



# Intro to Chemical Safety

Spotlight on the Globally Harmonized System of  
Classification and Labelling of Chemicals (GHS)



## ▶ Session objectives

**At the end of the session, you will be able to:**

1. Understand the linkages with the world of work.
2. Define the GHS.
3. Understand why the GHS is needed.
4. Explain the history of the GHS.
5. Identify the different label elements.
6. Recognize the different GHS pictogram symbols.
7. Describe the synergies between the ILS and the GHS.
8. Provide areas for future action.



▶ **What is the GHS  
and why was it  
created?**

## ▶ Question:

Can you think of any chemical accidents that have happened in the past?

## ▶ Preventable accidents

**Throughout the 20th century and since, the world of work witnessed a series of preventable industrial accidents, most of which share the inaccessibility of information as a common contributor to the ensuing tragedy.**

- ▶ 1974 - Vapour cloud explosion of cyclohexane took 28 workers' lives in Flixborough, UK.
- ▶ 1976 - Reactor in a chemical manufacturing plant exploded in Seveso, Italy, releasing a large volume of toxic chemicals (dioxin).
- ▶ 1984 - Bhopal disaster in Madhya Pradesh, India, where methyl isocyanate instantly killed more than 3,000 workers and local community members.
- ▶ 1989 - Phillips disaster caused 23 fatalities in Pasadena, Texas when chemicals were released from a complex, wounding around 300 workers.

## ▶ What is the GHS?

- ▶ The Globally Harmonized System of Classification and Labelling of Chemicals (or GHS) is an **internationally agreed upon system to standardize chemical hazard classification** and communication.
- ▶ Implemented in **over 60 countries** globally.
- ▶ While the GHS is a **voluntary international instrument**, implementation is typically done through legislation.
- ▶ **All chemicals are included** in the scope of the GHS, with few exceptions.

## ▶ What is the GHS?

- ▶ System of **harmonized labels with symbols** (pictograms).
- ▶ Can be interpreted by people across linguistic and national boundaries.
- ▶ Safety data sheets (SDS) are part of the **hazard communication system** for chemicals used in the workplace.
- ▶ The ILO has also contributed to the development of the **International Chemical Safety Cards (ICSCs)**. This project was undertaken between the ILO and the WHO, with the cooperation of the European Commission.
- ▶ ICSCs provide information in **over 10 languages** on **over 1,700 chemicals**, which are being updated to reflect GHS standards.

## ▶ Case study: Agricultural works and pesticide labelling in Punjab

- ▶ In 2015, a report was filed with FAO on inadequate labelling of pesticides in Punjab.
- ▶ Labels lacked adequate safety advice or health warnings.
- ▶ Omitted phrases about possible reproductive damage.
- ▶ Pesticides didn't have Punjabi on the label and many farmers were illiterate anyway.
- ▶ Products didn't use GHS compliant symbols, but rather a colour code system that was confusing to users.
- ▶ Users interviewed did not know the correct order or understand the logic of the system.
- ▶ One worker believed that products with a green colour “increased the yield” or that yellow was the most dangerous as it “worked from the outside”.



## ► Why is the GHS needed?

- To ensure all countries are “**speaking the same language**” in the classification of chemicals and hazard communication.
- To **inform and protect** people involved in chemical production, handling, transport, use and disposal.
- To enable **education and training** for employers and workers on chemical hazards and risk reduction.
- To **facilitate global trade** by enabling the communication of hazard information about chemicals to those at risk, and to promote **regulatory efficiency**.
- To help users understand the information provided, national programs on GHS have included mandatory workplace training.

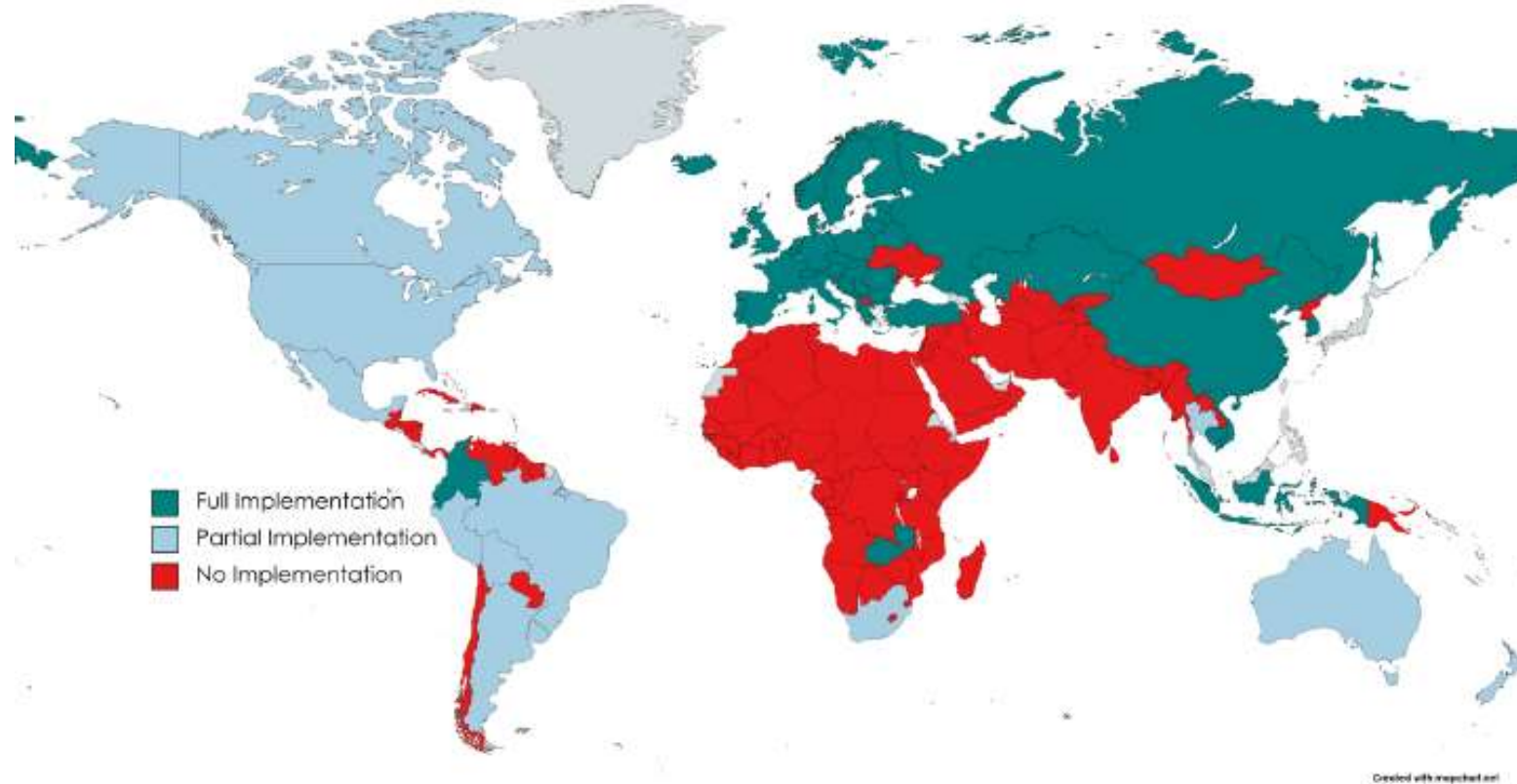
## ▶ History of the GHS

- ▶ 1952 – The ILO called on its Chemical Industries Committee to study the classification and labelling of dangerous substances.
- ▶ 1956 - The first internationally recognized classification and labelling system for the purpose of transporting dangerous goods was published the UN Committee of Experts on the Transport of Dangerous Goods (UN CETDG).
- ▶ 1989 - The ILO adopted a Resolution concerning the harmonization of systems of classification and labelling for the use of hazardous chemicals at work.
- ▶ 1990 - ILO Convention No. 170 and Recommendation No. 177 concerning safety in the use of chemicals at work were adopted, containing explicit provisions on core elements of what later became the GHS, namely classification, labelling, safety data sheets and training.

## ▶ History of the GHS

- ▶ 1992 - the UN Conference on Environment and Development (UNCED), identified harmonization of classification and labelling of chemicals by the year 2000 as one of six action programs on hazardous chemicals as part of the pivotal outcomes of the Rio Conference.
- ▶ 1994 - The Intergovernmental Forum on Chemical Safety (IFCS) adopted a resolution calling for the completion of classification criteria and hazard communication elements, as well as an international framework to translate the technical work of harmonization into an instrument or recommendations applicable legally at the national level.
- ▶ 2002 - the GHS was adopted by the United Nations and has been identified as one of the main tools to achieve sound management of chemicals.
- ▶ Starting from the 2002 World Summit on Sustainable Development, to the 2006 Strategic Approach to International Chemicals Management (SAICM) and 2015 UN Sustainable Development Goals (12.4), governments continue to be encouraged to implement the GHS as soon as possible.

## Global GHS implementation status



*The boundaries shown on this map do not imply endorsement or acceptance by the ILO*

Source: UNITAR, as at 19 April 2021; adapted and updated, based on the GCO-II, UNEP, 2019 and Explaining the Legal Implementation Gap, Stockholm Environment Institute, Persson et al. 2017. Updates are based on information received from partners and stakeholders and is presented as an indicator of implementation status, verified to the extent possible.

## ▶ GHS partnership: ILO, UNITAR and OECD

- ▶ Partnership since 2002 to support implementation of the GHS.
- ▶ The partnership aims to re-energise commitment and scale up implementation of the GHS.
- ▶ Works alongside a coalition of stakeholders including governments, regional economic integration organizations, trade unions, NGOs and the private sector.
- ▶ The Partnership and the coalition meet informally, to provide updates and agree on priority activities.
- ▶ UNITAR/ILO GHS training programme has provided a range of capacity building services, including:
  - Regional workshops in Africa, Latin America and Caribbean, the Asia-Pacific and Central and Eastern Europe.
  - National projects for the development of capacities and GHS implementation strategies
  - An e-Learning GHS course (12 editions run0, focusing on technical skills for classification and labelling; and publication of guidance documents to support national GHS implementation.

## ▶ GHS partnership: ILO, UNITAR and OECD

- ▶ **Key elements of a national GHS adoption and implementation roadmap (2020).**
  - General guide for the main steps and activities for adoption and implementation.
  - Provides suggestions to countries for developing national GHS roadmaps.
  - Includes preparatory steps, legal and policy frameworks and implementing activities, such as classification and labelling, awareness raising, technical training, communication, emergency response and monitoring.
- ▶ **The GHS in the world of work: Mapping synergies between ILO Instruments and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) (2021).**
  - ILO report exploring critical synergies between the GHS and the ILO's instruments on chemicals and occupational safety and health.
  - Aims to further promote GHS implementation and an even greater engagement of the world of work in global efforts toward the safer management of chemicals.

## ▶ GHS partnership: ILO, UNITAR and OECD

### ▶ **GHS Implementation: Experiences and lessons learned (2021).**

- Identification of lessons learned and good practices from GHS activities and capacity development projects.
- Key determinants which fostered successful GHS implementation, as well as factors impeding success.

### ▶ **Options for legislation and standard setting to implement the GHS (2021).**

- Guidance document to support implementation of the Globally Harmonized Systems of Classification and Labelling of Chemicals.

### ▶ **A Selection and Summary of Case-Studies of Countries or Regions with Experience in Adopting and/or Implementing the Globally Harmonized System (GHS) of Classification and Labelling of Chemicals (2019).**

- Some perspectives and examples that may be useful to countries that have not yet adopted GHS.



► **What does a  
GHS label look  
like?**



# GHS label elements

**DANGER**

**Carbon Monoxide**

H220: Extremely flammable gas. –  
H331: Toxic if inhaled. – H360D: May damage the unborn child. – H372: Causes damage to organs through prolonged or repeated exposure

Keep container tightly closed. Avoid breathing vapors. If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a Poison Center or doctor. Store in a well-ventilated place.

3630-08-0      006-001-00-2      Company ABC  
211-128-3      #####      1234 Elm Road  
Somewhere, TX  
555-800-8585

30.0

Signal word

Hazard pictograms

Product name

Hazard statements

Precautionary statements

Manufacturer info

## GHS pictograms

- ▶ Hazard symbols are standard symbols used in the GHS.
- ▶ Used on chemical labels and safety data sheets.
- ▶ Used to alert users of risks and precautionary steps needed.
- ▶ Consist of black symbols on a white background with a red diamond-shaped border.



GHS01 Explosive



GHS04 Compressed Gas



GHS07 Harmful



GHS02 Flammable



GHS05 Corrosive



GHS08 Health Hazard



GHS03 Oxidizing












GHS06 Toxic



GHS09 Environmental Hazard

## Some examples of hazards and pictograms

<p><b>Health Hazard</b></p> <p>Carcinogens, respiratory sensitisers, reproductive toxicity, target organ toxicity, germ cell mutagens</p> 	<p><b>Flame</b></p> <p>Flammable gases, liquids, &amp; solids; self-reactives; pyrophorics;</p> 	<p><b>Exclamation Mark</b></p> <p>Irritant, dermal sensitiser, acute toxicity (harmful)</p> 
<p><b>Gas Cylinder</b></p> <p>Compressed gases; liquefied gases; dissolved gases</p> 	<p><b>Corrosion</b></p> <p>Skin corrosion; serious eye damage</p> 	<p><b>Exploding Bomb</b></p> <p>Explosives, self-reactives, organic peroxides</p> 
<p><b>Flame Over Circle</b></p> <p>Oxidisers gases, liquids and solids</p> 	<p><b>Environment</b></p> <p>Aquatic toxicity</p> 	<p><b>Skull &amp; Crossbones</b></p> <p>Acute toxicity (severe)</p> 

## ► Synergies between the ILS and the GHS

**Many ILO instruments, including conventions, recommendations and codes of practice have clear synergies with the GHS.**

The GHS is relevant for the implementation of over 25 ILO conventions, recommendations and codes of practice:

- **Chemicals Convention, 1990 (No. 170):** includes obligations for ratifying states that cover components of the GHS such as classification, labelling and provision of SDS.
- **Convention on Major Industrial Accidents (No. 174):** includes provisions on requiring hazard identification and training.
- The GHS is fundamental for the objectives of ILS for specific hazardous substances and sectors including **asbestos** (Convention No. 162), **carcinogens in general** (Convention No. 139), **agriculture** (Convention No. 184), **mining** (Convention No. 176) and **construction** (Convention No. 167).

**By implementing the GHS, States work toward fulfilling obligations in ILS, at the same time by ratifying and implementing many ILS, States work toward fulfilling obligations of the GHS.**

# Synergies between the GHS and ILS

ILO instrument	GHS element			
	Classification	Labelling	Safety Data Sheets	Training
<i>Conventions</i>				
C170 - Chemicals	X	X	X	X
C174 - Major industrial accidents	X	X		X
C187 - Promotional framework for OSH	X	X		X
C155 - Occupational Safety and Health	X	X	X	X
C139 - Occupational cancer	X	X	X	X
C148 - Working environment	X	X	X	X
C162 - Asbestos		X	X	X
C136 - Benzene		X	X	X
C184 - Safety and health in agriculture	X	X	X	X
C176 - Safety and health in mines	X	X	X	X

# Synergies between the GHS and ILS

ILO instrument	GHS element			
	Classification	Labelling	Safety Data Sheets	Training
<b>Recommendations</b>				
R177 - Chemicals	X	X	X	X
R164 - Occupational Safety and Health		X	X	X
R147 - Occupational Cancer	X	X		X
R172 - Asbestos		X	X	X
R144 - Benzene	X	X	X	X
R192 - Safety and Health in Agriculture				X
R175 - Safety and Health in Construction				X
R183 - Safety and Health in Mines	X	X	X	X

# ▶ ILO report on GHS in the world of work: Mapping synergies between ILO Instruments and the GHS

## Overview

- ▶ Introduction and Development of the GHS.
- ▶ GHS and the world of work in the 21<sup>st</sup> century.
- ▶ Agricultural workers and pesticide labelling.
- ▶ GHS in the garment sector.
- ▶ The world of work as a driver of GHS development and implementation.
- ▶ Synergies between ILS and GHS.
- ▶ Includes an annex with ILO instruments which contain GHS elements.



## ▶ Areas for action

- ▶ All States should **implement the GHS**.
- ▶ States should also **ratify and implement Convention No. 170, Convention No. 174, Convention No. 155 and Convention No. 187**.
- ▶ National labour authorities should consider **enhancing international cooperation**, both bilaterally and regionally.
- ▶ Businesses should **ensure that hazard communication and training procedures are GHS compliant** and consider including due diligence responsibilities.
- ▶ Employers should **ensure that chemical hazard information is available in workplaces** and workers are properly trained.
- ▶ Governments, employers organizations and workers organizations should **engage in social dialogue on GHS implementation**.



## ▶ Case study: The GHS in the garment sector in Vietnam

- ▶ The garment sector utilizes many different types of hazardous chemicals in its operations.
- ▶ In 2012, prior to implementation of the GHS, chemical labelling was not standardised in factories:
  - Containers were not labelled with contents in a third of the factories.
  - Hazard pictograms were not indicated on secondary containers in most factories.
  - Other defects: wrong chemical on the label, chemicals stored in water bottles, the wrong pictogram was used or pictogram was missing.
- ▶ Since 2016, Vietnam has fully implemented the GHS through legislation.
- ▶ However, practical application of the GHS can take time after reform, with manufactures having existing stocks of chemicals with old labels.

## ▶ Case study: The GHS in the garment sector in Vietnam

- ▶ The ILO/IFC Better Work program was developed to monitor conditions in garment factories and conduct assessments on factory compliance with national legislation and international labour standards.
- ▶ The program worked with Vietnamese authorities and businesses to provide regular individual advisory visits to participating factories to help them improve working conditions, as well as joint classroom training sessions (including on chemical management).
- ▶ The advisory visits and training cover aspects such as chemical management systems, the role of OSH, good practices on labelling and SDS and restricted substances lists.
- ▶ By 2018 significant progress was achieved in GHS implementation in the Vietnamese garment sector.
- ▶ Non-compliance related to chemical labelling and SDS concerns were significantly reduced.
- ▶ The experience illustrates the potential of the labour sector to be a critical partner in GHS implementation and highlights the potential for expanding this good practice to other countries and regions.

# Key ILO resources

- ▶ [The GHS in the world of work: Mapping synergies between ILO Instruments and the Globally Harmonized System of Classification and Labelling of Chemicals \(GHS\).](#)
- ▶ [Exposure to hazardous chemicals at work and resulting health impacts: A global review \(2021\).](#)
- ▶ [ILO Instruments on Chemical Safety – Analysis and synergies with other international frameworks on the sound management of chemicals \(2020\).](#)
- ▶ [The Sound Management of Chemicals and Waste in the World of Work \(2019\).](#)
- ▶ [All You Need to Know: Convention No. 170.](#)
- ▶ [Guidelines on occupational safety and health management systems \(2001\).](#)
- ▶ [Major hazard control: A practical manual \(1993\).](#)
- ▶ [Safety in the use of chemicals at work: code of practice \(1991\).](#)
- ▶ [Prevention of major industrial accidents: code of practice \(1991\).](#)
- ▶ [ILO indicators of progress in implementing SAICM \(2021\).](#)