

# **HAZARD COMMUNICATION AND THE GLOBAL HARMONIZING SYSTEM PLU EMPLOYEE TRAINING PROGRAM**

## **PROGRAM INTRODUCTION**

Recent changes in OSHA's Hazard Communication Standard brought the regulation in line with international standards through the creation of the Global Harmonizing System (GHS). Implementing the Global Harmonizing System, helps ensure quality and consistency in the classification and labeling of all chemicals; improving an employee's ability to quickly understand critical safety information.

This program is designed to assist Pacific Lutheran University (PLU) employees in understanding three key elements of the GHS: Hazard Classification, Container Labeling and Safety Data Sheets. Other topics in this program include: The Written Hazard Communication Plan, Physical and Health Hazard Classes, Pictograms, Signal Words and other information found on GHS Container Labels and Safety Data Sheets.

## **PROGRAM OBJECTIVES**

After reviewing this program, the employee will be able to explain the following:

- What the written hazard communication plan and the Global Harmonizing System are;
- What health and physical hazard classes are;
- What information can be found on GHS chemical container labels;
- What a Safety Data Sheet is and when it should be consulted.

## **PROGRAM OUTLINE**

### **BACKGROUND**

- Hazardous chemicals are utilized by PLU staff, faculty, and students in various occupational and academic endeavors throughout the University. Employees and students handle, use, or work around these potentially harmful substances.
- Effects from exposure to hazardous chemicals can range from mild skin or eye irritation to severe burns to death from various types of exposure.
- Because of the dangers presented by hazardous chemicals, The Occupational Safety and Health Administration (OSHA) developed the Hazard Communication Standard, CFR 1910.1200.
- OSHA's regulation requires companies to develop a Hazard Communication Program which communicates the hazards of workplace chemicals to all employees.

### **THE WRITTEN HAZARD COMMUNICATION PLAN & THE GLOBAL HARMONIZING SYSTEM**

- PLU's Hazard Communication Program includes a written plan. This written plan specifies the policies, procedures and essential elements of the Hazard Communication Program such as container labeling, the collection, storage and availability of Safety Data Sheets, and an inventory with location listing all hazardous chemicals on-site.
- The written plan also details specific guidelines for the training of employees. For example, employees will receive specific training based on the hazardous chemicals to which they may be exposed.
- The written plan is an important document which all employees have a right to review upon request.
- OSHA's Hazard Communication Standard was first enacted in 1983; however, recent changes have brought the regulation more in line with international standards with the implementation of the Global Harmonizing System (GHS).

- Created by the international community and adopted by the United Nations, the GHS provides a single set of standardized criteria for classifying chemicals and mixtures according to their health, physical, and environmental hazards.

## **HAZARD CLASSIFICATION (SEE APPENDIX B)**

- Hazard Classification is the process of assigning a chemical or mixture to a hazard or danger category based on its health and physical hazards.
- Physical hazards are the properties of a gas, liquid or solid that could adversely affect you or the workplace in a physical way, such as a fire or explosion.
- Health hazards are determined by the properties of a substance or mixture that can cause illness or injury to the skin, eyes, lungs or other organs and body parts. Because there are such a large variety of hazardous chemicals, there are also a large variety of physical and health hazards presented by these chemicals.
- To better communicate the specific information needed by chemical workers, the Global Harmonizing System has created multiple classes of hazards. There are 16 classes of physical hazards and 10 classes of health hazards.
- The 16 classes of physical hazards include: explosives, flammable gases, aerosols, oxidizing gases, gases under pressure, flammable liquids, flammable solids, self-reactive substances, pyrophoric liquids, pyrophoric solids, self-heating substances and mixtures, substances and mixtures emitting flammable gases when contacting water, oxidizing liquids, oxidizing solids, organic peroxides, and substances corrosive to metal.
- The 10 classes of health hazards include: acute toxicity, skin corrosion and irritation, serious eye damage or eye irritation, respiratory or skin sensitization, germ cell mutagenicity, carcinogenicity, reproductive toxicology, specific target organ toxicity from a single exposure, specific target organ toxicity from repeated exposures, and aspiration.

## **CONTAINER LABELS (SEE APPENDIX A)**

- Container labels will provide information on the relevant hazard classifications of the chemical. As part of the Global Harmonizing System, chemical manufacturers and importers are required to provide a label that includes a pictogram, signal word, hazard statements, and precautionary statements for each hazard class and category.
- Your specific chemical training, as well as your company's written plan, will include an explanation of the pictograms associated with the chemicals in your work environment. This knowledge helps workers quickly identify a chemical's hazards and is the first step to taking proper precautions to work safely.
- Pictograms are standardized graphics, sometimes called harmonized hazard symbols, which are assigned to a specific hazard class or category. Pictograms on a GHS label may convey health, physical or environmental hazard information.
- Each pictogram is assigned to only one class of hazard. A pictogram will represent either a physical hazard, health hazard or environmental hazard.
- Keep in mind that there is not a unique pictogram for each individual hazard within each class. In other words, one pictogram may be used to represent several hazards within a class.

## **PHYSICAL HAZARD PICTOGRAMS (SEE APPENDIX A & B)**

- There are five pictograms displayed on GHS labels to represent physical hazards of a chemical.
- The exploding bomb pictogram is used to signify a material as explosive, unstable explosive organic peroxide, or a self-reactive substance or mixture.
- The flame pictogram is used for flammable gases, liquids, solids and aerosols as well as self-reactive substances. It may also indicate a material is an organic peroxide, pyrophoric liquid or solid, a self-heating substance or mixture or emits flammable gases when it makes contact with water.
- The flame over circle, or oxidizer pictogram, appears on a label when a chemical is an oxidizing gas, liquid or solid.
- The gas cylinder pictogram is exhibited when a substance is a compressed, liquefied, refrigerated liquefied or dissolved gas.
- The corrosion pictogram indicates a material is corrosive to metal.

## HEALTH HAZARD & ENVIRONMENTAL PICTOGRAMS (SEE APPENDIX A)

- There are four pictograms displayed on GHS labels to represent health hazards of a chemical.
- The corrosion pictogram is used to denote the health hazards of skin corrosion and serious eye damage.
- The skull and crossbones are used when a chemical is acutely toxic to the skin, lungs or digestive system.
- The health hazard pictogram, sometimes called the chronic health hazard pictogram, denotes respiratory sensitization, cell mutagenicity, carcinogenicity, reproductive toxicity or an aspiration hazard. It is also used when a substance can cause specific target organ toxicity following a single or repeated exposure.
- The exclamation point pictogram is used for the health hazards of acute toxicity, skin irritation, eye irritation, skin sensitization and specific target organ toxicity following a single exposure in the form of narcotic effects or a respiratory tract infection.
- The environmental hazard pictogram is used when a substance poses acute or chronic hazards to the aquatic environment.

## SIGNAL WORDS (SEE APPENDIX A)

- There are two signal words that appear on GHS container labels. The words "Danger" or "Warning" are used to emphasize hazards and indicate the relative level of severity of the hazard.
- "Danger" represents a more severe hazard than the signal word "Warning".
- Only one signal word, corresponding to the class of the most severe hazard, should be used on a chemical label.

## HAZARD & PRECAUTIONARY STATEMENTS (SEE APPENDIX A)

- Other standardized communication elements found on GHS container labels are Hazard Statements and Precautionary Statements. For products which pose more than one risk, an appropriate hazard statement for each GHS hazard will be included on the chemical label.
- Hazard Statements are standard phrases assigned to a hazard class and category that concisely describe the nature of the hazard.
- Precautionary Statements are standardized explanations of the measures to be taken to minimize or prevent adverse effects.
- There are four types of precautionary statements for each hazard class: prevention, response, storage and disposal.
  - Some examples of "Prevention" precautionary statements include "Do not allow contact with water" and "Wear protective gloves."
  - Some examples of "Response" precautionary statements include "If on skin wash with plenty of water" and "If inhaled remove person to fresh air."
  - Some examples of "Storage" precautionary statements include "Store in well ventilated place" and "Protect from sunlight."
  - "Disposal" precautionary statements typically state to "Dispose in accordance to local regulations". Disposal precautions are an area the United Nations plans to further develop in the future.

## SAFETY DATA SHEETS (SEE APPENDIX C)

- Required by OSHA's original Hazard Communications Standard, Material Safety Data Sheets have been the comprehensive source of safety information about specific chemicals; unfortunately, these documents came in a wide variety of styles and formats making them hard to read and understand quickly.

- As part of the Global Harmonized System, they are now called "Safety Data Sheets" and have a uniform 16 section format that allows employees to obtain concise, relevant and accurate information more easily:
  - Chemical Identification; Hazard(s) identification; Composition/ information on ingredients;
  - First-aid measures; Fire-fighting measures; Accidental release measures; Handling and storage
  - Exposure control/ personal protection; Physical and chemical properties; Stability and reactivity;
  - Toxicological information; Ecological information; Disposal considerations; Transport information;
  - Regulatory information; and Other information
- Your facility maintains a Safety Data Sheet for every chemical in the workplace as part of its Hazard Communication Program, You should review the SDS before working with any chemical or anytime you have concerns about safety issues.
- Always ask your supervisor if you have any questions about a chemical label or Safety Data Sheet.

## **PERSONAL PROTECTIVE EQUIPMENT (SEE APPENDIX A & C)**

- Always wear the proper protective equipment specified by the container label or Safety Data Sheet. This often includes wearing gloves, protective clothing and goggles with a face shield.
- Respiratory protection may also be required to avoid breathing in hazardous fumes.
- If you are unsure about the required PPE for any chemical, stop and ask your supervisor.

APPENDIX A: GHS CONTAINER LABEL (EXAMPLE)

**CHEMICAL X**

**DANGER**



**HAZARD STATEMENTS:**  
Fatal if swallowed.  
Causes severe skin burns and eye damage.










**PRECAUTIONARY STATEMENTS:**

- Wear protective gloves.
- Wear face protection.
- Do not eat drink or smoke when using this product.
- Wash hands thoroughly after use.
- Store in a sealed container.
- **IF ON SKIN:** Rinse immediately with with cool water.
- **IF IN EYES:** Rinse thoroughly with water and seek medical attention.
- **IF SWALLOWED:** Do not induce vomiting. Seek medical attention.

Dispose of contents/container in accordance with local regulations.  
Chemical X Manufacturing, 1234 Over There St., (123) 456-7890

**See the S.D.S for more information.**

## APPENDIX B: GHS PICTOGRAMS & HAZARD CLASSES

 <ul style="list-style-type: none"> <li>▪ Oxidizers</li> </ul>	 <ul style="list-style-type: none"> <li>▪ Flammables</li> <li>▪ Self Reactives</li> <li>▪ Pyrophorics</li> <li>▪ Self-Heating</li> <li>▪ Emits Flammable Gas</li> <li>▪ Organic Peroxides</li> </ul>	 <ul style="list-style-type: none"> <li>▪ Explosives</li> <li>▪ Self Reactives</li> <li>▪ Organic Peroxides</li> </ul>
 <ul style="list-style-type: none"> <li>▪ Acute toxicity (severe)</li> </ul>	 <ul style="list-style-type: none"> <li>▪ Corrosives</li> </ul>	 <ul style="list-style-type: none"> <li>▪ Gases Under Pressure</li> </ul>
 <ul style="list-style-type: none"> <li>▪ Carcinogen</li> <li>▪ Respiratory Sensitizer</li> <li>▪ Reproductive Toxicity</li> <li>▪ Target Organ Toxicity</li> <li>▪ Mutagenicity</li> <li>▪ Aspiration Toxicity</li> </ul>	 <ul style="list-style-type: none"> <li>▪ Environmental Toxicity</li> </ul>	 <ul style="list-style-type: none"> <li>▪ Irritant</li> <li>▪ Dermal Sensitizer</li> <li>▪ Acute toxicity (harmful)</li> <li>▪ Narcotic Effects</li> <li>▪ Respiratory Tract Irritation</li> </ul>

## APPENDIX C: SAFETY DATA SHEET SECTIONS AND INFORMATION

1.	<b>Identification of the substance or mixture and of the supplier</b>	<ul style="list-style-type: none"> <li>▪ GHS product identifier.</li> <li>▪ Other means of identification.</li> <li>▪ Recommended use of the chemical and restrictions on use.</li> <li>▪ Supplier's details (including name, address, phone number, etc.).</li> <li>▪ Emergency phone number.</li> </ul>
2.	<b>Hazards identification</b>	<ul style="list-style-type: none"> <li>▪ GHS classification of the substance/mixture and any national or regional information.</li> <li>▪ GHS label elements, including precautionary statements. (Hazard symbols may be provided as a graphical reproduction of the symbols in black and white or the name of the symbol, e.g., flame, skull and crossbones.)</li> <li>▪ Other hazards which do not result in classification (e.g., dust explosion hazard) or are not covered by the GHS.</li> </ul>
3.	<b>Composition/information on ingredients</b>	<p style="text-align: center;"><b>Substance</b></p> <ul style="list-style-type: none"> <li>▪ Chemical identity.</li> <li>▪ Common name, synonyms, etc.</li> <li>▪ CAS number, EC number, etc.</li> <li>▪ Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance.</li> </ul> <p style="text-align: center;"><b>Mixture</b></p> <ul style="list-style-type: none"> <li>▪ The chemical identity and concentration or concentration ranges of all ingredients which are hazardous within the meaning of the GHS and are present above their cutoff levels.</li> </ul> <p><i><b>NOTE:</b> For information on ingredients, the competent authority rules for CBI take priority over the rules for product identification.</i></p>
4.	<b>First aid measures</b>	<ul style="list-style-type: none"> <li>▪ Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion.</li> <li>▪ Most important symptoms/effects, acute and delayed.</li> <li>▪ Indication of immediate medical attention and special treatment needed, if necessary.</li> </ul>
5.	<b>Firefighting measures</b>	<ul style="list-style-type: none"> <li>▪ Suitable (and unsuitable) extinguishing media.</li> <li>▪ Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products).</li> <li>▪ Special protective equipment and precautions for firefighters.</li> </ul>
6.	<b>Accidental release measures</b>	<ul style="list-style-type: none"> <li>▪ Personal precautions, protective equipment and emergency procedures.</li> <li>▪ Environmental precautions.</li> <li>▪ Methods and materials for containment and cleaning up.</li> </ul>
7.	<b>Handling and storage</b>	<ul style="list-style-type: none"> <li>▪ Precautions for safe handling.</li> <li>▪ Conditions for safe storage, including any incompatibilities.</li> </ul>
8.	<b>Exposure controls/personal protection.</b>	<ul style="list-style-type: none"> <li>▪ Control parameters, e.g., occupational exposure limit values or biological limit values.</li> <li>▪ Appropriate engineering controls.</li> <li>▪ Individual protection measures, such as personal protective equipment.</li> </ul>
9.	<b>Physical and chemical properties</b>	<ul style="list-style-type: none"> <li>▪ Appearance (physical state, color, etc.).</li> <li>▪ Odor.</li> <li>▪ Odor threshold.</li> <li>▪ pH.</li> <li>▪ melting point/freezing point.</li> <li>▪ initial boiling point and boiling range.</li> <li>▪ flash point.</li> <li>▪ evaporation rate.</li> </ul>

		<ul style="list-style-type: none"> <li>▪ flammability (solid, gas).</li> <li>▪ upper/lower flammability or explosive limits.</li> <li>▪ vapor pressure.</li> <li>▪ vapor density.</li> <li>▪ relative density.</li> <li>▪ solubility(ies).</li> <li>▪ partition coefficient: n-octanol/water.</li> <li>▪ autoignition temperature.</li> <li>▪ decomposition temperature.</li> </ul>
10.	<b>Stability and reactivity</b>	<ul style="list-style-type: none"> <li>▪ Chemical stability.</li> <li>▪ Possibility of hazardous reactions.</li> <li>▪ Conditions to avoid (e.g., static discharge, shock or vibration).</li> <li>▪ Incompatible materials.</li> <li>▪ Hazardous decomposition products.</li> </ul>
11.	<b>Toxicological information</b>	<p>Concise but complete and comprehensible description of the various toxicological (health) effects and the available data used to identify those effects, including:</p> <ul style="list-style-type: none"> <li>▪ information on the likely routes of exposure (inhalation, ingestion, skin and eye contact);</li> <li>▪ Symptoms related to the physical, chemical and toxicological characteristics;</li> <li>▪ Delayed and immediate effects and also chronic effects from short- and long-term exposure;</li> <li>▪ Numerical measures of toxicity (such as acute toxicity estimates).</li> </ul>
12.	<b>Ecological information</b>	<ul style="list-style-type: none"> <li>▪ Ecotoxicity (aquatic and terrestrial, where available).</li> <li>▪ Persistence and degradability.</li> <li>▪ Bioaccumulative potential.</li> <li>▪ Mobility in soil.</li> <li>▪ Other adverse effects.</li> </ul>
13.	<b>Disposal considerations</b>	<ul style="list-style-type: none"> <li>▪ Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.</li> </ul>
14.	<b>Transport information</b>	<ul style="list-style-type: none"> <li>▪ UN Number.</li> <li>▪ UN Proper shipping name.</li> <li>▪ Transport Hazard class(es).</li> <li>▪ Packing group, if applicable.</li> <li>▪ Marine pollutant (Yes/No).</li> <li>▪ Special precautions which a user needs to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises.</li> </ul>
15.	<b>Regulatory information</b>	<ul style="list-style-type: none"> <li>▪ Safety, health and environmental regulations specific for the product in question.</li> </ul>
16.	<b>Other information including information on preparation and revision of the SDS</b>	