University of New Haven

POLICIES AND PROCEDURES

Policy Title:

Hazard Communication Program

Policy No.:	*8213*
Effective Date:	*May 2011*
Last Revision:	**January 2025**

Responsible Office: Department of Public Safety

Responsible Official: Associate VP of Public Safety & Administrative Services

Table of Contents

1.0 Overview

This Hazardous Materials Communication Program (Program) is designed to ensure that any hazardous chemicals and materials present at 300 Boston Post Road, West Haven, CT 06516, and any other affiliated University of New Haven properties, are identified and that all students and employees are provided with a basic awareness of the information that they need to protect themselves, other employees, the public and the environment from potential risks related to the use and management of those chemicals and materials.

1.1 Purpose

The purpose of the program is to provide guidance to University of New Haven employees and students for evaluating the potential risks of hazardous chemicals and materials on campus and to provide information concerning potential hazards to the environment. The Program complies with the requirements of OSHA's Hazard Communication Standard (29 CFR § 1910.1200), commonly known as the "Employee Right-to-Know Law."

1.2 Scope

This standard preempts all other existing legal requirements regarding the subject. Under requirements of this safety standard, all chemicals that are produced, imported or are otherwise used at the University of New Haven campus and satellite locations are reviewed, and information related to the hazards of these chemicals is communicated to all affected employees.

Employees engaged in the handling of hazardous chemicals have the right to know of, and to be informed by the University of New Haven as to the chemical and physical hazards that are inherent to their job duties. They also have the right to be informed of the proper methods for protecting themselves from these hazards. Employees with questions concerning the use of the written program, or questions concerning the information contained within it, will have those questions answered by the Associate Vice President of Public Safety & Administrative Services.

To address the additional hazards of asbestos and mold that may be present at the University, the University of New Haven has an Asbestos Management Program and Mold Response and Remediation Plan in place. Students having questions on asbestos or mold are asked to contact the Director of Facilities.

2.0 Roles and Responsibilities

2.1 Associate Vice President of Public Safety and Administrative Services

- Responsible for scheduling training on the Program in accordance with 29 CFR § 1910.1200 with the Department Chair, faculty, contractors and Facilities staff;
- Responsible for assuring safe practices are implemented and practiced within the laboratory setting;
- Review the Program for effectiveness in cooperation with the Chemistry, Biology, Forensic Sciences, Mechanical Engineering, Medical Lab Science, and Dental Hygiene department chairs and amend as necessary at least annually; and
- Assure that students have access to the information contained in sections 4.14 and 4.15.

2.2 Associate Vice President of Facilities

- Assure that all Facilities Department staff adhere to this policy and the procedures outlined within.

2.3 Department Chair (Chemistry, Biology, Forensics, Dental Hygiene, Fire Science, Medical Lab Science, and Mechanical Engineering)

- Responsible for assuring the Hazardous Materials Communication Safety plan is followed within laboratories under their control;
- Assure laboratory staff attend at least annually a laboratory specific training on the Program and its contents;
    - Staff can include students, volunteers, minors and researchers;
- Implement safe laboratory practices and engineering controls to minimize the potential exposure to hazardous chemicals;
- Ensure that equipment and protective devices are available and in working order, and that appropriate training has been provided;
- Attend necessary trainings;
- Review and understand the program and applicable laboratory specific procedures in their entirety before beginning work in the laboratory or with hazardous chemicals; and
- In cooperation with the Associate Vice President of Public Safety & Administrative Services, review the Program for effectiveness and amend as necessary at least annually.

2.4 Managers, Supervisors, Lab Managers and Employees

- Review and understand the program;
- Ensure that hazardous chemical containers are labeled properly;

- Ensure all individuals working within the laboratory have completed necessary trainings prior to participation in lab activities.
- Read and understand Safety Data Sheets (SDS's) for the chemicals used; and
- Responsible for following all safe work practices and using proper precautions required by this Program.

3.0 Hazard Communication Safety Program

3.1 Location

This Program is available to all employees and students for review on the Environmental Health and Safety website on MyCharger. Hard copies are maintained in the following area(s): office of the Associate Vice President of Public Safety & Administrative Services, Biology Department main office, Chemistry Department main office, Forensic Sciences Department main office, the Facilities Department main offices in Maxcy Hall, Winchester Hall, and satellite location at Canal Dock Boathouse at 475 Long Wharf Drive, New Haven, CT 06511

The written program will be made available, upon request, to the Assistant Secretary and the Director of OSHA.

3.2 Review

The Associate Vice President of Public Safety will annually review and evaluate this Program and amend as necessary.

4.0 Categories of Hazardous Chemicals

The department managers shall ensure that all employees are aware of the locations, hazards and appropriate control measures for work involving hazardous chemicals. In some cases, specific procedures may be required for working with highly hazardous materials. Review the SDS for specific handling and storage requirements of hazardous chemicals prior to working with every chemical. Some specific hazards that may be present in various work areas at the University of New Haven and satellite locations are listed below.

4.1 Allergens and Sensitizers

A chemical allergy is an adverse reaction by the immune system to a chemical. Allergic reactions result from previous sensitization to a chemical or a structurally similar chemical. Once sensitization occurs, allergic reactions can result from exposure to extremely low doses of the chemical. Allergic

reactions can be immediate, occurring a few minutes after exposure. Anaphylactic shock is a severe immediate allergic reaction that can result in death if not treated quickly. Allergic reactions can also be delayed, taking hours or even days to develop. It is important to recognize that a delayed chemical allergy can occur after the chemical has been removed. Examples of substances that may cause allergic reactions include formaldehyde, various isocyanates and certain phenol derivatives.

4.2 Asphyxiants

Asphyxiants are substances that interfere with the transport of an adequate supply of oxygen to the vital organs of the body. Simple asphyxiants are substances that displace oxygen from the air being breathed to such an extent that adverse effects result. Acetylene, carbon dioxide, argon, helium, ethane, nitrogen, and methane are common asphyxiants. It is important to recognize that even chemically inert and biologically benign substances can be extremely dangerous under certain circumstances such as carbon monoxide.

4.3 Compressed Gases

Gas cylinders contain either compressed liquids or gases. Gas cylinders represent the most insidious hazard, as puncture, heat, faulty valves, pressure or regulators may result in a rapid release of the contents. The following safety considerations should be implemented where applicable:

- The cylinder contents must be clearly identifiable.
- Handle cylinders carefully and do not roll, slide or drop. Use a cart or hand truck to transport.
- Do not lift a cylinder by its cap.
- Secure all cylinders while in storage, transport, or use. Use suitable racks, straps, chains or stands to support cylinders. Restraints should be positioned at approximately 2/3 of the way up on the cylinder. Do not allow cylinders to fall or lean against one another.
- Cylinders must be secured upright.
- Never tamper with cylinder valves, force connections or use homemade adapters. Use only approved equipment. Never repair or alter cylinders, valves or safety relief devices.
- Only use a regulator compatible with the cylinder contents.
- Close the cylinder valve when not in use.
- When empty, turn off the cylinder valve and label the cylinder as empty. Store separately from full cylinders.
- Store cylinders in a well-ventilated area away from ignition sources, heat, flames and flammable chemicals.
- Check for gas leaks using soapy water around the connections.

- Do not store flammable gas cylinders with oxidizers such as nitrous oxide or oxygen. They must be separated by a minimum of 20 ft. or a 5-foot fire wall.
- Use cylinder tags to indicate whether the tank in full, empty, or in-use.

4.4 Corrosive Chemicals

The Resource Conservation and Recovery Act (RCRA) defines a corrosive chemical as a liquid with a pH ≤2 or >12.5. Acids and bases can cause severe tissue damage depending on the corrosivity of the chemical. The primary means of protection from corrosive chemicals is the use of gloves, goggles, face shields, aprons, lab coats and other chemical resistant clothing. Exercise extreme caution when handling corrosive chemicals. The following safety considerations should be implemented where applicable:

- Transport acids and bases in a bottle carrier or cart. Do not handle by the neck alone; support the weight of the bottle from the bottom when handling or pouring.
- Do not store acids and bases with flammable liquids or oxidizing chemicals.
- Isolate corrosive chemicals from incompatible chemicals.
- Reference the chemical's SDS for proper handling, PPE and storage requirements.
- If an acid or base comes in contact with your skin or clothing, thoroughly wash the affected areas utilizing the safety showers or eyewash units and notify your department manager or laboratory manager.

4.5 Cryogenic Liquids

Cryogenic liquids are liquefied gases that are kept in their liquid state at very low temperatures and are associated with various hazards including: extreme cold, asphyxiation, explosion, cold contact burns, and toxicity. The most common cryogenic liquid at the University of New Haven is liquid nitrogen. Employees should be thoroughly trained in the hazards and the proper steps to avoid them. Training should include emergency procedures, operation of equipment, safety devices, appropriate engineering controls, knowledge of the properties of the materials used and personal protective equipment required. Insulated gloves should always be worn when handling anything that comes into contact with cryogenic liquids or vapors. Considerations must be made to prevent cryogenic material from contacting skin. Clothing such as a lab coat, gloves, pants, closed toed shoes, safety glasses, goggles and face shields should be worn.

4.6 Flammable and Combustible Chemicals

Flammable chemicals are considered to be liquids with a flashpoint below 100 °F and solid materials that readily sustain combustion. Liquids with a flashpoint between 100 °F and 200 °F are generally

classified as combustible; the same basic procedures should be applied when handling flammable or combustible liquids.

- Do not allow smoking or other sources of open flames in areas where flammable chemicals are used.
- Know the locations of fire extinguishers, fire blankets, fire alarms, and emergency exits in the work area.
- Do not store flammable liquids in domestic-type refrigerators. Use only refrigerators rated for flammables.
- Do not store flammables with oxidizing agents (e.g., nitric, perchloric, and sulfuric acids).
- Do not expose flammable liquids to potential sources of ignition such as electrical equipment, heat, burners, or open flames.
- To prevent accidental electrical charge, the use of bonding and grounding equipment should be used whenever applicable. The use of non-sparking tools can prevent an ignition source.
- Store flammable liquids in an approved fire rated flammable storage cabinet.
- Do not store flammable liquids on the floor, unless protected by secondary containment.
- Minimize the amount of flammable liquids that are in use, being stored, and that are generated as waste.
- Storage of flammable liquids greater than 10 gallons within a work area must be in an approved and labeled flammable storage cabinet.
- The SDS must be reviewed for additional safety requirements and precautions.

4.7 Irritants

An irritant is a chemical, which is not corrosive, but causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A wide variety of organic and inorganic chemicals are irritants; thus, skin contact with all chemicals should be avoided. Use a properly functioning chemical fume hood when handling irritants that can be inhaled. At minimum, safety glasses, lab coat, long pants, gloves and closed toed shoes should be worn.

4.8 Organic Peroxides

Organic peroxides are hazardous because of their extreme sensitivity to shock, sparks, heat, light, strong oxidizing and reducing agents, and other forms of detonation. Organic peroxides may cause fire, create explosion hazards, and may be toxic or corrosive. Some organic peroxides are dangerously reactive, decomposing very rapidly or explosively if they are exposed to slight heat, friction, mechanical shock or contamination with incompatible materials. Precautions for handling peroxides should include the following:

- Limit the quantity of peroxides.
- Store away from sunlight and increased temperatures; avoid humidity. Keep containers capped, clean, and undamaged.
- Do not return unused peroxides to the container.
- Clean up all spills immediately. Solutions of peroxides can be absorbed using vermiculite or other absorbing materials.
- Do not permit smoking, open flames, and other sources of heat near peroxides. Areas should be labeled that contain peroxides so that this hazard is evident.
- Avoid friction, grinding, and other forms of impact near peroxides, especially solid peroxides. Glass containers that have screw-cap lids or glass stoppers should not be used. Polyethylene bottles that have screw-cap lids may be used.
- Isolate from incompatible materials such as strong acids and bases, flammable and combustible liquids, and reducing agents.

4.8.1 Peroxide Formers

Peroxide formers are compounds that can potentially change to form Organic Peroxides. As such, the recommendations for storing Organic Peroxides should apply to Peroxide Formers.

- There are three categories of Peroxide Formers
    - List A contains compounds that can form peroxides while stored; such as, vinyl monomers and potassium metal
    - List B contains compounds that can form peroxides from concentration; such as, ether and dioxane.
    - List C contains compounds that can form peroxides via polymerization reaction; such as vinyl monomers.
- Peroxides may have formed if one detects
    - Increased viscosity
    - Changes in color
    - Formation of crystals

Peroxides must be regularly inspected for any signs of changes in physical properties. More information regarding peroxide formers can be found in appendix D of the University Chemical Hygiene Plan.

4.9 Oxidizers

Oxidizers are chemicals other than blasting agents or explosives as defined in § 1910.109(a), that

initiate or promote combustion in other materials, causing fire either of itself or through the release of oxygen or other gases. Examples include perchloric acid, potassium persulfate and lead nitrate. Precautions for handling oxidizers should include the following:

- Minimize the amount of oxidizers used and stored.
- Isolate from incompatible chemicals (e.g., organics, flammable, dehydrating, or reducing agents).
- Do not store oxidizers in wooden cabinets or on wooden shelves.
- Do not return unused material to the original container.
- Store in a tightly closed container and in a cool, dry, ventilated area.

4.10 Pyrophoric Chemicals

Pyrophoric chemicals are extremely reactive toward oxygen and/or water and must never be exposed to the atmosphere. Examples include sodium hydride and magnesium. Exposure of these chemicals to the air could result in spontaneous combustion, which could cause serious burns or other injuries to the person handling the chemical or others in the immediate area. In addition, all combustible materials, including paper products, should not be allowed to come in contact with any pyrophoric material at any time. Pyrophoric material can be handled and stored safely if all exposure to atmospheric oxygen and moisture is avoided. Solids must be transferred under an inert atmosphere in an efficient glove box. Glass bottles of pyrophoric material should not be handled or stored unprotected. The metal container shipped with each bottle should be retained as a protective container for each bottle for transporting and storage.

4.11 Reproductive Toxins

Reproductive toxins are chemicals which affect the reproductive capabilities including chromosomal damage and effects on fetuses. Reproductive toxins have adverse effects on various aspects of reproduction, including fertility, gestation, lactation, and general reproductive performance. Reproductive toxins can affect both men and women. Reproductive toxins include lead, carbon disulfide and mercury.

4.12 Toxic Chemicals

Toxic is defined by OSHA 29 CFR 1910.1200 as a chemical which fall in any of these three categories:

- A chemical that has a median lethal dose (LD50) of more than 50 milligrams per kilogram but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
- A chemical that has a median lethal dose (LD50) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous

contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

- A chemical that has a median lethal concentration (LC50) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than two milligrams per liter but not more than 20 milligrams per liter of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

4.13 Unknown Chemicals

Unknown chemicals or those, for which complete physical and chemicals hazards are not known, must be assumed to be hazardous and highly toxic. Should an unknown chemical be identified, the CHO and Associate Vice President of Public Safety & Administrative Services should be notified immediately. The University will work with a third-party vendor to determine the chemical properties (pH) prior to disposal. Appropriate PPE and engineering controls should be utilized.

5.0 Safety Data Sheets (SDS's)

The University of New Haven ensures that SDS's for all chemicals stored or used at the facility and Satellite locations are accessible to all personnel and regulatory inspectors as needed. SDS's must be readily available electronically for all employees and students through MSDSOnline. SDS must be retained 30 years after use has ceased. Each SDS must be in English and contain at least the following information:

- Identity used on the label
- Its chemical and common names
- List of ingredients if a mixture
- Physical and chemical characteristics
- Physical and health hazards
- Signs and symptoms of exposures
- OSHA permissible exposure limit and other exposure limit values
- If it is listed in the National Toxicology Program (NTP) annual report on carcinogens or a potential carcinogen in the International Agency for Research on Cancer (IARC), or by OSHA
- Safe handling and use precautions
- Control measures
- Emergency and first aid measures
- Date of preparation and the most recent change

- Manufacturer information

If an SDS is not provided with a shipment, the department manager must obtain one from the chemical manufacturer as soon as possible and upload the information within the MSDSOnline system. Reference Appendix A for further information.

5.1 Routes of Entry

Exposure occurs when an employee is exposed to a hazardous chemical in the workplace via any route of entry. The most common routes of entry by which chemicals enter the body include inhalation, ingestion, skin contact (absorption), and injection.

Inhalation is one of the quickest ways to spread toxins throughout the body, as the lungs readily disperse many substances when they recharge the blood with oxygen. Ingestion has long been considered one of the least likely means of workplace exposure. However, published information indicates that significant worker exposure may occur when gum or tobacco is chewed, or food is eaten in the presence of toxic vapors.

5.2 Signs and Symptoms of Exposure

The signs and symptoms of exposure are the detectable adverse effects of a chemical on the body. Examples include eye irritation, dizziness, fatigue, nausea, skin rash, shortness of breath, or headache. Some signs and symptoms may be of a highly technical nature referencing medical terminology not immediately recognizable such as polyserositis, dysneuria and ulaganactesis. A good medical dictionary should be handy for understanding this element of the health hazard section of SDS's.

5.3 Chemical Inventory

A chemical inventory involving each hazardous chemical and associated quantity shall be available upon request. The chemical inventory will be maintained and managed by the head lab supervisors and updated as needed. The corresponding Safety Data Sheets (SDSs) are made available on MSDSOnline, located on the Environmental, Health and Safety page on myCharger.

6.0 Labels and Other Forms of Warning

All containers of hazardous chemicals must be labeled, tagged, or marked with the identity of the material and appropriate hazard warnings. If the material is subsequently transferred by employees from a labeled container to another container, employees will have to label that container, unless it is subject to the portable container exemption (1910.1200(f) (7)). The University of New Haven and Satellite

locations are not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer. The identity for the material and appropriate hazard warnings must be on the label. The identity is any term which appears on the label, the SDS, and the list of chemicals and thus links these three sources of information.

7.0 Non-Routine Tasks

A non-routine task is one which the employee does not routinely perform and or has not previously been trained. Prior to beginning any non-routine task involving actual or potential exposure to hazardous chemicals, the University of New Haven must inform employees of the hazards present and be given training on work practices and necessary personal protective equipment.

8.0 Multi-Employer Workplace

8.1 University of New Haven Information to Contractors

The University of New Haven is responsible for providing contractors with the following information:

- List of hazardous chemicals to which employees of other employer(s) may be exposed to
- Information about the labeling system
- Any precautionary measures
- The location of SDS's
- The provisions of this program

8.2 Contractor information to the University of New Haven

The University of New Haven is responsible for obtaining information from contractors on all hazardous chemicals to which University employees may be exposed to as a result of the contractor's work at the University of New Haven and satellite locations.

Contractors who bring hazardous chemicals on-site to the University of New Haven and satellite locations must comply with the following:

- Supply an inventory of the hazardous chemicals and their applicable SDS's to the Director of Facilities.
- Ensure all chemical containers are properly labeled.
- Remove all unused chemicals after the project is complete.
- Arrange for proper disposal of all hazardous and non-hazardous wastes by contacting the

Associate Vice President of Public Safety & Administrative Services or the Director of Facilities.

- Handle, store, and transport all hazardous materials in compliance with University of New Haven's policies and procedures.

9.0 Chemical Mixtures

Those working with mixtures of chemicals at the University and satellite locations must determine their hazards. If the mixture has not been tested, it must be assumed to pose the same health hazards as any component that makes up 1% or more of the mixture by volume or weight. However, if the mixture contains a component classified as a carcinogen at a concentration of 0.1% or greater, it must be assumed to present a carcinogenic hazard.

10.0 Employee Information and Training

Prior to starting work with hazardous chemicals or at the time of employment, each employee will attend a Hazard Communication training where they will receive information on the following topics:

- Policies and procedures related to the Hazard Communication Standard
- Location of the written Hazard Communication Program
- How to read and interpret an SDS
- Location of SDS's
- Physical and health hazards of hazardous substances in their work area
- Methods and observation techniques to determine the presence or release of hazardous chemicals
- Work practices that may result in exposure
- How to prevent or reduce exposure to hazardous substances
- Personal protective equipment
- Procedures to follow if exposure occurs

Supplemental or follow-up training will be provided if the University of New Haven has reason to believe that employees do not understand the program or any of its elements or there are changes in the workplace which involve chemicals or chemical-related work practices not previously in training.

APPENDIX A - READING and UNDERSTANDING SAFETY DATA SHEETS

The federal Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, requires users of products with hazardous constituents to obtain Safety Data Sheets (SDSs) from the manufacturer and maintain them in such a way that they are readily accessible to users. While the format of these data sheets currently varies from manufacturer to manufacturer, certain components appear on each sheet. Please note that revisions to the Hazard Communication Standard promulgated in March 2012 require manufacturers/importers to use a standardized format and minimum information required on all SDSs by no later than December 1, 2015.

The 16-section standardized SDS includes the following information which may be found in a different order and format in current SDSs as noted above.

1. **Identification**

(a) Product identifier used on the label;
(b) Other means of identification;
(c) Recommended use of the chemical and restrictions on use;
(d) Name, address, and telephone number of the manufacturer, importer, or other responsible party;
(e) Emergency phone number.

2. **Hazard(s) Identification**

(a) Classification of the chemical in accordance with paragraph (d) of 1910.1200:
(b) Signal word, hazard statement(s), symbol(s), and precautionary statement(s). Hazard symbols may be provided as graphical reproductions in black and white or the name of the symbol.; e.g., flame, skull and crossbones, etc.
(c) Describe any hazards not otherwise classified;
(d) Where an ingredient with unknown acute toxicity is used in a mixture at a concentration > 1% and the mixture is not classified based on testing of the mixture as a whole, a statement that X% of the mixture consists of ingredient(s) of unknown acute toxicity.

3. **Composition/information on ingredients**

Except as provided for in 1910.1200 on trade secrets:

For Substances
(a) Chemical name;
(b) Common name and synonyms;
(c) CAS number and other unique identifiers;
(d) Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance.

For Mixtures

In addition to the information required for substances:
(a) The chemical name and concentration (exact percentage) or concentrations of all ingredients Which are classified as health hazards in accordance with paragraph (d) of 1910.1200 and
(1) are present above their cut-off/concentration limits; or
(2) present a health risk below the cut-off/concentration limits.
(b) The concentration (exact percentage) shall be specified unless a trade secret claim is made, when there is batch-to-batch variability in the production of the mixture, or for a group of substantially similar mixtures with similar chemical composition.

4. **First Aid Measures**
(a) Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion;
(b) Most important symptoms/effects, acute and delayed;
(c) Indication of immediate medical attention and special treatment needed, if necessary.

5. **Fire-Fighting Measures**
(a) Suitable (and unsuitable) extinguishing media;
(b) Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products).

6. **Accidental Release Measures**
(a) Personal precautions, protective equipment, and emergency procedures;
(b) Methods and materials for containment and cleaning up.

7. **Handling and Storage**
(a) Precautions for safe handling.

8. **Exposure controls/ Personal Protection**
(a) OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available;
(b) Appropriate engineering controls.

9. **Physical and Chemical Properties**
(a) Appearance (physical state, color, etc.);
(b) Odor;
(c) Odor threshold;
(d) pH;
(e) Melting point/freezing point;
(f) Initial boiling point and boiling range;
(g) Flash point;
(h) Evaporation rate;
(i) Flammability (solid, gas);
(j) Upper / lower flammability or explosive limits;
(k) Vapor pressure;
(l) Vapor density;
(m) Relative density;
(n) Solubility(ies);

(o) Partition coefficient: n-octanol/water;
(p) Auto-ignition temperature;
(q) Decomposition temperature;
(r) Viscosity.

10. **Stability and Reactivity**
(a) Reactivity;
(b) Chemical stability;
(c) Possibility of hazardous reactions;
(d) Conditions to avoid (e.g., static discharge, shock, or vibration);
(e) Incompatible materials;
(f) Hazardous decomposition products.

11. **Toxicological Information**
Description of the various toxicological (health) effects and the available data used to identify those effects, including:
(a) Information of the likely routes of exposure (inhalation, ingestion, skin and eye contact);
(b) Symptoms related to the physical, chemical and toxicological characteristics;
(c) Delayed and immediate effects and also chronic effects from short- and long-term exposure;
(d) Numerical measures of toxicity (such as acute toxicity estimates);
(e) Whether the hazardous 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 edition) or by OSHA.

12. **Ecological Information (non-mandatory)**
(a) Ecotoxicity (aquatic and terrestrial, where available);
(b) Persistence and degradability;
(c) Bio accumulative potential;
(d) Mobility in soil.

13. **Disposal Considerations (non-mandatory)**
Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.

14. **Transport Information (non-mandatory)**
(a) UN number;
(b) UN proper shipping name;
(c) Transport hazard class(es);
(d) Packing group, if applicable;
(e) Environmental hazards (e.g., Marine pollutant (yes/no));
(f) Transport in bulk;
(g) 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.

15. **Regulatory Information (non-mandatory)**
Safety, health and environmental regulations specific for the product in question.

16. **Other information, including date of preparation or last revision**

APPENDIX B - 2012 HAZARD COMMUNICATION STANDARD REVISIONS – LABEL DEFINITIONS AND PICTOGRAMS

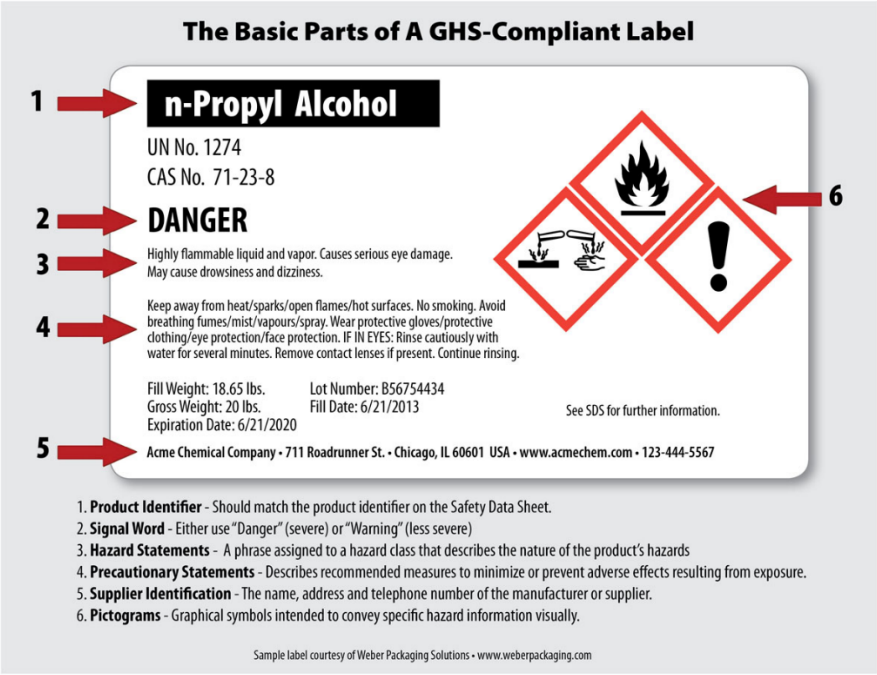
Product Identifier: *the name or number used for a hazardous chemical on a label or in the Safety Data Sheet (SDS). It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.*

Signal Word: *a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this section are "danger" and "warning". "Danger" is used for the more severe hazards, while "warning" is used for the less severe.*

Hazard Statement: *a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.*

Pictogram: *a composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.*

Precautionary Statement: *a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.*



Training includes the Globally Harmonized System of Classification and Labeling of Chemicals (GHS), as demonstrated below.

HCS Pictograms and Hazards

Health Hazard

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

Flame

- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self Reactives
- Organic Peroxides

Exclamation Mark

- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (Non-Mandatory)

Gas Cylinder

- Gases Under Pressure

Corrosion

- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

Exploding Bomb

- Explosives
- Self-Reactives
- Organic Peroxides

Flame Over Circle

- Oxidizers

Environment (Non-Mandatory)

- Aquatic Toxicity

Skull and Crossbones

- Acute Toxicity (fatal or toxic)