TRAINING MANUAL

Hazard Communication

Contents

Objectives

After completing today's Hazard Communication Training program employees will be familiar with:

- The OSHA Hazard Communication Standard & (GHS) transition
- Chemical hazards in the workplace
- Hazard Classification
- Safety Data Sheets (SDS)
- Labels and other forms of warnings

Regulatory Review

Health and Safety Regulations

Federal Occupational Health and Safety Administration (OSHA) within the Department of Labor

1) Established in 1970 to carry out the Occupational Safety and Health Act

> The purpose of the act was to: "...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources."

2) Responsibilities include:

- Regulating workplace hazards and protecting workers
- Setting standards to protect workers and inspect workplaces to make sure these standards are being met
- Administering fines to employers with violations; under OSHA, both employers and employees have certain responsibilities and rights.
- Giving workers the right to request inspections, new standards, and other rights
- Developing legally enforceable standards or rules to protect workers

Hazard Communication Standard: Employee Right to Know 29 CFR 1910.1200

Purpose: To inform employees of the chemical hazards that may be present in the workplace.

The Hazard Communication Standard gives you the right to information that can answer the following questions:

1. What hazardous materials are stored and/or used in my workplace?
2. What is hazardous about this material?
3. How hazardous is it?
4. How can I protect myself from the potential hazards posed by this material?

History of the Hazard Communication Standard:

In 1983, the United States Department of Labor and the Occupational Safety and Health Administration (OSHA) passed the original Hazard Communication Standard (HCS), which applied only to employees of manufacturing companies. This regulation required that employers inform their employees of chemical hazards that may be present in the workplace. In 1987, OSHA expanded the scope of the standard to apply to all businesses, including the retail and other commercial industries. In 2012 the HCS was revised again to align with the international Global Harmonization initiatives.

The Hazard Communication requirements include:

- Written Program
- Hazardous Materials Inventory
- Labels on all hazardous materials
- Safety Data Sheets (SDS) for all hazardous materials
- Training for all employees

Global Harmonization System (GHS)

Based on United Nations initiative to develop global standard for classification and communication of chemical hazards, the Global Harmonization System (GHS) has been adopted by OSHA into the HCS as of March 2012. It is important to note that the HCS is not going away but is being enhanced to conform to the GHS requirements. A few of the most noticeable standard changes are the format of the Material Safety Data Sheet (MSDS) to a standard 16 section format and additional required data elements. The name Material Safety Data Sheet has been changed to Safety Data Sheet (SDS) to align to how they are referred to internationally. Also new HCS Pictograms and GHS labels will be required on incoming containers. The transition period for compliance with all modified parts of the HazCom Standard is June 2015.

Employer Requirements:

- Assess the workplace for hazardous chemicals.
- Maintain a chemical inventory in the workplace.
- Have a written hazard communication program.
- Inform employees of the hazardous properties of chemicals in the workplace.
- Provide Safety Data Sheets (SDS) and train employees on their use.
- Label hazardous chemicals (i.e., secondary containers).

Employee Responsibilities

The commitment of all employees is necessary to assure the success of the Hazard Communication program. Each employee is responsible for the following items:

- Knowing the location of the written Hazard Communication plan.
- Following procedures for the handling and storage of hazardous materials.
- Reporting all accidents and injuries to their supervisor.
- Participating in appropriate training related to their job responsibilities.
- Knowing the procedure for obtaining Safety Data Sheets (SDS).

Hazardous Materials Classification

Hazard Classification

A hazardous material is any material that because of its quantity, concentration, physical and/or chemical characteristics, poses a present or potential hazard to human health or the environment. Manufactures are required to identify and describe the hazards associated to the chemicals they produce in accordance with the requirements of the HCS. Hazardous materials include common and uncommon materials used throughout homes, manufacturing processes, service and maintenance industries, and many other types of businesses.

The acronym CIRT is often used to identify four general hazard categories:

Corrosive, Ignitable, Reactive, and Toxic.

Hazardous Materials May Include:

Adhesives	Pesticides
Solvent Cement	Paints
Glass Cleaner	Solvents
Lubricants	Custodial Supplies
Welding Gases	Gasoline, Diesel
Aerosols	Bleach
Water Treatment Chemicals	Ammonia
Laboratory Chemicals	Acids

Physical and Health Hazards

Physical Hazards

Physical Hazards: a chemical that is ignitable, reactive, corrosive, explosive, oxidizer, flammable solid, pyrophoric, explosive, water reactive and/or a compressed gas. Examples of some products that can present physical hazards include gasoline, propane to run forklifts, and welding gases.

Ignitability: The “flash point” of a chemical determines the chemical’s ignitability class.

Flash Point: The minimum temperature at which a liquid emits a vapor that could burn or explode.

> For example, acetone, (used in cleaning solvents) and ether (used in starting fluid) have very low flash points (at or below 0° F). These chemicals evaporate quickly at temperatures above 0°. A spark from turning on a light switch can ignite these vapors.

Ignitable chemicals are divided into two groups:

1) Flammable chemicals that have a flash point below 100° F. Products in this category include gasoline, spray paint and acetone.

2) Combustible products have a flash point between 100 and 200° F, and include water sealer, paint thinner and some types of paint.

   Examples: Gasoline; Turpentine; Raw Linseed Oil

   - Oxidizers: chemicals that promote combustion in other materials. Chlorine, an ingredient commonly found in cleaning solutions, is an oxidizer.

     Examples: Pool chlorine products; hydrogen peroxide

   - Compressed Gas: materials that are put into containers under pressure. Including spray paints, propane cylinders and welding gas tanks.

     Examples: Compressed Air Cylinders; Propane Cylinder Fuel; Aerosol WD-40

Health Hazards

Health Hazards: a chemical that is a carcinogen, toxic, irritant, corrosive, target organ, sensitizer.

Health hazards can differ depending on how much of the chemical you are exposed to and for how long. Chemicals can cause either acute or chronic health effects to the body.

Acute effects: usually occur quickly and are a result of short-term exposure. The burning sensation caused by getting drain cleaner on skin is an acute effect.

Chronic effects: take longer to occur and usually are the result of long-term exposure. For example, long term exposure to some chemicals known as carcinogens, may cause cancer. Continuous exposure to certain skin irritants may cause a condition known as dermatitis, characterized by chronic dry, itching skin.

Corrosive: A substance that causes visible destruction or irreversible alteration of living tissue. Materials that cause metals to “rust” are also in the corrosive class. This destruction is caused by chemical reaction at the site of contact.

Examples: Battery acid (sulfuric acid); Drain Cleaners; Lye

Toxic: A substance that can cause damage or disturbance to bodily functions when it enters the body. Highly toxic chemicals, even in small amounts, can cause serious bodily injury.

Examples: Gasoline; Ethylene Glycol, Strychnine

Irritant: A substance that is not corrosive but causes reversible inflammation at the site of contact.

Examples: General Purpose Detergent, Pepper Spray

Target Organ Effects: Chemicals may be categorized by the specific body organs that they affect. Some examples of these hazards include:

- Cutaneous Hazards: Chemicals that affect the skin and often cause rashes, irritation, and inflammation. Household and industrial cleaners are cutaneous hazards.
- Eye (ocular) Hazards: Chemicals that affect the eyes or visual capacity (blurring or inflammation). Some examples are acids, fungicides, and wood preservatives.
- Neurotoxins: Chemicals that have their primary effect on the nervous system. Symptoms include behavioral changes and decreased motor function. Mercury, toluene, and alcohol are neurotoxins.

- Carcinogens: Chemical substances that are recognized as cancer causing agents or potential cancer-causing agents. Benzene, a chemical ingredient in gasoline and methylene chloride, a chemical used in some paint removers, has been identified as carcinogenic.

- Reproductive Toxins: Chemicals which affect human reproductive capabilities including chromosomal damage (mutagens) and effects on a fetus (teratogens).

Toxicity and Hazard

Toxicity is a substance's ability to cause an acute or chronic injury to human health if inhaled, injected, ingested or absorbed. Results from an exposure may range from dizziness to coma or death. Animal studies are conducted to determine a substance's toxicity. These studies help distinguish how hazardous a substance may be based on toxicity and potential for exposure.

A measured dose of a substance is given to a test population through oral, inhalation, or dermal routes to determine the dose required to kill 50% of the test group. This dose is called the Lethal Dose 50 (LD50) or Lethal Concentration 50 (LC50). Toxicity data such as the LD50 are typically expressed in mg/Kg meaning the mass of the test material per kilogram of test animal. These values are useful for judging the relative toxicity of various materials; however, they should not be extrapolated to human body weight to determine safe levels for exposure.

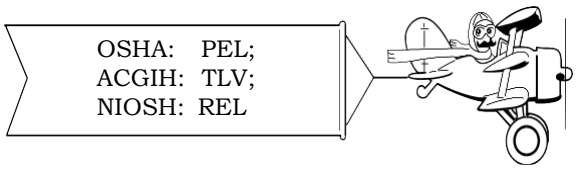
Standards for Exposure

Numerous agencies develop standards for the acceptable levels of chemical exposure that are thought to be safe (i.e., no injury or illness from exposure < limit).

The Occupational Safety and Health Administration (OSHA) has developed legally enforceable maximum exposure levels for hazardous materials called Permissible Exposure Limits (PELs).

The American Conference of Governmental Industrial Hygienists (ACGIH) has set Threshold Limit Values (TLVs) for almost 800 substances. TLV's are recommended maximum exposure levels.

The National Institute for Occupational Safety and Health (NIOSH) works in conjunction with OSHA to develop health and safety standards for substances. These Recommended Exposure Limits (REL) are transmitted to OSHA and the Mine Safety and Health Administration (MSHA).



To make use of these exposure standards, one must conduct air monitoring to determine the concentration of a hazardous material in an employee's breathing zone. It is important not to rely on warning properties to determine if you are being exposed to a dangerous level of a substance. You could easily be exposed to a level of a chemical above the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) before you can smell or taste it. For example, the PEL for benzene is 1 part per million (ppm), but you cannot smell benzene until the concentration reaches 80 ppm (80 times the "safe" level of exposure).

Other Hazards

Carbon Monoxide: Carbon monoxide is an odorless, colorless gas that is produced from the incomplete combustion of fuels (propane, gasoline). Symptoms of exposure include:

- Headaches
- Tightness across chest
- Nausea
- Drowsiness
- Dizziness
- Flushed face
- Fatigue
- Lack of coordination

Steps to take to prevent accidental build-up and exposure:

- Provide adequate ventilation.
- Preventative maintenance (ensure fuel-burning equipment is in prime working order).
- Alert workers to the potential hazards of carbon monoxide.

In the event of overexposure, notify management.

Sulfuric Acid/Hydrogen Gas: Sulfuric acid is commonly used in batteries and drain openers. It is a powerful acid that is very corrosive and emits a pungent odor. If spilled, it can cause violent reactions and hazardous fumes. Under some conditions, acid filled batteries may release flammable hydrogen gas. Some of the symptoms/conditions that may result from a sulfuric acid release and/or exposure include:

- Headaches
- Nausea
- Severe burns to the skin and/or eyes
- Vomiting
- Irritation of the respiratory tract

Compliance for battery recharging areas is outlined under 29CFR1910.178(g)(2). This area should provide adequate ventilation for off gassing batteries, proper personal protective equipment, and an eye wash station.

Blood Borne Pathogens: Blood borne pathogens are microorganisms in the blood that can cause disease. These pathogens include, but are not limited to, the hepatitis B virus (HBV) and the human immunodeficiency virus (HIV).

The regulations that prescribe safeguards to protect workers against health hazards associated with exposure to blood and other body fluids and to reduce risk of exposure are found in the Code of Federal Regulations 29 CFR1910.1030.

Potential exposure situations:

- Janitorial cleanup
- Applying first-aid
- Workplace injuries and accidents

Confined Space: An area “large enough and so configured that an employee can bodily enter and performed assigned work”. The space must “have limited or restricted means for entry or exit”. The space must not be “designed for continuous employee occupancy”.

The potential for a hazard exists when entering small spaces or rooms that are not well ventilated and where chemical vapors are present.

Chemical vapors can be lighter, equal to, or heavier than air. In an enclosed area this can result in the movement or displacement of oxygen to the extent that there may be insufficient oxygen concentrations. The normal atmosphere contains 21 percent oxygen. The physiological effects of reduced oxygen become evident at 16 percent oxygen.

No personnel may enter a confined space with the potential for oxygen levels less than 19.5 % without an air supplied respirator, specialized training, and related safeguards identified in 29 CFR Section 1910.146.

Routes of Entry

Accidental Exposure

With the exception of some radioactive hazards, toxic hazards can only cause harm once they enter your body. For this reason, it is important for you to be aware of the routes for chemical entry into your body. These routes are absorption, inhalation, injection, and ingestion.

Absorption

Many toxic chemicals can be absorbed directly through the skin. Although your skin acts as a natural protection barrier, solvents (such as paint thinners, alcohol and components in adhesives and insecticides) will dissolve the oils in your skin and pass directly through to your blood stream. Your best protection against accidental absorption is to never handle a spilled or leaking container of any kind without appropriate gloves and eye protection. Wash your hands frequently if you are involved in the handling of any hazardous chemicals.

In the event you do spill a chemical on yourself or come in contact with a chemical in some way, wash the area thoroughly. Soap and water are the best response to contamination of the skin. If the area of skin contact is large, or the material is readily absorbed through the skin, clean the area first and then seek medical evaluation.

Absorption exposures could result in the following:

- Skin irritation/dermatitis
- Chemical tissue destruction (burns)
- Systemic poisoning

Inhalation

Exposure can occur while using a product, such as using mineral spirits after painting. Whenever you are exposed to any product with a strong odor that irritates your nose, mouth, or lungs, get away quickly or stop using the product. Not all inhalation hazards cause irritation, however some products like methylene chloride, cause rapid loss of your ability to detect them by odor. You may need to wear personal protective equipment when working with these materials if the area cannot be adequately ventilated.

Acute exposures through inhalation can result in the following:

- Wheezing
- Tightness across chest
- Difficulty breathing
- Coughing
- Systemic poisoning

Ingestion

While it may seem unlikely, ingestion of hazardous chemicals is quite possible. For example, if you do not wash your hands thoroughly after handling chemicals, the chemicals can be transferred from your hands to food and from the food to your mouth. If you handle chemicals, you must wash your hands frequently throughout the day and make a conscious effort to keep your hands away from your mouth.

Acute exposures through ingestion could lead to the following symptoms:

- Nausea
- Stomach cramps
- Diarrhea
- Systemic poisoning

Injection

Although injection with a hazardous material outside of a medical environment is unusual, it is possible. Injection occurs when chemicals to enter the body through punctures, cuts, or other open wounds. Examples include injection by hypodermic needles or getting cut while cleaning up contaminated broken glass.

Acute exposures through injection could result in the following:

- Skin infections
- Blood poisoning
- Systemic poisoning

Learn to recognize the symptoms of accidental exposures to harmful chemicals. If skin rashes, shortness of breath, asthma, or any other abnormal physical or health condition develops immediately after handling hazardous chemicals in the workplace, please let your supervisor know.

Hazardous Material Labeling and Safety Data Sheets

Labels

Manufacturers or distributors must label all chemical containers before the chemical package leaves their facility. The label must include the identity of the hazardous material (name), appropriate hazard statements (including target organs when applicable), and the name, address, and phone number of the chemical manufacturer or other responsible party. These labels must be compliant with the requirements of the regulations of the Occupational Safety and Health Administration (OSHA), and/or the Consumer Product Safety Commission.

The labels on incoming materials should not be changed or removed. If a product enters your facility without proper labeling, notify your supervisor. Materials that do not have labels must not be used until proper labels are obtained, or workplace label is put on the material.

When hazardous materials are transferred from a manufacturer's container into a secondary container, that secondary container must be labeled with a workplace label. The information required on the workplace label includes (1) the product name, and (2) the hazard information relevant to that material. It is essential that the product name on the workplace label be the same as that on the product SDS, allowing the appropriate SDS to be identified should additional information be needed in the future.

Industry often uses one of several labeling systems as the workplace label. These systems include the National Fire Protection Association (NFPA), the Hazardous Material Identification System (HMIS), Consumer Product labeling system, Department of Transportation marking and labeling and GHS labeling.

National Fire Protection Association (NFPA) Labeling System

The National Fire Protection Association has a distinctive labeling system that identifies the hazard class of a material in four ways. The rating system is displayed in a diamond that is divided into four color coded areas (one for each hazard category).

This system shows the level of hazard by using five numbers ranking from "0" to "4". Materials assigned a number "4" are extremely hazardous. A "0" suggests no special hazard. The hazard classes and their related color codes are:

Blue - Health: The capacity of a material, upon contact, to cause personal injury
Red - Flammability: The degree of fire risk associated with a material.
Yellow - Reactivity: The likelihood that a material will react violently with another material
White - Specific Hazard: This could include identification of oxidizers, acids, water reactive materials, or radioactive hazards

The NFPA labeling system is one of the systems used to help employees and emergency responders identify hazards in the facility. All employees should be familiar with NFPA labels and understand the rating system.

An example of NFPA labeling:

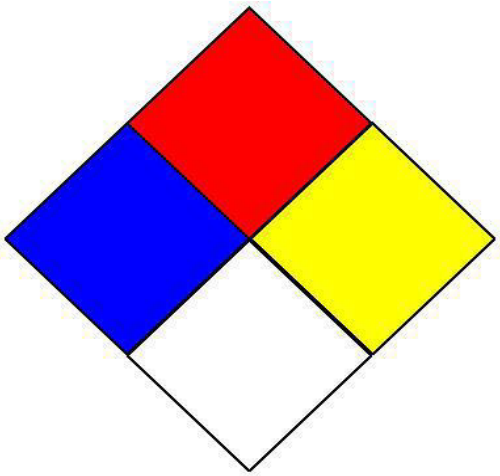
NFPA Rating Explanation Guide

RATING NUMBER	HEALTH HAZARD	FLAMMABILITY HAZARD	INSTABILITY HAZARD
4	Can be lethal	Will vaporize and readily burn at normal temperatures	May explode at normal temperatures and pressures
3	Can cause serious or permanent injury	Can be ignited under almost all ambient temperatures	May explode at high temperature or shock
2	Can cause temporary incapacitiation or residual injury	Must be heated or high ambient temperature to burn	Violent chemical change at high temperatures or pressures
1	Can cause significant irritation	Must be preheated before ignition can occur	Normally stable. High temperatures make unstable
0	No hazard	Will not burn	Stable

RATING SYMBOL	SPECIAL HAZARD
ALK	Alkaline
ACID	Acidic
COR	Corrosive
OX	Oxidizing
☢	Radioactive
W	Reacts violently or explosively with water
W OX	Reacts violently or explosively with water and oxidizing

This chart for reference only - For complete specifications consult the NFPA 704 Standard

NFPA-Chart_1 www.ComplianceSigns.com



HMIS Labeling System

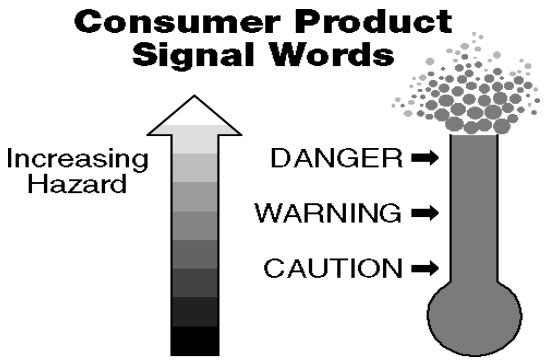
The HMIS system is a proprietary system similar to the National Fire Protection Association system. HMIS stands for Hazardous Material Identification System, and the system uses the same hazard classes and color identification system as the NFPA system. The HMIS system does not use a diamond but lists the classes in a rectangle. The white portion of the HMIS label identifies the required personal protective equipment needed to safely work with the product, using an alphabetic code.

HEALTH *(Blue)*	4. Deadly 3. Extreme Danger 2. Hazardous 1. Slightly Hazardous 0. Normal		
FIRE *(Red)*	4. Below 73 degrees F 3. Below 100 degrees F 2. Below 200 degrees F 1. Above 200 degrees F 0. Will not burn		
REACTIVITY *(Yellow)*	4. Will Detonate 3. Shock and heat may detonate 2. Violent chemical change 1. Unstable if heated 0. Stable		
PERSONAL PROTECTION		**A**	

Consumer Product Signal Words

The Consumer Product Safety Commission has specific labeling requirements for consumer products (those packaged for sale to the general public). The easiest way to recognize a hazardous product is to read the label. Products should be considered hazardous if any of the following words or phrases appear on the container or label:

Danger	Irritant	Flammable	Harmful if inhaled
Harmful if inhaled	Sensitizer	Combustible	May cause irritation
Caution	Reactive	Reactive	Causes eye injury
Hazard	Carcinogen	Poison	Fatal if swallowed
Toxic	Oxidizer	Radioactive	

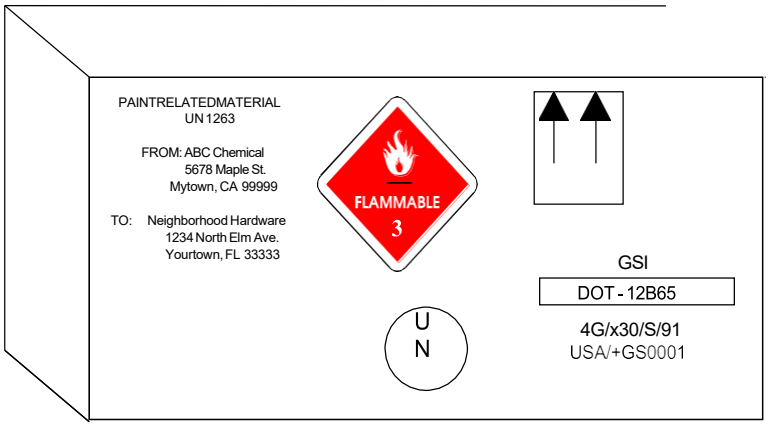


As an employee you should be aware of the various signal words on the different products found in your work area. The signal word “caution” indicates a relatively minor hazard. The signal word “warning” indicates a relatively moderate hazard. The signal word “danger” indicates a relatively severe hazard.

Department of Transportation (DOT)

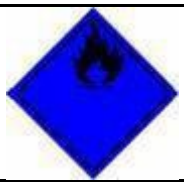
Hazardous materials must be properly packaged, marked, and labeled before being offered for transport. Hazardous materials are typically already packed, marked, and labeled in accordance with federal DOT regulations by the manufacturer prior to being shipped.

It is important to note that DOT labeling alone is not adequate to comply with the Hazard Communication labeling requirements.



Transportation Pictograms

Transport "Pictograms"		
		
Flammable Liquid Flammable Gas Flammable Aerosol	**Flammable solid Self-Reactive**	**Pyrophorics (Spontaneously Combustible) Self-Heating**

		
Substances, which in contact with water, emit flammable gases (Dangerous When Wet)	**Oxidizing Gases Oxidizing Liquids Oxidizing Solids**	**Explosive Divisions 1.1, 1.2, 1.3**
		
Explosive Division 1.4	**Explosive Division 1.5**	**Explosive Division 1.6**
		
Compressed Gases	**Acute Toxicity (Poison): Oral, Dermal, Inhalation**	**Corrosive**

Global Harmonization System (GHS)

This is an example of a GHS label. With GHS standardization coming into effect, you will see similar labels with the GHS pictograms and information. Manufacturers are now required to provide GHS labels on their products.

GHS labels are different then the HMIS and NFPA labeling standards. The rating for the NFPA and HMIS labeling systems identifies a larger number to be a greater risk. The GHS system designates the hazard category/sub-category by identifying the lower number being the higher degrees of risk (decreases with a higher number). Also, these GHS labels will identify additional required information such as: Product Identifier, Pictograms, Supplier Identification, Signal Word, Hazard Statement, and Precautionary Statement(s).

SAMPLE LABEL

CODE _____
Product Name_____

Product Identifier

Company Name_____
Street Address_____
City_____ State_____
Postal Code_____Country_____
Emergency Phone Number_____

Supplier Identification

Hazard Pictograms

Signal Word
Danger

Keep container tightly closed. Store in a cool, well-ventilated place that is locked.
Keep away from heat/sparks/open flame. No smoking.
Only use non-sparking tools.
Use explosion-proof electrical equipment.
Take precautionary measures against static discharge.
Ground and bond container and receiving equipment.
Do not breathe vapors.
Wear protective gloves.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Dispose of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or Carbon Dioxide (CO_2) fire extinguisher to extinguish.

First Aid
If exposed call Poison Center.
If on skin (or hair): Take off immediately any contaminated clothing. Rinse skin with water.

Precautionary Statements

Highly flammable liquid and vapor.
May cause liver and kidney damage.

Hazard Statements

Supplemental Information

Directions for Use
_____
_____
_____

Fill weight:_____ Lot Number:_____
Gross weight:_____ Fill Date:_____
Expiration Date:_____

HCS Pictograms and Hazards

Health Hazard	Flame	Exclamation Mark
		
▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity	▪ Flammables ▪ Pyrophoric ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides	▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)

Gas Cylinder	Corrosion	Exploding Bomb
		
▪ Gases Under Pressure	▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals	▪ Explosives ▪ Self-Reactive ▪ Organic Peroxides
Flame Over Circle	**Environment**	**Skull and Crossbones**
		
▪ Oxidizers	▪ Aquatic Toxicity ***(Non-Mandatory)**	▪ Acute Toxicity (fatal or toxic)

Safety Data Sheets
Safety Data Sheet (SDS) describes the hazards, safe handling, and emergency procedures for each hazardous material in the workplace. OSHA requires that each employee be advised how he or she may obtain an SDS for hazardous materials found in the workplace. The objective is to ensure that all employees are aware of this information and can easily access them when needed.

You have access to an important source of information, a Safety Data Sheet (SDS). SDS's are an integral part of the Hazard Communication Standard.

3E Company maintains a database of SDS for clients and their employees. These SDS's are available by either calling 3E's 24/7 phone number or by accessing the Online System.

The SDS is prepared by the manufacturer and contains detailed information about the product, its potential hazards and proper handling procedures. With the adoption of GHS, the SDS has been standardized into the following 16 sections.

1) Identification
2) Hazard(s) identification
3) Composition/information on ingredients
4) First-aid measures
5) Fire-fighting measures
6) Accidental release measures
7) Handling and storage
8) Exposure controls/personal protection
9) Physical and chemical properties
10) Stability and reactivity
11) Toxicological information

12) Ecological information
13) Disposal consideration
14) Transport information
15) Regulatory information
16) Other information, including date of preparation or last revision

Presence of Hazardous Materials

Becoming familiar with the hazardous materials present in your work area is the best way to protect your safety and health. If you handle hazardous materials, you must follow safety precautions. By following these precautions, you can reduce the risk of accidental exposure and spills.

Once you know which hazardous materials you are working with, you can read labels, review the SDS, and discuss the hazards with your supervisor. The following are some suggestions that may help you determine if hazardous materials are present in your work area:

1) Think about your operations. Do you work with any chemicals?

2) Check containers and boxes for labels. Do they have GHS, DOT, NFPA or consumer warning labels on them?

3) Look for containers that often contain hazardous materials. Such as welding cylinders, solvents, or spray cans.

4) Are incoming or outgoing trucks placarded to carry hazardous materials?

5) Are there flammable cabinets in your work area? Do they contain spray paint, paint removers, or gasoline? These materials can be toxic, as well as flammable.

When storing chemicals, it is important to keep the areas neat and clean. Materials should always be put back when they are not being used. The following storage and handling procedures should always be followed.

1) Maintain chemicals in their proper storage area, flammable cabinet etc.

2) Keep hazardous materials in their proper containers and be sure they have proper labels. If labels become illegible or torn, replace with new label.

3) Keep all incompatible chemicals stored in separate locations. For example, acid and caustic materials should not be stored in the same storage locker.

4) Keep absorbent in areas where there are chemicals used or stored.

5) No smoking or other ignition sources shall be allowed near any flammable or reactive liquids or gases.

6) Never store chemicals in unlabeled or damaged containers.

Handling of Hazardous Materials

1) Never leave containers open, always close containers immediately after use.

2) Never mix any chemicals together unless otherwise specified by the manufacturer.

3) Always handle chemical products carefully.

4) Maintain adequate ventilation in areas where chemicals are used.

5) Follow all instructions, and directions received from supervisors, labels, and SDSs.

6) Use chemicals for their intended purpose only.

7) Notify a supervisor immediately if you notice any spills, damaged containers, or damaged goods.

8) Always wear proper personal protective equipment when using or handling chemicals.

Personal Protective Equipment

Personal Protective Equipment (PPE) is available to help employees protect themselves from the dangers posed by chemicals. There are many types of PPE ranging from fully encapsulating chemically resistant suits to rubber/neoprene gloves designed to keep your hands clean.
Employees must be trained to properly use any PPE, but some types of equipment such as respirators require extensive training with annual refresher training.
Always wear proper personal protective equipment when using or handling chemicals. PPE is designed to prevent or reduce exposure to chemicals.

Conclusion

Review

It is important to understand the following (any questions regarding these items should be discussed with your supervisor):

- Identifying hazardous materials in the workplace
- Being familiar with the Hazard Communication Standard
- Knowing how to obtain a Safety Data Sheet (SDS)
- Knowing how to identify and read warning labels
- Understanding how to minimize exposure to hazardous materials
- Reporting a spill or hazardous material problem to your supervisor immediately

Glossary

Aerosols: Any non-refillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied, or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state. Aerosol includes aerosol dispensers.

Alloy: A metallic material, homogeneous the naked eye, consisting of two or more elements so combined that they cannot be readily separated by mechanical means. Alloys are considered to be mixtures for the purpose of classification under the GHS.

Aspiration: The entry of a liquid or solid chemical product into the trachea and lower respiratory system directly through the oral or nasal cavity, or indirectly from vomiting.

ASTM: the "American Society of Testing and Materials".

BCF: "Bio concentration factor".

BOD/COD: "biochemical oxygen demand/chemical oxygen demand".

Carcinogen: A chemical substance or a mixture of chemical substances which induce cancer or increase its incidence.

CAS RN: "Chemical Abstract Service Reference Number".

Chemical Identity: A name that will uniquely identify a chemical. This can be a name that is in accordance with the nomenclature systems of the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS), or a technical name.

Compressed Gas: A gas which when packaged under pressure is entirely gaseous at -50°C; including all gases with a critical temperature £ -50°C.

Contact Sensitizer: Substance that will induce an allergic response following skin contact. The definition for "contact sensitizer" is equivalent to "skin sensitizer".

Corrosive to Metal: A substance or a mixture which by chemical action will materially damage, or even destroy, metals.

Critical Temperature: The temperature above which a pure gas cannot be liquefied, regardless of the degree of compression.

Dermal Corrosion: see skin corrosion.

Dermal irritation: see skin irritation.

Dissolved Gas: A gas which when packaged under pressure is dissolved in a liquid phase solvent.

EC50: The effective concentration of a substance that causes 50% of the maximum response.

EC Number or (ECN°): Is a reference number used by the European Communities to identify dangerous substances, in particular those registered under EINECS.

End Point: Physical, health and environmental hazards.

ErC50: EC50 in terms of reduction of growth rate.

EU: means "European Union".

Explosive Article: means an article containing one or more explosive substances.

Explosive Substance: means a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not emit gases.

Eye Irritation: The production of changes in the eye following the application of test substance to the front surface of the eye, which are fully reversible within 21 days of application.

Flammable Gas: A gas having a flammable range with air at 20°C and a standard pressure of101.3kPa.

Flammable Liquid: means a liquid having a flash point of not more than 100°F.

Flammable Solid: means a solid which is readily combustible or may cause or contribute to fire through friction.

Flash Point: The lowest temperature (corrected to a standard pressure of 101.3 kPa) at which the application of an ignition source causes the vapors of a liquid to ignite under specified test conditions.

Gas: A substance which (i) at 50 °C has a vapor pressure greater than 300 kPa; or (ii) is completely gaseous at 20 °C at a standard pressure of 101.3 kPa.

GHS: "The Globally Harmonized System of Classification and Labelling of Chemicals".

Hazard Category: The division of criteria within each hazard class, e.g., oral acute toxicity includes five hazard categories and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

Hazard Class: The nature of a physical, health or environmental hazard. E.g., flammable solid, carcinogen, oral acute toxicity.

Hazard Statement: A statement assigned to a hazard class and category that describes the nature of the hazards of a hazardous product, including, where appropriate, the degree of hazard.

IARC: The "International Agency for the Research on Cancer".

IMO: The "International Maritime Organization".

Initial Boiling Point: The temperature of a liquid at which its vapor pressure is equal to the standard pressure (101.3kPa), i.e., the first gas bubble appears.

Label: An appropriate group of written, printed, or graphic information elements concerning a hazardous product, selected as relevant to the target sector(s), that is affixed to, printed on, or attached to the immediate container of a hazardous product, or to the outside packaging of a hazardous product.

Label Element: Information that has been harmonized for use in a label, e.g., pictogram, signal word.

LC50 (50% lethal concentration): The concentration of a chemical in air or of a chemical in water which causes the death of 50% (one-half) of a group of test animals.

LD50: The amount of a chemical, given all at once, which causes the death of 50% (one half) of a group of test animals.

L(E)C50: LC50 or EC50.

Liquefied Gas: A gas which when packaged under pressure, is partially liquid at temperatures above-50°C. A distinction is made between.

(i) High pressure liquefied gas: a gas with a critical temperature between -50°C and+65°C; and
(ii) Low pressure liquefied gas: a gas with a critical temperature above +65°C.

Liquid: A substance or mixture which at 50°C has a vapor pressure of not more than 300kPa (3bar), which is not completely gaseous at 20 °C and at a standard pressure of 101.3kPa, and which has a melting point or initial melting point of 20°C or less at a standard pressure of 101.3 kPa. A viscous substance or mixture for which a specific melting point cannot be determined shall be subjected to the ASTM D 4359-90 test; or to the test for determining fluidity (penetrometer test) prescribed in section 2.3.4 of Annex A of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).

Mixture: a solution composed of two or more substances in which they do not react.

MSDS/SDS: "Material Safety Data Sheet" and in this document is used interchangeably with Safety Data Sheet (SDS). Mutagen means an agent giving rise to an increased occurrence of mutations in populations of cells and /or organisms. Mutation means a permanent change in the amount or structure of the genetic material in a cell.
NOEC means the "no observed effect concentration".

Organic Peroxide: means a liquid or solid organic substance which contains the bivalent -0-0- structure and may be considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulation (mixtures).

Oxidizing Gas: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.

Oxidizing Liquid: A liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.

Oxidizing Solid: A solid which, while in itself not necessarily combustible may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.

Pictogram: A graphical 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.

Precautionary Statement means a phrase (and/or pictogram) that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous product, or improper storage or handling of a hazardous product. Product identifier means the name or number used for a hazardous product on a label or in the SDS. It provides a unique means by which the product user can identify the substance or mixture within the particular use setting (e.g., transport, consumer, or workplace).

Pyrophoric Liquid: A liquid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.

Pyrophoric Solid: A solid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.

Pyrotechnic Article: An article containing one or more pyrotechnic substances.

Pyrotechnic Substance: A substance or mixture of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative, self-sustaining exothermic (heat-related) chemical reactions.

Readily Combustible Solid: A powdered, granular, or pasty substance or mixture which is dangerous if it can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly.

Refrigerated Liquefied Gas: A gas which when packaged is made partially liquid because of its low temperature.

Respiratory Sensitizer: A substance that induces hypersensitivity of the airways following inhalation of the substance.

SDS: "Safety Data Sheet" and in this document is used interchangeably with Material Safety Data Sheet (MSDS).

Self-Accelerating Decomposition Temperature (SADT): means the lowest temperature at which self-accelerating decomposition may occur with substance as packaged.

Self-Heating Substance: means a solid or liquid substance, other than a pyrophoric substance, which, by reaction with air and without energy supply, is liable to self-heat; this substance differs from a pyrophoric substance in that it will ignite only when in large amounts (kilograms) and after long periods of time (hours or days).

Self-Reactive: A thermally unstable liquid or solid substance liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances or mixtures classified under the GHS as explosive, organic peroxides or as oxidizing.

Serious Eye Damage: the production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the front surface of the eye, which is not fully reversible within 21 days of application.

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 GHS uses 'Danger' and 'Warning' as signal words.

Skin Corrosion: The production of irreversible damage to the skin following the application of a test substance for up to 4 hours.

Skin irritation: The production of reversible damage to the skin following the application of a test substance for up to 4 hours.

Skin Sensitizer: A substance that will induce an allergic response following skin contact. The definition for "skin sensitizer" is equivalent to "contact sensitizer".

Solid: A substance or mixture which does not meet the definitions of a liquid or gas.

Substance: Chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities

deriving from the process used but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

Substance which, in contact with water, emits flammable gases: A solid or liquid substance or mixture which, by interaction with water, is liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

Supplemental Label Element: means any additional non-harmonized type of information supplied on the container of a hazardous product that is not required or specified under the GHS. In some cases, this information may be required by other competent authorities or it may be additional information provided at the discretion of the manufacturer/distributor.

Symbol: A graphical element intended to succinctly convey information.

Technical Name: means a name that is generally used in commerce, regulations and codes to identify a substance or mixture, other than the IUPAC or CAS name, and that is recognized by the scientific community. Examples of technical names include those used for complex mixtures (e.g., petroleum fractions or natural products), pesticides (e.g., ISO or ANSI systems), dyestuffs (Color Index system) and minerals.