Elliot Health System

HAZARD COMMUNICATION COURSE

Course Rationale

- Under its Hazard Communication Standard (HCS), 29 CFR 1910.1200, OSHA requires all employers to develop written hazard communication programs.
- The primary goal of the HCS is to ensure the safety of employees who work with hazardous materials.
- This course will give you the information you need to keep safe when working with hazardous materials:
  - Learn about hazardous materials and how they can hurt you
  - Identify your potential for exposure and recognize signs of overexposure
  - Learn how to safeguard against exposure

Two Types of ChemicalHazards

- **Physical hazards** are related to the way that a chemical interacts with other substances or the environment. A chemical that is physically hazardous can harm you by:
  - Exploding
  - Igniting
  - Reacting violently with other substances
- **Health hazards** are related to the way that a chemical interacts with your body. If you are exposed to a chemical hazardous to human health, you could suffer:
  - Death
  - Long-term damage
  - Short-term injury or illness

Physical Hazards: Examples

- Examples of chemicals that are physical hazards include:
  - Cryogenic (very cold) liquids
  - Compressed gas in a cylinder
  - Isopropanol and other alcohols

Health Hazards: Examples

Examples of chemicals that are health hazards include:

- **Lead:** Exposure to lead can cause mental retardation in children.
- **Mercury:** This chemical can cause brain damage, as well as damage to other parts of the body.
- **Formalin:** This chemical is used as a fixative. Ten percent formalin is a carcinogen and severe eye and skin irritant. It can cause instant and irreversible lung damage; dry, flaky skin; and/or allergic reactions.

Health Hazards: Routes of Exposure

You must be exposed to the chemical for it to harm you.

Routes of exposure include:

- Absorption (includes Eyes)
- Inhalation
- Ingestion
- Injection

Routes of Exposure:

Eyes:

- Many chemicals can burn or irritate the eyes. In some cases, chemicals may be absorbed through the eyes and enter the bloodstream.

Skin:

- Some chemicals can burn the skin. Other chemicals may pass through the skin and enter the bloodstream.

Inhalation:

- Inhaled chemicals may:
  - Irritate the nose or throat
  - Damage the lungs
  - Enter the bloodstream through the lungs

Routes of Exposure:

Ingestion:

- You may ingest hazardous chemicals while:
  - Smoking
  - Eating
  - Drinking
- It is never safe to eat, drink or smoke near hazardous chemicals. Always wash your hands after working with hazardous chemicals. Wash your hands before eating, drinking or smoking.

Injection:

- Injection may occur if you are cut with a tool, instrument, or needle that has been contaminated with a chemical.

Health Hazards: Types of Damage

- Toxic chemicals can have local and/or systemic health effects.
- A local effect occurs when the chemical causes damage at the point where it first contacts the body. For example:
  - Eyes
  - Skin
  - Nose
- A systemic effect occurs when the chemical enters the bloodstream and travels throughout the body. The organs most commonly harmed include:
  - Liver
  - Kidneys
  - Heart
  - Brain
  - Reproductive organs

Key Thoughts

- A local effect, such as a chemical burn, can provide warning of exposure, alerting you that you may be at risk for systemic injury.
- Many chemicals, however, do not produce noticeable local effects. Certain toxic gases, for example, can be inhaled without causing irritation or other local effects. Nevertheless, these gases may produce serious systemic effects.

Hazardous Chemicals: Solid

- Solids are not usually hazardous. This is because solid materials are not readily absorbed into the body.
- Certain forms of solids, however, can be highly hazardous. These include:
  - Dust
  - Fume
  - Fibers

Hazardous Chemicals: Solid

- **Dust** – consists of very small solid particles These are suspended in the air. Hazardous dust is created when certain solids are pulverized, or settled dust becomes airborne. Dust can:
  - Be inhaled
  - Enter the bloodstream through the lungs
  - Explode or react violently with other substances. An example of hazardous dust is silica.

Hazardous Chemicals: Solid

- **Fume** – consists of very small, fine solid particles, suspended in the air. Fume is created when solid chemicals (often metals) are heated to very high temperatures. After they evaporate to the gaseous state, they re-solidify. Fume is easily inhaled. Metal fumes can be highly toxic.
- An example of hazardous fume is lead oxide, which can be produced during soldering.

Hazardous Chemicals: Solid

- **Fiber** – A fiber is a long, thin solid particle. Small fibers can be inhaled. Very small fibers can lodge in the lungs and cause damage.
- An example of hazardous fiber is asbestos.

Hazardous Chemicals: Liquid

- Many hazardous chemicals are liquids at normal temperatures and pressures. Hazardous liquids may:
  - Damage the skin
  - Enter the body through the skin
  - Evaporate, forming toxic gases that can be inhaled
- **Mists** – A mist consists of liquid particles produced by agitating or spraying a liquid. Mists can be hazardous if inhaled or sprayed on the skin.

Hazardous Chemicals: Gas

- Gases can be:
  - **Flammable**
  - **Explosive**
  - **Toxic**
- Hazardous gases can be difficult to detect. Many gases do not have a distinctive color or odor.
- **Vapor** – is the gaseous form of a substance that is primarily a liquid at normal temperatures and pressures, but evaporates readily.
  - **For example, alcohol is a liquid at room temperature, but evaporates rapidly to form vapors.**
  - **Vapors can:**
    - Be inhaled
    - Irritate the eyes, skin or respiratory tract
    - Be flammable, explosive, and/or toxic

Summary

Remember:

- Chemicals can have physical and/or health hazards
- Physical hazards are related to the way a chemical interacts with other substances or the environment
- Health hazards are related to the way a chemical interacts with your body
- Routes of exposure to hazardous chemicals include the eyes, the skin, inhalation, ingestion and injection
- Toxic chemicals can have local or systemic health effects
- Hazardous chemicals may be solids, liquids or gases
- Solids are not usually hazardous. Dust, fume, and fibers, however, can be highly hazardous, depending on the material
- Many hazardous chemicals are liquids at normal temperatures and pressures
- Gases can be flammable, explosive and/or toxic

Safety Data Sheets

- The HCS requires that all manufacturers of hazardous materials determine the specific physical and health hazards of their products
- The manufacturer must record all hazard information for the product in a Safety Data Sheet (SDS)
- Finally, the manufacturer (or distributor) is responsible for providing the relevant safety data sheet to those who purchase the product

Format of a Safety Data Sheet

- How to read an SDS

- OSHA's Hazard Communication Standard specifies the information that has to be on the safety data sheet, but no specific format is required. A 16-section format has been developed and is recommended by OSHA.
- See your EOC binder for OSHA Quick Cards on how to read SDS

16 Sections recommended by OSHA:

Identification	Physical and chemical properties
Hazard(s) identification	Stability and reactivity
Composition	Toxicology information
First-aid measures	Ecological information
Fire-fighting measures	Disposal considerations
Accidental release measures	Transport information
Handling & Storage	Regulatory information
Personal Protection	Other Information

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Hazard Communication Safety Data Sheets

The Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets or MSDSs) to communicate the hazards of hazardous chemical products. As of June 1, 2015, the HCS will require new SDSs to be in a uniform format, and include the section numbers, the headings, and associated information under the headings below:

Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

Section 2, Hazard(s) identification includes all hazards regarding the chemical; required label elements.

Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.

Section 4, First-aid measures includes important symptoms/effects, acute, delayed; required treatment.

Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.

Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.

Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.

(Continued on other side)

For more information:

OSHA® Occupational Safety and Health Administration

OSHA 3493-02 2012

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Hazard Communication Safety Data Sheets

Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).

Section 9, Physical and chemical properties lists the chemical's characteristics.

Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.

Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12, Ecological information*
Section 13, Disposal considerations*
Section 14, Transport information*
Section 15, Regulatory information*

Section 16, Other information, includes the date of preparation or last revision.

*Note: Since other Agencies regulate this information, OSHA will not be enforcing Sections 12 through 15 (29 CFR 1910.1200(g)(2)).

Employers must ensure that SDSs are readily accessible to employees.
See Appendix D of 29 CFR 1910.1200 for a detailed description of SDS contents.

For more information:

OSHA® Occupational Safety and Health Administration

OSHA 3493-02-2012

Labeling of Hazardous Chemicals

This lesson will review:

- Who is responsible for labeling hazardous chemicals
- The proper contents of a container label

Container Labels: Manufacturer Responsibilities

- OSHA standards require chemical manufacturers and importers to label all containers of hazardous materials.
- Labels must be written in English.
- A label must include the following information:
  - Product identifier
  - Signal word
  - Hazard statement(s)
  - Pictogram(s)
  - Precautionary statement(s)
  - Name, address, and telephone number of the manufacturer

Container Labels: Product Identifier

- The product identifier on the label should match that used on the SDS.

Container Labels: Signal Word

- The signal word indicates the relative level of the hazard.
  - “Danger” is used for more severe hazard categories
  - “Warning” for less severe.

Sample label pic.JPG - Windows Picture and Fax Viewer

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: _____

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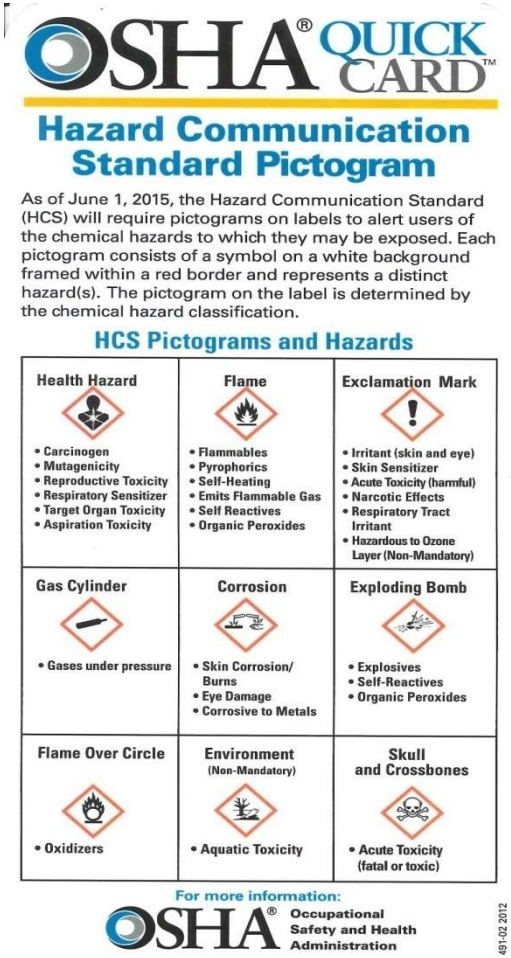
Container Labels: Hazard Statement

- Hazard statements are assigned to a hazard class and category to describe the nature and degree of the hazard.
- Examples include:
  - Fatal if swallowed
  - Toxic if swallowed
  - Harmful if swallowed
  - May be harmful if swallowed

Container Labels: Pictograms

- Nine pictograms are in use. Some are used for more than one class of hazard.
- A label may contain more than one pictogram.
- See also the reference card in your EOC binder.



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Hazard Communication Standard Pictogram

As of June 1, 2015, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

HCS Pictograms and Hazards

Health Hazard	Flame	Exclamation Mark
• Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	• Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self Reactives • Organic Peroxides	• Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • 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-Reactives • Organic Peroxides
Flame Over Circle	**Environment** (Non-Mandatory)	**Skull and Crossbones**
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

For more information:

OSHA® Occupational Safety and Health Administration

491-02 2012

Pictograms

- The “Flame Over Circle” picture is used to identify an oxidizing agent.

Pictograms

- The “Flame” representation is used to identify:
  - Flammable
  - Pyrophorics
  - Self-heating
  - Emits Flammable Gas
  - Self Reactive chemicals
  - Organic Peroxides

Pictograms

- The “Exploding Bomb” pictogram is used to indicate:
  - Explosives
  - Self Reactives
  - Organic Peroxides

Pictograms

- The “Skull and Crossbones” identifies products with the potential for severe, acute toxicity.

Pictograms

- Corrosives are identified by the “Corrosion” pictogram.

Pictograms

- The “Gas Cylinder” picture is used to label gases under pressure.

- This might also be used for liquid nitrogen, a cryogenic material.

Pictograms

- This picture is titled "Health Hazard" and is used to label the following products:
  - Carcinogens
  - Mutagens
  - Reproductive Toxins
  - Respiratory Sensitizers
  - Products with target organ toxicity
  - Products with aspiration toxicity

Pictograms

- The “Exclamation Mark” is used for these properties:
  - Irritant
  - Skin Sensitizer
  - Acute Toxicity (harmful)
  - Narcotic effects
  - Respiratory Tract Irritation
  - Hazardous to Ozone Layer

Pictograms

- The “Environmental” pictogram indicates environmental or aquatic toxicity. Since environmental concerns are outside the scope of OSHA, this pictogram is not mandatory.

Summary

You have completed the lesson on chemical container labeling.

Remember:

- The manufacturer must label all containers in English. The label must contain the product identifier, signal word, hazard statement(s), pictogram(s), precautionary statement(s), and contact information for the manufacturer.
- We must make sure that all chemical containers are labeled properly. Incoming chemicals should be inspected to verify proper labeling. If a chemical is transferred to a new container, the new container must be labeled appropriately.
- Employees must read product labels carefully. Follow all instructions. Heed all warnings.
- The 8 mandatory and 1 optional pictograms are used to identify the class of the hazard.

Personal Protective Equipment

- Responsibilities of EHS and employees, with regard to PPE and the various types of PPE that may be required.

PPE: Purpose

- The purpose of PPE is to shield workers from physical and health workplace hazards. These hazards include:
  - Chemical
  - Radiological
  - Physical
  - Electrical
  - Mechanical
  - Other

PPE: Employer Responsibilities

- We (EHS)are responsible for selecting the types of PPE. We must provide appropriate PPE for all hazards in your work area.
- We must train all workers required to use PPE. We do this through the Department Safety trainer. Training includes :
  - When to use PPE
  - Which types of PPE to use
  - How to put on PPE
  - How to use PPE
  - How to remove PPE
  - How to store and maintain reusable PPE
  - How to dispose of single-use PPE
  - Understanding the limitations of PPE

PPE: Employee Responsibilities

- Trained employees are responsible for following EHS procedures for PPE.
- Reusable PPE should be decontaminated, cleaned and stored after each use.
- Single-use PPE should be disposed according to Department protocol. This is also true for heavily contaminated reusable PPE.

Types of PPE

- Protective clothing may include:
  - Gloves
  - Suits/downs
  - Coveralls
  - Hoods
  - Boots
- Choose a glove material appropriate for the chemical. Latex gloves are permeable to many chemicals. They *do not* provide adequate protection.
- Gowns, coveralls, and other protective clothing should be worn if hazardous chemicals might splash or spill on your clothes.
- Choose protective clothing appropriate for the chemical. Some chemicals require impermeable gowns for adequate protection.

Types of PPE: Respiratory Equipment

- Respirators cover the mouth and nose. They prevent inhalation of hazardous substances. Except for the Decontamination Team, the only respirators used a EHS are N95 respirators.
- Respirators are only effective if:
  - The proper respirator for the chemical/situation is selected.
  - The worker is trained in use of the respirator.
  - The respirator fits properly.
  - The respirator is properly maintained.

Types of PPE: Eye Protection

- Goggles protect the eyes from hazardous chemical splashes.
- Face shields protect the entire face.
- Prescription glasses are not a substitute for goggles. Glasses may break. They also do not shield the eyes from all angles.

Summary

You have completed the lesson on PPE.

Remember:

- EHS must select and provide appropriate PPE for all hazards in the work environment.
- EHS must train workers in the safe and effective use of PPE.
- Trained employees must follow EHS procedures and protocols for the selection, use, storage, maintenance and disposal of PPE.
- Choose protective clothing appropriate for the chemical.
- Use respirators appropriately.
- Use goggles or a face shield when there is a risk of splash or splatter from a hazardous chemical.