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# The Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

## Hazard communication

*(The contents of this presentation have been updated according to the fourth revised edition of the GHS, published in 2011)*

# Objective

Develop a harmonized hazard communication system,  
including:

- Labelling;
- Safety Data Sheets (SDS's)

based on GHS classification criteria

# Target audiences: needs

- **Factors considered:**
  - Potential use of products
  - Availability of information other than label
  - Availability of specific training
- **Needs:**
  - **Workplace:** labels, SDS, specific training
  - **Consumers:** labels
  - **Emergency responders:** labels, specific training
  - **Transport:** labels, transport documents, specific training

# Comprehensibility of hazard communication elements

## Guiding principles:

- Information should be conveyed in more than one way
- Comprehensibility should take account of existing information (literature, studies and data)
- Phrases indicating degree of hazard should be consistent across different hazard types
- Words and phrases should retain comprehensibility when translated into other languages
- Format and colour of the label elements, and SDS format should be standardized

# Updating information

Labels and Safety Data Sheets should be updated when new and significant information is available for a chemical

*“New and significant information” means any information that changes GHS classification and leads to a change in the information to be provided in the label or in the SDS*

# Labelling according to GHS

## Information required on a GHS label:

- Pictograms
- Signal words
- Hazard statements
- Precautionary statements and pictograms
- Product identifier
- Supplier information

# Pictograms (1)

- **Definition:**

Graphical composition that includes a symbol and other graphic elements, such as a border, background pattern or colour that is intended to convey specific information

- **Characteristics:**

- **Shape:** square set at a point.

- **Colours:**

- Symbol: black;
- Background: white;
- Border: red\*.

(\* In some cases, competent authorities may allow the use of a black border)



*Example:  
GHS pictogram for skin irritant*

# Pictograms (2)

- Packages covered by the UN Model Regulations:
  - For transport, the pictograms (labels) prescribed by the UN Model Regulations should be used
  - For specifications for transport pictograms see Part 5 of the UN Model Regulations
  - If a transport pictogram appears on the package, the GHS pictogram for the same hazard should not appear



*Example:  
Transport pictogram for flammable liquids*



# Signal words

- Definition

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

- “**Danger**” (for more severe hazard categories)
- “**Warning**” (for less severe hazard categories)

# Hazard statements

## Definition:

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.

*Hazard statements and a code uniquely identifying each one “Hxxx” are listed in section 1 of Annex 3 of the GHS. Hazard statement codes are intended to be used for reference purposes only, are not part of the hazard statement text and should not be used to replace it*

- **Examples of hazard statements are:**
  - “Highly flammable liquid and vapour” (H225)
  - “Toxic in contact with skin” (H311)
  - “Harmful to aquatic life” (H402)

# Precautionary statements

## Definition:

phrases (and/or pictograms) that describe recommended measures that should be taken to minimise or prevent adverse effects resulting from exposure to a hazardous product, or improper storage or handling of a hazardous product.

*Precautionary statements and a code uniquely identifying each one “Pxxx” are listed in section 2 of Annex 3 of the GHS. Precautionary statement codes are intended to be used for reference purposes only, are not part of the precautionary statement text and should not be used to replace it*

# Precautionary statements

## 5 types of precautionary statements:

- General (codes “P1xx”)
- Prevention (codes “P2xx”);
- Response (in case of spillage or exposure) (codes “P3xx”);
- Storage (codes “P4xx”); and
- Disposal (codes “P5xx”);

*Annex 3 of the GHS provides guidance on the use of precautionary statements consistent with GHS*

# Precautionary pictograms

To be used where allowed by the competent authority.

Examples:



*(Additional examples may be found in section 4 of Annex 3 of the GHS)*

# Product identifier

- Chemical identity of the substance
- For mixtures and alloys, chemical identities of:
  - all the ingredients/alloying elements contributing to the hazard of the mixture/alloy (as specified by the competent authority); or,
  - all the ingredients/alloying elements contributing to:
    - o Acute toxicity
    - o Skin corrosion/serious eye damage
    - o Germ cell mutagenicity
    - o Carcinogenicity
    - o Reproductive toxicity
    - o Skin/respiratory sensitization
    - o Specific target organ toxicity

when these hazards appear on the label

# Product identifier and supplier identification

## Product identifier (*cont'd*):

- **Proper shipping name** (for substances/mixtures covered by the UN Model Regulations)
- **For substances/mixtures supplied exclusively for workplace use:**
  - Competent authority may authorize chemical identities to be included only in SDS

## However...

*If a substance/ingredient meets the competent authority criteria for CBI, its identity does not have to be included on the label*

## Supplier identification

- **Name, address and telephone number** of the manufacturer or supplier of the substance/mixture

# Example of arrangement of label elements

**CODE**

**PRODUCT NAME**

**COMPANY NAME**

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

**DIRECTIONS FOR USE:**

XXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXXXXXXXXX

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



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

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

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

IN CASE OF FIRE use [as specified] for extinction

**FIRST AID**

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

Store in a cool, well-ventilated place.

UN Number  
Proper shipping  
name

[Universal Product Code (UPC)]

*Additional examples of arrangements of the GHS labels may be found in Annex 7 of the GHS*



# Precedence of hazard information

## Symbols and signal words

### Symbols:

- For physical hazards:
  - Substances/mixtures covered by UN Model Regulations:  
as specified by the Model Regulations
  - Workplace: as specified by competent authority
- For health hazards:
  - Exclamation mark should not appear if:
    - if skull and crossbones applies; or
    - if used for skin sensitization or skin/eye irritation:
      - if corrosive symbol applies
      - if the health hazard symbol appears for respiratory sensitization

### Signal words:

- If “Danger” applies, “warning” should not appear

# Precedence of hazard information

## Hazard statements

- All assigned hazard statements should appear on the label, except where otherwise provided below. The competent authority may specify the order in which they appear
- The following precedence rules may be applied:
  - If statement H410 “Very toxic to aquatic life with long lasting effects” is assigned, statement H400 “Very toxic to aquatic life” may be omitted
  - If statement H411 “Toxic to aquatic life with long lasting effects” is assigned, statement H401 “Toxic to aquatic life” may be omitted
  - If statement H412 “Harmful to aquatic life with long lasting effects” is assigned, statement H402 “Harmful to aquatic life” may be omitted
  - If statement H314 “Causes severe skin burns and eye damage” is assigned, statement H318 “Causes serious eye damage” may be omitted
- Competent authorities may decide whether to require use of the above precedence rules, or to leave the choice to the manufacturer/supplier
- Where a combined hazard statement is indicated, the competent authority may specify whether the combined hazard statement or the corresponding individual statements should appear on the label, or may leave the choice to the manufacturer/supplier

# Labelling of small packagings

## General principles

- (a) All applicable GHS label elements should appear on the immediate container of a hazardous substance or mixture where possible
- (b) Where it is impossible to put all the applicable label elements on the immediate container itself, other methods of providing the full hazard information should be used in accordance with the definition of “Label” in the GHS. Factors influencing this include *inter alia*:
  - (i) the shape, form or size of the immediate container
  - (ii) the number of label elements to be included, particularly where the substance or mixture meets the classification criteria for multiple hazard classes
  - (iii) the need for label elements to appear in more than one official language
- (c) Where the volume of a hazardous substance or mixture is so low and the supplier has data demonstrating, and the competent authority has determined, that there is no likelihood of harm to human health and/or the environment, then the label elements may be omitted from the immediate container
- (d) Competent authorities may allow certain label elements to be omitted from the immediate container for certain hazard classes/categories where the volume of the substance or mixture is below a certain amount
- (e) Some labelling elements on the immediate container may need to be accessible throughout the life of the product, e.g. for continuous use by workers or consumers

# Safety Data Sheets

- Provide comprehensive information of a substance/mixture for use in workplace
- Are product related
- The information provided enables the employer:
  - To develop worker protection measures specific to the workplace
  - To consider measures to protect the environment

# Safety Data Sheets

- SDS should be provided for:
  - all substances/mixtures meeting GHS harmonized criteria for physical, health and environmental hazards
  - mixtures containing substances meeting criteria for carcinogenicity, toxicity for reproduction or specific target organ toxicity, in concentration exceeding cut-off values
  - other substances/mixtures not meeting the criteria for classification as hazardous but containing hazardous substances in certain concentrations, if required by the competent authority

# Safety Data Sheets

## Information should be presented as follows

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

# Safety Data Sheets: Sections 1 and 2

## Section 1: Identification

- Identification of the substance or mixture:
  - GHS identifier
  - Other unique identifiers
- Supplier's details:
  - Name, full address and phone number(s)
- Recommended use of the chemical and restrictions on use; and
- Emergency phone number

## Section 2: Hazard identification

- Classification of the substance or mixture
- GHS labels, including precautionary statements
- Other hazards which do not result in classification

# Safety Data Sheets: Section 3

## Section 3: Composition/information on ingredients

- Substances:
  - Chemical identity
  - Common name, synonym of the substance
  - CAS number and other unique identifiers
  - Impurities and stabilizing additives
- Mixtures (for all hazardous ingredients):
  - Chemical identity
  - Identification number
  - Concentration range



# Safety Data Sheets: Sections 4 and 5

## Section 4: First-aid measures

- Description
- Most important symptoms/effects, acute and delayed
- If needed, indication of:
  - Immediate medical attention
  - Special treatment

## Section 5: Fire-fighting measures

- Suitable extinguishing media
- Specific hazards arising from the chemical
- Special protective equipment and precautions for fire-fighters

# Safety Data Sheets: Sections 6, 7 and 8

## Section 6: Accidental release measures

- Personal precautions, protective equipment and emergency procedures
- Environmental precautions
- Methods and materials for containment and cleaning up

## Section 7: Handling and storage

- Precautions for safe handling
- Conditions for safe storage (including incompatibilities)

## Section 8: Exposure controls/personal protection

- Control parameters
- Appropriate engineering controls
- Individual protection measures, including personal protective equipment (PPE)

# Safety Data Sheets: Section 9

## Section 9: Physical and chemical properties

- Appearance
- Odour
- Odour threshold
- pH
- Melting point/freezing point
- Initial boiling point and boiling range
- Flash point
- Evaporation rate
- Flammability (solid, gas)
- Upper/lower flammability or explosive limits
- Vapour pressure
- Vapour density
- Relative density
- Solubility(ies)
- Partition coefficient n-octanol/water
- Auto-ignition temperature
- Decomposition temperature
- Viscosity

*And any other physical or chemical parameter*

# Safety Data Sheets: Section 10

## Section 10: Stability and reactivity

- Reactivity
- Chemical stability
- Possibility of hazardous reactions
- Conditions to avoid
- Incompatible materials
- Hazard decomposition products

# Safety Data Sheets: Section 11

## Section 11: Toxicological information

- Provide data for all the health hazards covered by the GHS.

*If data for any of those hazards is not available, they should be listed on the SDS with a statement that data is not available.*

- Information on the likely routes of exposure;
- Symptoms related to the physical, chemical and toxicological characteristics;
- Delayed and immediate effects and chronic effects from short or long term exposure;
- Numerical measures of toxicity (such as ATE)
- Interactive effects
- Where specific chemical data are not available
- Mixtures
- Mixture versus ingredient information
- Other relevant information

# Safety Data Sheets: Sections 12 and 13

## Section 12: Ecological information

- Toxicity
- Persistence and degradability
- Bioaccumulative potential
- Mobility in soil
- Other adverse effects

## Section 13: Disposal considerations

- Disposal methods

# Safety Data Sheets: Section 14

## Section 14: Transport information

- UN Number
- UN Proper Shipping Name
- Transport hazard classes
- Packing group, if applicable
- Environmental hazards
- Special precautions for user
- Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

# Safety Data Sheets: Sections 15 and 16

## Section 15: Regulatory information

- Regulatory information not provided elsewhere in the SDS
- Safety, health and environmental regulations **specific** for the chemical in question

## Section 16: Other information

- **Date** of preparation of the latest version of the SDS
  - Clear indication of the changes made to the previous revision
- **Key/legend to abbreviations and acronyms** used in the SDS
- **Key literature references and sources for data** used to compile the SDS



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## End of hazard communication

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