

Chemicals and Materials

Globally Harmonized System (GHS)

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What is the Globally Harmonized System (GHS)?

GHS stands for the Globally Harmonized System of Classification and Labelling of Chemicals.

It is a system of hazard communication for chemical hazards that can be adopted by countries around the world. GHS was developed by a United Nations (UN) international team of hazard communication experts. They established the following two major standardized elements:

1. rules for classifying the hazards of chemical products (i.e., substances, materials, or mixtures)
2. hazard communication tools such as:
 - format for safety data sheets (SDSs),
 - content for label and SDSs with

- hazard and precautionary statements
- symbols
- signal word

NOTE: This document discusses the global GHS, as developed by the United Nations. GHS is a 'non-binding' system of hazard communication. Only the elements of GHS that have been explicitly adopted by Canadian legislation are enforceable. See the OSH Answers documents on [WHMIS 2015](#) for a summary of how GHS was implemented in Canada.

Why was GHS developed?

GHS was developed because many different countries had different systems for classification and labelling of chemical products. In addition, several different systems can exist even within the same country.

While existing systems were similar in many respects, their differences were significant enough to result in different hazard classifications, labels, or SDS for the same product. For example, one country may classify a product as carcinogenic while another country will not.

This situation has been expensive for governments to regulate and enforce, costly for companies who have to comply with many different systems, and confusing for workers who need to understand the hazards of a chemical in order to work safely.

As more and more countries adopt the principles of GHS, the benefits include:

- Promoting regulatory efficiency.
- Facilitating trade.
- Easing compliance.
- Reducing costs.
- Providing improved, consistent hazard information.
- Encouraging the safe transport, handling and use of chemicals.
- Promoting better emergency response to chemical incidents.
- Reducing the need for animal testing.

What is the scope of GHS?

GHS covers all hazardous chemicals products, such as those used for the following purposes:

- industrial chemicals

- consumer chemical products
- pesticides
- agricultural chemicals
- pharmaceuticals

The target audiences for GHS include workers in many different industries (e.g., warehouses, construction, chemical manufacturing, transportation), emergency responders, and consumers.

What are some key terms in the GHS Vocabulary?

- **SDS** – Safety Data Sheet. The GHS SDS has 16 sections in a set order, and minimum information is prescribed.
- **Labels** - With the GHS, certain information will appear on the label. Standardized elements such as chemical identify, hazard statements, signal words and symbols will appear on the label according to the classification of that chemical or mixture. Precautionary statements may also be required, if adopted by your regulatory authority.
- **Hazard group** – While not given a formal definition, GHS divides hazards into three major groups – health, physical and environmental.
- **Class** – Class is the term used to describe the different types of hazards. For example, Gases under Pressure is an example of a class in the physical hazards group.
- **Category** – Category is the name used to describe the sub-sections of classes. For example, Self-Reactive Chemicals have 7 categories. Each category has rules or criteria to determine what chemicals are assigned to that category. Categories are assigned numbers (or letters) with category 1 (or A) being the most hazardous.
- **Hazard Statement** – For each category of a class, a standardized statement is used to describe the hazard. For example, the hazard statement for chemicals which meet the criteria for the class Self-heating substances and mixtures, Category 1 is Self-heating; may catch fire. This hazard statement would appear both on the label and on the SDS.
- **Precautionary Statement** – These statements are standardized phrases that describe the recommended steps to be taken to minimize or prevent adverse effects from exposure to or resulting from improper handling or storage of a hazardous product.
- **Signal word** – There are two signal words used by the GHS – Danger and Warning. These signal words are used to communicate the level of hazard on both the label and the SDS. The appropriate signal word to use is set out by the classification system. For example, the signal word for Self-heating substances and mixtures, Category 1 is Danger while Warning is used for the less serious Category 2. There are categories where no signal word is used.

- **Pictogram** – Pictogram refers to the GHS symbol on the label and SDS. Not all categories have a pictogram associated with them.
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How is GHS organized ?

GHS consists of three major hazard groups :

- Physical hazards.
- Health hazards.
- Environmental hazards.

Within each of these hazard groups there are classes and categories.

What are the classes within the Health hazard group?

Criteria for classifying chemicals have been developed for the following health hazard classes:

- Acute toxicity.
 - Skin corrosion/irritation.
 - Serious eye damage/eye irritation.
 - Respiratory or skin sensitization.
 - Germ cell mutagenicity.
 - Carcinogenicity.
 - Reproductive toxicity.
 - Specific target organ toxicity - single exposure.
 - Specific target organ toxicity - repeated exposure.
 - Aspiration hazard.
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What are the classes within the Physical hazard group?

Criteria for classifying chemicals have been developed for the following physical hazard classes:

- Explosives.
 - Flammable gases.
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- Aerosols.
 - Oxidizing gases.
 - Gases under pressure.
 - Flammable liquids.
 - Flammable solids.
 - Self-reactive substances and mixtures.
 - Pyrophoric liquids.
 - Pyrophoric solids.
 - Self-heating substances and mixtures.
 - Substances and mixtures which, in contact with water, emit flammable gases.
 - Oxidizing liquids.
 - Oxidizing solids.
 - Organic peroxides.
 - Corrosive to metals.
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What are the classes within the Environmental hazard group?

Criteria for classifying chemicals have been developed for the following environmental hazard classes:

- Hazardous to the aquatic environment (acute and chronic).
 - Hazardous to the ozone layer.
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Where can I get information on the GHS criteria for the different hazard classes?

The GHS criteria are specified in the publication known as the [Globally Harmonized System of Classification and Labelling of Chemicals \(GHS\)](#) from the United Nations Economic Commission for Europe (UNECE) (this publication is often referred to as the “purple book”.) The first edition of this book was published in 2003. Since then, the GHS book has been revised every two years as needed and as experience is gained in its implementation. All editions are available in multiple languages and can be accessed for free at the [UNECE website](#).

When checking the criteria for a particular hazard class and or a category, make sure that you are viewing the revised edition of the GHS purple book that corresponds to the version that was adopted by your country.

Is the adoption of GHS mandatory for all countries around the globe/world?

No. The GHS is a 'non-binding' system of hazard communication. However, as mentioned above, there are many benefits when it is voluntarily adopted by countries around the globe.

How is GHS adopted by a country?

It is up to the country's authorities to decide how GHS will be adopted in their legislation. For example, Canada adopted the GHS by revising the existing WHMIS legislation.

When a country decides to adopt GHS, must all GHS elements be adopted?

No. When a country adopts GHS, the country has freedom to:

- Select one or more of the hazard classes
- Select the categories it will adopt for a particular hazard class

The key is that when a GHS hazard class is adopted by a country, the country must adopt that hazard class as specified by GHS. This adoption will help make sure that each country has the same classification criteria as each other. For example, if a country adopts the flammable hazard class and only the Category 1 level, the criteria for Category 1 will be the same for all the countries that adopted this Category.

In situations where the country had regulations concerning hazard classes that are not included in GHS, the country is free to include or create legislation to maintain desired levels of protection.

Is the adoption of GHS mandatory for all countries around the globe/world?

The UNECE publishes information about the status of implementation of [GHS by country](#). Examples include:

Canada

Canada adopted GHS in February 2015 by amending the federal Hazardous Product Act (HPA) and the publication of a new regulation titled Hazardous Products Regulations (HPR) under the HPA which is commonly referred to as the federal Workplace Hazardous Materials Information System 2015 (WHMIS 2015) legislation. Provincial and territorial jurisdictions also updated their related legislation.

Note that the amendment of the HPA and implementation of the new HPR is based on the fifth revised edition (Rev 5). Amendments are expected from time to time to keep WHMIS in alignment with current GHS recommendations.

WHMIS 2015 regulatory updates can be monitored by checking:

- Canada's National WHMIS Portal (www.whmis.org)
- [WHMIS News – Workplace Hazardous Materials Information System – Health Canada](#)
- [Forward Regulatory Plan 2021-2023: Regulations Amending the Hazardous Products Regulations \(GHS, Seventh Revised Edition\) and Order Amending Schedule 2 to the Hazardous Products Act](#)

United States (USA)

United States adopted the GHS elements from the 3rd revised edition of the GHS purple book in their Hazardous Communication Standard (HCS) in 2012. This standard is commonly referred to as HCS 2012 and is currently in full force. OSHA is conducting rulemaking to harmonize the HCS to the latest edition of the GHS and to codify a number of enforcement policies that have been issued since the 2012 standard. In their "OSHA Trade Release", OSHA announced that they are issuing a proposed rule to update the HCS 2012 with the 7th revised edition of the GHS purple book.

Check regulatory updates at:

- OSHA Trade Release <https://www.osha.gov/news/newsreleases/trade/02052021>

Information and resources for the current US HCS 2012 standard is available at:

- **Hazard communication** <https://www.osha.gov/hazcom>

Europe

Information about the adoption of GHS in EU and European Economic Area's legislation and revisions is available at:

GHS implementation: EU and European Economic Area

<https://unece.org/transport/documents/2021/01/ghs-implementation-eu-and-european-economic-area>

The EU Classification, Labelling and Packaging (CLP) regulations was updated to align with GHS as of January 20, 2009. Currently CLP with the adopted GHS elements is in full force. The CLP was updated to include changes introduced in the 6th and 7th revised editions of GHS. These changes have been in force as of October 17, 2019.

Other Countries

Information on the status of [GHS implementation](#) in other countries is available at the UNECE website:

GHS implementation: Implementation by country

<https://unece.org/transport/documents/2021/01/ghs-implementation-implementation-country>

Who enforces GHS ?

There is no global organization (e.g., UN, WHO, etc.) that enforces GHS for different countries. Once a country adopts GHS elements (e.g., hazard classes) in its own legislation (e.g., WHMIS), they are enforced by the country's own authorities.

For example, in Canada when a supplier's WHMIS label or SDS are incorrect, Health Canada will enforce the federal WHMIS legislation. Meanwhile, provincial or territorial health and safety authorities enforce their jurisdiction's WHMIS legislation.

Where can I get more information?

Information from across Canada is available on the website WHMIS.org.

Health Canada also offers an [email news service](#) to announce information about WHMIS.

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