



HAZARD COMMUNICATION AND THE GLOBALLY HARMONIZED SYSTEM (GHS)

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What is Hazard Communication?

The Hazard Communication Standard (1910.1200) or HazCom requires employers to provide their employees with information on any hazardous chemicals they may come in contact with within their workplace. For this reason, it's often referred to as the "Right to Know" standard.

Who is covered by the HazCom standard?

In general, a company that has even one hazardous chemical is required to comply with the standard. The only exceptions:

- Workplaces where only sealed containers are handled (like a warehouse
- Laboratories

If an employer has workers that could potentially be exposed to hazardous chemicals as part of their job, these employees must be trained in HazCom prior to starting their work. This is done to ensure the protection of each employee.

Communicating the Hazards

In order to communicate the hazards associated with the use of chemicals, employers are required to do the following:

- Maintain a complete list of hazardous chemicals present in the workplace
- Ensure Safety Data Sheets(SDS's) are current and available for access by employees
- Implement a written hazardous communication plan.
- Ensure the labeling of all hazardous chemical containers
- Conduct training with all affected employees

The Globally Harmonized System



The Globally Harmonized System or GHS is an update on how HazCom is actually communicated. We are in an increasingly global marketplace. For this reason, it was necessary to establish a standard that could be used anywhere in the world. GHS accomplishes this by creating a uniform way of classifying and labeling hazardous chemicals.

Classifying and Labeling Hazardous Chemicals

Hazardous chemicals will generally fall into three classifications, often more than one:

- Health hazards- these are dangerous to human health (ex: vision or breathing)
- Physical hazards- these cause direct physical damage to the body (ex: flammables)
- Environmental hazards- these have a lasting impact on the environment and aquatic life.

This information should be gathered using the Safety Data Sheet. Every SDS should clearly state the hazards for the substance.

Types of Hazards

Health Hazards



This pictogram is used as a general indication of health hazards that are often associated with the breathing of chemicals. When this pictogram is used it can mean one or more of the following:

- Carcinogen a substance that is known or suspected of causing cancer
- Mutagen a substance that can alter the health of DNA
- Reproductive Toxicity a substance that can cause fertility issues. Additionally, it can mean a substance that can have effects on a person's offspring well after exposure to the parent.
- Respiratory sensitizer/aspiration toxicity a substance that can cause increasingly adverse reactions to the lungs and respiratory system
- Target organ toxicity- a substance that affects a specific organ

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This pictogram is a general health hazard can mean one or more of the following:



- Skin and eye irritant
- Respiratory tract irritant
- Skin sensitizer
- Narcotic effects
- Acute toxicity (harmful immediately)



This pictogram is only for acutely toxic substances and can be potentially fatal.

Physical Hazards



This pictogram indicates a substance is corrosive. The potential hazards include:

- Skin corrosion or burns
- Potentially serious eye damage
- Corrosive to metals- storing corrosive substances in an elevated position should be avoided where possible. Corrosives can eat through metal, leading to a potentially serious situation if a storage rack is structurally compromised.



This pictogram indicates compressed gas. It is important that compressed gas cylinders or other containers remain secure, as puncturing or otherwise damaging the container could lead to the container becoming a projectile.

This pictogram indicates a substance is flammable. If the substance is a liquid, it is important to remember that it will be the vapors that are flammable. Additionally, these substances can be potentially self-reactive. This means that a fire hazard could be present simply through reacting with the atmosphere or exposure to heat.

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This pictogram indicates that the substance is an oxidizer. An oxidizer is something that reacts strongly with oxygen, causing the potential for a fire to rapidly profligate.





This pictogram indicates a potential explosion hazard. Additionally, substances labeled with this pictogram can be self-reactive.

Environmental Hazards



This pictogram indicates a substance is harmful to aquatic life. Any substance labeled with this pictogram should never be dumped into general sewage.

Labeling Hazardous Chemicals

GHS compliant labels should include all of the following:

- 1. Product identifier- this should be the same name used on the Safety Data Sheet
- 2. Signal word- "Warning" (less severe) or "Danger" (more severe)
- 3. Pictograms- at least one of the previously identified pictograms should be included on any hazardous chemical label
- Hazard statements-these can be found on the Safety Data Sheet and corresponds to the hazard classifications established by the manufacturer
- 5. Precautionary Statements- these describe how to minimize hazards associated with the substance.
- 6. Supplier- the name, address, and telephone number of the company that distributed the product.



Safety Data Sheets

Safety Data Sheets are used as the primary source of information for any hazardous substance. A manufacturer or supplier is required to supply a Safety Data Sheet the first time a product is shipped to a new customer. Additionally, SDS's now have a uniform format. Every SDS should contain the following sections in the same order:

Section 1: Identification

This section identifies the chemical on the SDS as well as the recommended uses. It also provides the essential contact information of the supplier. The required information consists of:

- Product identifier used on the label and any other common names or synonyms by which the substance is known.
- Name, address, phone number of the manufacturer, importer, or other responsible party, and emergency phone number.
- Recommended use of the chemical (e.g., a brief description of what it actually does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).

Section 2: Hazard(s) Identification

This section identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards. The required information consists of:

- The hazard classification of the chemical (e.g., flammable liquid, category¹).
- Signal word.
- Hazard statement(s).
- Pictograms (the pictograms or hazard symbols may be presented as graphical reproductions
 of the symbols in black and white or be a description of the name of the symbol (e.g., skull
 and crossbones, flame).
- · Precautionary statement(s).
- · Description of any hazards not otherwise classified.
- For a mixture that contains an ingredient(s) with unknown toxicity, a statement describing how much (percentage) of the mixture consists of ingredient(s) with unknown acute toxicity. Please note that this is a total percentage of the mixture and not tied to the individual ingredient(s).

Section 3: Composition/Information on Ingredients

This section identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives. This section includes information on substances, mixtures, and all chemicals where a trade secret is claimed. The required information consists of:

Substances

- Chemical name.
- Common name and synonyms.
- · Chemical Abstracts Service (CAS) number and other unique identifiers.
- Impurities and stabilizing additives, which are themselves classified and which contribute to the classification of the chemical.

Mixtures

- Same information required for substances.
- · The chemical name and concentration (i.e., exact percentage) of all ingredients which are classified as health hazards and are:
 - Present above their cut-off/concentration limits or
 - Present a health risk below the cut-off/concentration limits.
- The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used in the following situations:
 - A trade secret claim is made, 0
 - There is batch-to-batch variation, or ٥.
 - The SDS is used for a group of substantially similar mixtures. Q.

Chemicals where a trade secret is claimed

 A statement that the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret is required.

Section 4: First-Aid Measures

This section describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical. The required information consists of:

- Necessary first-aid instructions by relevant routes of exposure (inhalation, skin and eye contact, and ingestion).
- Description of the most important symptoms or effects, and any symptoms that are acute or delayed.
- Recommendations for immediate medical care and special treatment needed, when necessary.



Section 5: Fire-Fighting Measures

This section provides recommendations for fighting a fire caused by the chemical. The required information consists of:

- Recommendations of suitable extinguishing equipment, and information about extinguishing equipment that is not appropriate for a particular situation.
- Advice on specific hazards that develop from the chemical during the fire, such as any hazardous combustion products created when the chemical burns.
- Recommendations on special protective equipment or precautions for firefighters.

Section 6: Accidental Release Measures

This section provides recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties, or the environment. It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard. The required information may consist of recommendations for:

- Use of personal precautions (such as removal of ignition sources or providing sufficient) ventilation) and protective equipment to prevent the contamination of skin, eyes, and clothing.
- Emergency procedures, including instructions for evacuations, consulting experts when needed, and appropriate protective clothing.
- Methods and materials used for containment (e.g., covering the drains and capping procedures).
- Cleanup procedures (e.g., appropriate techniques for neutralization, decontamination, cleaning) or vacuuming; adsorbent materials; and/or equipment required for containment/clean up).

Section 7: Handling and Storage

This section provides guidance on the safe handling practices and conditions for safe storage of chemicals. The required information consists of:

- Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment, and providing advice on general hygiene practices (e.g., eating, drinking, and smoking in work areas is prohibited).
- Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation requirements).

Section 8: Exposure Controls/Personal Protection

This section indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure. The required information consists of:

- OSHA Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available.
- Appropriate engineering controls (e.g., use local exhaust ventilation, or use only in an enclosed system).
- Recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE) (e.g., appropriate types of eye, face, skin or respiratory protection needed based on hazards and potential exposure).
- Any special requirements for PPE, protective clothing or respirators (e.g., type of glove material, such as PVC or nitrile rubber gloves; and breakthrough time of the glove material).

Section 9: Physical and Chemical Properties

This section identifies physical and chemical properties associated with the substance or mixture. The minimum required information consists of:

- Appearance (physical state, color, etc.);
- Odor;
- Odor 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;
- Vapor pressure;
- Vapor density;
- · Relative density;
- Solubility(ies);
- · Partition coefficient: n-octanol/water;
- Auto-ignition temperature;
- Decomposition temperature; and
- Viscosity.

The SDS may not contain every item on the above list because information may not be relevant or is not available. When this occurs, a notation to that effect must be made for that chemical property. Manufacturers may also add other relevant properties, such as the dust deflagration index (Kst) for combustible dust, used to evaluate a dust's explosive potential.

Section 10: Stability and Reactivity

This section describes the reactivity hazards of the chemical and the chemical stability information. This section is broken into three parts: reactivity, chemical stability, and other. The required information consists of:

Reactivity

Description of the specific test data for the chemical(s). This data can be for a class or family
of the chemical if such data adequately represent the anticipated hazard of the chemical(s),
where available.

Chemical stability

- Indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled.
- · Description of any stabilizers that may be needed to maintain chemical stability.
- Indication of any safety issues that may arise should the product change in physical appearance.

Other

- Indication of the possibility of hazardous reactions, including a statement whether the chemical will react or polymerize, which could release excess pressure or heat, or create other hazardous conditions. Also, a description of the conditions under which hazardous reactions may occur.
- List of all conditions that should be avoided (e.g., static discharge, shock, vibrations, or environmental conditions that may lead to hazardous conditions).
- List of all classes of incompatible materials (e.g., classes of chemicals or specific substances) with which the chemical could react to produce a hazardous situation.
- List of any known or anticipated hazardous decomposition products that could be produced because of use, storage, or heating. (Hazardous combustion products should also be included in Section 5 (Fire-Fighting Measures) of the SDS.)

Section 11: Toxicological Information

This section identifies toxicological and health effects information or indicates that such data are not available. The required information consists of:

- Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact). The SDS should indicate if the information is unknown.
- Description of the delayed, immediate, or chronic effects from short- and long-term exposure.
- The numerical measures of toxicity (e.g., acute toxicity estimates such as the LD50 (median lethal dose)) - the estimated amount [of a substance] expected to kill 50% of test animals in a single dose.
- Description of the symptoms. This description includes the symptoms associated with
 exposure to the chemical including symptoms from the lowest to the most severe exposure.
- Indication of whether the chemical is listed in the National Toxicology Program (NTP)

Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions) or found to be a potential carcinogen by OSHA.

Section 12: Ecological Information (non-mandatory)

This section provides information to evaluate the environmental impact of the chemical(s) if it were released to the environment. The information may include:

- Data from toxicity tests performed on aquatic and/or terrestrial organisms, where available (e.g., acute or chronic aquatic toxicity data for fish, algae, crustaceans, and other plants; toxicity data on birds, bees, plants).
- Whether there is a potential for the chemical to persist and degrade in the environment either through biodegradation or other processes, such as oxidation or hydrolysis.
- Results of tests of bioaccumulation potential, making reference to the octanol-water partition coefficient (K_{ow}) and the bioconcentration factor (BCF), where available.
- The potential for a substance to move from the soil to the groundwater (indicate results from adsorption studies or leaching studies).
- Other adverse effects (e.g., environmental fate, ozone layer depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and/or global warming potential).

Section 13: Disposal Considerations (non-mandatory)

This section provides guidance on proper disposal practices, recycling or reclamation of the chemical(s) or its container, and safe handling practices. To minimize exposure, this section should also refer the reader to Section 8 (Exposure Controls/Personal Protection) of the SDS. The information may include:

- · Description of appropriate disposal containers to use.
- · Recommendations of appropriate disposal methods to employ.
- · Description of the physical and chemical properties that may affect disposal activities.
- Language discouraging sewage disposal.
- Any special precautions for landfills or incineration activities.

Section 14: Transport Information (non-mandatory)

This section provides guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea. The information may include:

- UN number (i.e., four-figure identification number of the substance)².
- UN proper shipping name².
- Transport hazard class(es)².
- Packing group number, if applicable, based on the degree of hazard².
- Environmental hazards (e.g., identify if it is a marine pollutant according to the International Maritime Dangerous Goods Code (IMDG Code)).
- Guidance on transport in bulk (according to Annex II of MARPOL 73/78³ and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code (IBC Code)).
- Any special precautions which an employee should be aware of or needs to comply with, in connection with transport or conveyance either within or outside their premises (indicate when information is not available).

1973, as modified by the Protocol of 1978 relating thereto, as amended.

Section 15: Regulatory Information (non-mandatory)

This section identifies the safety, health, and environmental regulations specific for the product that is not indicated anywhere else on the SDS. The information may include:

 Any national and/or regional regulatory information of the chemical or mixtures (including any OSHA, Department of Transportation, Environmental Protection Agency, or Consumer Product Safety Commission regulations).

Section 16: Other Information

This section indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes. Other useful information also may be included here.

² Found in the most recent edition of the United Nations Recommendations on the Transport of Dangerous Goods.

³MARPOL 73/78 means the International Convention for the Prevention of Pollution from Ships,

References



"OSHA Brief-Hazard Communication Standard: Safety Data Sheets.", Occupation Safety and Health Administration

