non-toxic gas
		2.3	Toxic gas
3	Flammable liquid		Flammable liquid
4	Flammable solids	4.1	Flammable solid
		4.2	Spontaneously combustible substance
		4.3	Substance which in contact with water emits flammable gas
5	Oxidizing substances	5.1	Oxidizing substances
		5.2	Organic peroxide
6	Toxic substances	6.1	Toxic substances

		6.2	Infectious substance
7	Radioactive material		Radioactive material
8	Corrosive substances		Corrosive substances
9	Miscellaneous dangerous goods		Miscellaneous dangerous goods

With regards to Hazard Communication, since the GHS pictograms were derived from the transport regulations, in the case of a packaging used for transport, the GHS pictograms from hazard classes and categories covered by the transport regulations are not necessary on the GHS label. These GHS pictograms are covered then by the transport label.

In conclusion, there is consistency between GHS and transport regulation but harmonization is not yet complete. As a matter of fact the systems are implemented separately and compliance with both and a good knowledge of both systems are still needed to ensure compliance.

5. HAZARD CLASSIFICATION: GENERAL CONCEPTS

The purpose of hazard classification is to identify the properties of substances and mixture that may constitute a hazard during normal handling and use. The properties considered are: (a) physicochemical properties; (b) health effects; and (c) environmental effects. Classification in this Code of Practice is about identification of the hazard (i.e. inherent properties of a chemical) not the risk (i.e. the probability of the hazardous properties of the chemical causing harm to people or the environment). The obligation to classify applies to manufacturers, importers and downstream users of substances or mixtures that are placed on the market.

A substance or a mixture fulfilling the criteria relating to physical, health or environmental hazards, is hazardous and shall be classified in relation to the respective hazard classes provided for in Section 6.

5.1 Substances

The classification of a substance is based on the relevant data available on its hazardous properties, mostly data generated in tests for physical, toxicological and eco-toxicological hazards. Other data, such as information generated in “in vitro” tests, ”read across” can also be used. Impurities, additives or individual constituents of substances might influence the classification of the substance. In the absence of test data, mixtures and impure substances are treated the same way for classification purposes.

Leveraging on provisions developed under the CLP regulation, this Code of Practice introduces two types of classification: self-classification and harmonized-classification.

“Self-classification” is a process for determining the hazardous properties of a substance. The available toxicological, eco-toxicological and physical-chemical data on the substance are compared with the classification criteria in order to determine the appropriate hazard classification. It is important to note that this Code of Practice does not require the generation of new toxicology and eco-toxicology data in order to perform a self-classification. Other regulations such as REACH [22] in the European Union might drive the need to generate data.

The “harmonized classification‟ of a substance means that a decision to classify and label the substance for particular hazards has been taken by an authority [3]. Harmonized classification applies only to certain substances and they are in general published in national lists. The application of a harmonized classification helps suppliers of that substance to fulfil their obligations without having to perform the necessary tests. Section 8 of this document outlines the provisions adopted by this Code of Practice.

5.2 Mixtures

The concept of harmonized classification is not applicable to mixtures (except for aqueous solutions of certain substances); as a consequence a mixture must always be self-classified. For mixtures, the same rules apply as for substances: where data are available on the mixture as a whole, they should primarily be used to determine the classification. If this cannot be done, further approaches to mixture classification may be applied.

A distinction is made depending on the type of hazards. Classification for physical hazards is normally based on the results of tests carried out on the mixtures themselves. For the classification for health and environmental hazards,

available data on the mixture as a whole should primarily be used; however no “in vivo” test data should be generated for mixtures.

When no test data are available, alternative approaches are used when classifying a mixture for health and environmental hazards. These are: 1) classification based on the application of bridging principles which make use of test data on similar tested mixtures and, if the hazard properties of some or all substances are known, 2) classification done using ingredient concentrations, concentration limits (and M-factors) and calculations methods.

The bridging principles are: dilution; batching; concentration of highly hazardous mixtures; interpolation within one toxicity category; substantially similar mixtures, classification where the composition of a mixture has changed and provisions for aerosol. Details on the application criteria are provided in CLP Annex I, 1.1.3.

When applying the calculation principles there are two distinct approaches: additive and non-additive approach. In the first approach, the sum of the concentrations of the components is compared to the concentration limit and if this is exceeded, the mixture will result classified for that particular hazard class. This approach cannot be applied for some hazard classes (see CLP Annex I 3.2.3.3.4), for those the non-additive approach applies, which means that the concentration of the individual components is compared to the concentration limits.

The definition of concentration limit is as follows. Concentration limits are the minimum concentrations for a substance which trigger the classification of a mixture if exceeded by the individual concentration or the sum of concentrations (where the additivity approach is allowed) of relevant substances. This Code of Practice, in accordance to CLP provisions, introduces two types of concentration limits: specific (SCL) and generic (GCL). The generic concentration limits (or thresholds) are set out in parts 2-5 of Annex I to CLP for those hazard classes where they apply. The SCLs are substance specific, they are only applicable to health hazards, and when available are given in Annex VI to CLP as outlined in section 8 of this Code of Practice.

The minimum concentrations for a substance (either as additive, impurity or an individual ingredient of mixture) to be taken into account for classification purposes is called cut-off values (in general 0.1% or 1% depending on the hazard class – Table 1.1 of Annex I to CLP).

6 HAZARD CLASSIFICATION: CLASSES AND CATEGORIES

Hazard classification is a process involving identification of the physical, health and environmental hazards of a substance or a mixture. The hazard classes and their differentiations are provided in section 6.1, 6.2 and 6.3. This Code of Practice is not a comprehensive description of the GHS hazard classes, their applicability and decision logic. References to this information are made thorough the text.

6.1 Physical Hazards

Whilst the general principles to classify substances and mixtures are outlined in section 5 of this Code of Practice, definitions of the physical hazard classes, the criteria for classification of substances and mixtures and the hazard communication elements are provided in part 2 of Annex I to CLP Regulation.

A substance or a mixture fulfilling the criteria relating to physical hazards is hazardous and shall be classified in relation to the respective hazard classes and categories provided in the Table below.

Physical Hazard	Categories and subcategories						
Explosives	Unstable Explosive	1.1	1.2	1.3	1.4	1.5	1.6
Flammable gases (including chemically unstable gases)	1		2		A		B
Aerosols	1		2		3		
Oxidizing gases	1						
Gases under pressure	Compressed gas		Liquefied gas		Refrigerated liquefied gas		Dissolved gas
Flammable liquids	1		2		3		
Flammable solids	1				2		
Self-reactive substances and mixtures	Type A		Type B		Type C & D	Type E & F	Type G

Pyrophoric liquids	1				
Pyrophoric solids	1				
Self-heating substances and mixtures	1				
Substances and mixtures which in contact with water emit flammable gases	1		2		3
Oxidizing liquids	1		2		3
Oxidizing solids	1		2		3
Organic peroxides	Type A	Type B	Type C & D	Type E & F	Type G
Corrosive to metals	1				

6.2 Health hazards

Whilst the general principles to classify substances and mixtures are outlined in section 5 of this Code of Practice, definitions of the health hazard classes, the criteria for classification of substances and mixtures and the hazard communication elements are provided in part 3 of Annex I to CLP Regulation.

A substance or a mixture fulfilling the criteria relating to health hazards is hazardous and shall be classified in relation to the respective hazard classes and categories provided in Table below.

Health Hazard		**Categories and subcategories**			
Acute Toxicity	Oral	1	2	3	4
	Dermal	1	2	3	4
	Inhalation	1	2	3	4
Skin Corrosion/Irritation		1: 1A / 1B / 1C	2		
Serious Eye Damage/Irritation		1	2		
Respiratory sensitization		1: 1A / 1B			
Skin sensitization		1: 1A / 1B			
Germ cell mutagenicity		1A / 1B			
Carcinogenicity		1A / 1B	2		
Reproductive toxicity		1A / 1B	2		
Lactation		No category or sub-category			
Specific target organ toxicity — single exposure		1	2	3	
Specific target organ toxicity — repeated exposure		1	2		
Aspiration hazard		1			

6.3 Environmental hazards

Whilst the general principles to classify substances and mixtures are outlined in section 5 of this Code of Practice, definitions of the environmental hazard classes, the criteria for classification of substances and mixtures and the hazard communication elements are provided in part 4 of Annex I to CLP Regulation.

A substance or a mixture fulfilling the criteria relating to health hazards is hazardous and shall be classified in relation to the respective hazard classes and categories provided in Table below

Environmental Hazard	Categories and subcategories			
Hazardous to the aquatic environment – Acute hazard	1			
Hazardous to the aquatic environment – Chronic hazard	1	2	3	4
Hazardous to the ozone layer	1			

7 HAZARD COMMUNICATON

The communication of safety information on substances and mixtures is one of the pillars of a sound chemical management program. The mode of application of the hazard communication elements of this Code of Practice are Safety data sheets (SDSs) and labels and they may vary by product category or stage in the life cycle.

The provisions for SDSs and labels are outlined, respectively in section 7.1 and 7.2 of this document.

7.1 Safety Data Sheets

The Safety Data Sheet (SDS) is an efficient and effective document for transmitting appropriate safety information along the supply chain on substances and mixtures. It is a source of information that shall enable users to take the necessary measures relating to protection of human health and safety at the workplace, and protection of the environment.

It is a responsibility of the manufacturer or importer to create the SDS for the hazardous products being placed on the market. Actors further down the supply chain either forward the SDS they have received from their suppliers or adapt, as needed, the content tailoring the SDS to the needs of their final customer.

This Code of Practice is based on the provisions laid down in the GHS (Rev.6) (2015). In particular in Chapter 1.5 “Hazard Communication: Safety Data Sheets” and references therein and, as such it is consistent with GSO ISO 11014:2013 (Safety data sheet for chemical products – Content and order of sections) [21] of the GCC Standardization Organization. Whenever the GHS text leaves freedom to the competent authorities in the implementation of a given provision, the provisions laid down in this document are based on well-established and well known national implementations.

A single safety data sheet may cover more than one substance or mixture, provided the information in that safety data sheet fulfils the requirements of this Code of Practice for each of those substances or mixtures

The following Table provides a concise summary of the SDS requirements applicable in GCC countries according to this code of practice.

Scope and applicability	Substances and mixtures classified as hazardous. Not classified mixtures which contains CMR ingredients exceeding the cut-off limits laid down in GHS
Language	For GCC countries, SDS should be in Arabic and English. The language used shall be simple, clear and precise.
Length	The length of the safety data sheet is not fixed
Units	International System of Units (SI)

Layout	The date of issue of the SDS should be stated and it should be easily readable. When the SDS has been revised the 'Revision: (date)' as well as a version number should be stated. All pages of an SDS should be numbered
Format	The information should be presented in 16 headings. The headings and their order is fixed
Headings	The list of 16 headings is: 1. Identification 2. Hazard Identification 3. Composition/information on ingredients 4. First-aid measures 5. Fire-fighting measures 6. Accidental release measures 7. Handling and storage 8. Exposure control/personal protection 9. Physical and Chemical properties 10. Stability and reactivity 11. Toxicological information 12. Ecological information 13. Disposal considerations 14. Transport information 15. Regulatory information 16. Other information
Sub-heading	Sub-headings are not mandatory (nor their numbering). They can be used to distinguish the route of exposure, provide national or regional information and in general to structure the content of the headings. The safety data sheet should not contain blank subsections. Subheading with no information might be suppressed
Content	The SDS should allow the identification of the product and the details of the supplier of the SDS, provide a clear description of the data used to identify the hazards, the measure to protect human health and environment, regulatory information, etc. The minimum information that should be included is provided in Table 1.5.2 of GHS Rev.6. More details and the guidance on the preparation of SDS s can be found in Annex 4 of GHS Rev.6.
Revision	Suppliers shall update the safety data sheet as new and significant information become available. Information updates that may affect the measures to protect human health or the environment are considered relevant changes. In this case the SDS should be updated without delay and the new version of the SDS shall be provided to all former recipients to whom they have supplied the product within the preceding 12 months.
Confidential business information	The protection of confidential business information (CBI) should not compromise the information provided to protect the human health and the environment. CBI claims should be limited to the chemical identity of certain substances in a way that does not put the confidential nature of their businesses at risk. Trade secret (TS) names, such as alternative chemical names, can be used. Where a TS name is used for a component with OELs, a statement in Section 8 should be included on the SDS to "contact the Customer Information service for additional information".
SDS author and training	The author of an SDS shall be a competent person. This is a person (or combination of persons) – or a coordinator of a group of people - who has or have, the required knowledge and experience for the compilation of the SDS. The supplier of the substances and mixtures should ensure that the competent persons have received appropriate training and refresher training

7.2 Labels

The labelling of chemical products is another pillar of a harmonized hazard communication system. The label is intended to provide essential information about hazardous substances and mixtures. It draws the attention of users (people at work and the general public) to the inherent hazards of such products so that the necessary precautionary measures can be taken. The label may also serve to draw attention to more comprehensive product information on safety such as the supplier's safety data sheet.

This Code of Practice is based on the provisions laid down in the GHS (Rev.6) (2015). In particular in Chapter 1.4, paragraph 1.4.10.5.4.2" Hazard Communication: Labelling" and references therein. When the GHS text leaves freedom to the competent authorities in the implementation of a given provision, the provisions laid down in this document are based on well-established and well known national implementations [3].

The following table provides a concise summary of the label requirements applicable in GCC countries.

Scope and applicability	Substances and mixtures classified as hazardous. Mixtures not classified as hazardous but containing substances classified as hazardous exceeding the cut-off limits as laid down in section 5 of this document.
Language	For GCC countries, labels should be in Arabic and English. The language used shall be simple, clear and precise.
Format and size	The size of the labels is in relation to the volume of the packaging. In general this Code of Practice applies the GHS provisions. In particular, for the labelling of small packaging and labelling of packaging of various layers the provisions as laid down in paragraph 1.4.19.5.4.4 of Chapter 1.4 of GHS (Rev.6) (2015).
Content of the label	A list of the mandatory labelling elements is given below: - Supplier identification - Product identifier - Hazard pictograms - Signal word - Hazard statement - Precautionary statement - Supplemental information - Emergency telephone number
Hazard communication label elements	The symbol, signal word and hazard statement) assigned to each of the hazard class/categories is provided in Annex 1 to GHS (Rev.6) (2015) paragraph 1.4.10.2. The precautionary statements to be used for each hazard class/category are provided in Section 3 of Annex 3 to GHS (Rev.6) (2015). A maximum of six precautionary statements shall appear on the label, unless more precautionary statements are necessary due to the nature and the severity of the hazards. Suppliers may combine the precautionary statements, having regard to clarity and comprehensibility of the precautionary advice
Supplemental information	Relevant supplemental information can be included as long as it is consistent with the classification of a substance or mixture and it does not contradict or cast in doubt the validity of the information given by the label elements. Without prejudice the provisions laid down in the GHS text, since the GHS building block approach adopted by this Code of Practice is the European GHS implementation (i.e. CLP Regulation), the supplemental hazard information and supplemental label elements as provided in Annex III to CLP are considered supplemental information.
Label composition	Without prejudice the provisions laid down in the GHS text, since the GHS building block approach adopted by this Code of Practice is the European GHS implementation (i.e. CLP Regulation [3]), the product identifier of a mixture shall

	consist (in addition to the name of the product) of the identity of all substances in the mixture that contribute to the classification of the mixture as to acute toxicity, skin corrosion or serious eye damage, germ cell mutagenicity, carcinogenicity, reproductive toxicity, respiratory or skin sensitization, specific target organ toxicity (STOT), or aspiration hazard. For a substance the product identifier shall consist of the chemical name of the substance (in addition to the name of the product) and an internationally recognized identification number (CAS number preferred)
Multiple hazards	Where a substance or mixture presents more than one GHS hazard, precedence for the allocation of symbols, signal words, hazard statements apply. The provisions are laid down in paragraph 1.4.10.5.3 of GHS (Rev.6) (2015). For substances that are included in the list of substances with harmonized classification (see section 8 of this document), the label shall include the hazard pictogram corresponding to the most severe hazard category for each relevant hazard class.
Revision	Suppliers shall update the label following any change to the classification and labelling of that substance or mixture. The label should be updated without undue delay.
Confidential business information	The same provisions laid down for SDS in section 6 apply.
Label author and training	The same provisions laid down for SDS in section 6 apply.

8 LIST OF SUBSTANCES WITH HARMONIZED CLASSIFICATION AND LABELLING

As GHS is being implemented around the world, a number of competent authorities have adopted lists of GHS classification for chemicals. Countries with their own substance classification lists include Europe (mandatory), Japan (non-mandatory), South Korea (mandatory), Malaysia (mandatory), Australia (non-mandatory) and New Zealand (non-mandatory). Competent authorities of some of these countries have made such list mandatory.

A global list would facilitate worldwide trade and would represent a step forward toward harmonization; the UN GHS Sub-Committee developed a set of guiding principles that would govern the development of such a list and started exploring the process and resources that are required to prepare a global classification list.

This Code of Practice adopts the list implemented by the CLP Regulation, namely the list of substances with an entry in Table 3.1 of Part 3 of Annex VI to CLP Regulation. This is the most comprehensive and consolidated list, thanks to a process that started in Europe in 1967. The list is also kept up to date with GHS and with scientific and technical advancements as outlined in this section.

In this list each substance is represented by an entry. The substance is identified by the Index No, the name (International Chemical Identification), the EC No, the CAS No. For each substance the Classification, the Labelling, the Specific Con. Limits/M-factors and Notes are provided as shown in the table below

Index No	International Chemical Identification	EC No	CAS No	Classification		Labelling			Specific Conc. Limits, M-factors	Notes
				Hazard Class and Category Code(s)	Hazard statement Code(s)	Pictogram, Signal Word Code(s)	Hazard statement Code(s)	Suppl. Hazard statement Code(s)		

The classification for each entry is provided by means of a code representing the hazard class and the category or categories and code(s) of the Hazard statement. For each hazard class, the hazard class and category code are shown in following Table.

Hazard class	Hazard Class and Category Code
Explosive	Unst. Expl. - Expl. 1.1 - Expl. 1.2 - Expl. 1.3 - Expl. 1.4 - Expl. 1.5 - Expl. 1.6

Flammable gas (including chemically unstable gases)	Flam. Gas 1 - Flam. Gas 2 - Chem. Unst. Gas A - Chem. Unst. Gas B
Aerosol	Aerosol 1 - Aerosol 2- Aerosol 3
Oxidizing gas	Ox. Gas 1
Gases under pressure	Press. Gas (Comp.) - Press. Gas (Liq.) - Press. Gas (Ref. Liq.) - Press. Gas (Diss.)
Flammable liquid	Flam. Liq. 1 - Flam. Liq. 2 - Flam. Liq. 3
Flammable solid	Flam. Sol. 1 - Flam. Sol. 2
Self-reactive substance or mixture	Self-react. A - Self-react. B - Self-react. CD - Self-react. EF - Self-react. G
Pyrophoric liquid	Pyr. Liq. 1
Pyrophoric solid	Pyr. Sol. 1
Self-heating substance or mixture	Self-heat. 1 - Self-heat. 2
Substance or mixture which in contact with water emits flammable gas	Water-react. 1 - Water-react. 2 - Water-react. 3
Oxidising liquid	Ox. Liq. 1 - Ox. Liq. 2 - Ox. Liq. 3
Oxidising solid	Ox. Sol. 1 - Ox. Sol. 2 - Ox. Sol. 3
Organic peroxide	Org. Perox. A - Org. Perox. B - Org. Perox. CD - Org. Perox. EF -Org. Perox. G
Substance or mixture corrosive to metals	Met. Corr. 1
Acute toxicity	Acute Tox. 1 - Acute Tox. 2 - Acute Tox. 3 - Acute Tox. 4
Skin corrosion/irritation	Skin Corr . -Skin Corr. 1A - Skin Corr. 1B - Skin Corr. 1C - Skin Irrit. 2
Serious eye damage/eye irritation	Eye Dam. 1 - Eye Irrit. 2
Respiratory/skin sensitization	Resp. Sens. 1, 1A, 1B - Skin Sens. 1, 1A, 1B
Germ cell mutagenicity	Muta. 1A - Muta. 1B - Muta. 2
Carcinogenicity	Carc. 1A - Carc. 1B - Carc. 2
Reproductive toxicity	Repr. 1A - Repr. 1B - Repr. 2 - Lact.
Specific target organ toxicity — single exposure	STOT SE 1 - STOT SE 2 - STOT SE 3
Specific target organ toxicity — repeated exposure	STOT RE 1 - STOT RE 2
Aspiration hazard	Asp. Tox. 1
Hazardous to the aquatic environment	Aquatic Acute 1 - Aquatic Chronic 1 - Aquatic Chronic 2 - Aquatic Chronic -Aquatic Chronic 4
Hazardous for the ozone layer	Ozone 1

The hazard statements are indicated in accordance with Annex III. For each substance, the labelling elements provided in this table are the Pictogram (Signal Word Code(s)), Hazard statement Code(s) and Suppl. Hazard statement Code(s). The hazard pictograms are indicated in accordance to Annex V to CLP Regulation, the signal word code 'Dgr' for 'Danger' or 'Wng' for 'Warning', the codes for the supplemental statements in accordance with Article 25(1) and the rules specified in Annex II, part 1.

A harmonized classification may include a Specific Concentration Limit (SCL) or a multiplication factor (M-factor), SCLs are concentration limits that are specific to the substance, and they can be lower or higher than the generic concentration limits. Substances classified in the list for the aquatic environment may have been assigned an M-factor which is the equivalent to an SCL. The Notes provided in the last column of the table provides special instructions in relation to the identification and classification of the substance.

A Harmonized classification indicated by an asterisk (*) corresponds to the minimum classification, meaning that the manufacturers or importers should apply this classification, but must classify in a more severe hazard category in case further information is available which shows that this is more appropriate.

The classifications in the list are not exhaustive for all hazards; the person placing the substance on the market must perform for it also a self-classification in hazard classes and differentiation not covered by the elements of the Annex VI entry for the substance

In Europe this list is updated by adapting the CLP Regulation to technical and scientific progress. This includes: incorporating amendments made on a biannual working rhythm at UN level to the GHS, considering the developments in internationally recognized chemical programs (e.g. REACh) and of the data from accident databases. The updates to the list may include a new entry (i.e. a decision has been taken to harmonize the classification of a substance), deletion or revising an entry for that purpose.

Adaptation to the CLP regulation are made through the publication of the "Adaptation to Technical Progress (ATP)", which are Commission Regulations amending the CLP Regulation. At the time of writing the first edition of this Code of Practice, the ninth Adaptation to Technical Progress to CLP Regulation applies [22].

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10 ANNEX

Building Blocks	EU	RU	US	CA	CN	JP	BR	AU
Physical Hazard								
Chemically unstable gases, Cat. A			■	■		■		■
Chemically unstable gases, Cat. B			■	■		■		■
Aerosol, Cat. 3			■	■		■		■
Flammable liquids Cat. 4	■					■		
Desensitized explosives 1-4	■	■	■	■	■	■	■	■
Pyrophoric gases	■	■	■	■	■	■	■	■
Health Hazard								
Acute toxicity, Cat. 5	■		■	■				■
Skin corrosion/irritation, Cat. 1	■	■	■		■	■	■	■
Skin corrosion/irritation, Cat. 3	■		■	■				■
Serious Eye damage/Eye Irritation, Cat. 2		■	■	■	■	■	■	■
Serious Eye damage/Eye Irritation, Cat. 2A	■					■		
Serious Eye damage/Eye Irritation, Cat. 2B	■					■		■
Aspiration hazard, Cat. 2	■		■	■				■
Environmental Hazard								
Acute hazards to aquatic environment Cat. 1			■	■				■
Acute hazards to aquatic environment Cat. 2	■		■	■				■
Acute hazards to aquatic environment Cat. 3	■		■	■				■
Long-term hazards to the aquatic environment Cat. 1			■	■				■
Long-term hazards to the aquatic environment Cat. 2			■	■				■
Long-term hazards to the aquatic environment, Cat. 3			■	■				■
Long-term hazards to the aquatic environment, Cat. 4			■	■				■
Hazard to the ozone layer			■	■				■

Building block adopted	
Building block not adopted	■

Table A.1