

Establishing a Hazardous Materials Program



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What is a hazardous material or waste?

- Any material with properties that cause it to be dangerous or potentially harmful to human health or the environment.
- EPA has a three part list that categorizes certain wastes and materials



EPA categories

- **The F-List** – (non-specific source wastes)
Wastes from common manufacturing and industrial processes, such as solvents that have been used in cleaning or degreasing operations.
- Examples are:
 - carbon tetrachloride,
 - chlorinated fluorocarbons
 - methylene chloride
 - spent solvents and spent solvent mixtures

EPA categories

- **The K-list** – (source-specific wastes) Wastes from specific industries, such as petroleum refining or pesticide manufacturing. Certain sludges and wastewaters from treatment and production processes are examples of “Source Specific Wastes”
- Examples are:
 - Centrifuge and distillation residues
 - Bottom sediment sludge
 - Wastewater treatment sludge

EPA categories

- The P & U-Lists - (discarded commercial chemical products) These lists include specific commercial chemical products in an unused form. For example, some pesticides and pharmaceutical products become hazardous waste when discarded.
- Examples are:
 - Calcium cyanide
 - Carbon disulfide
 - Sodium salt (fluoroacetic acid)



Characteristics of Hazardous materials

- **Ignitability** – a product may be considered hazardous if it has a flash point < than 60 °C (140 °F) and or are spontaneously combustible.
- **Corrosivity** – acids or bases that are capable of corroding metal containers, such as storage tanks, drums, and barrels.
- **Reactivity** – wastes that are unstable under “normal” conditions. Can cause explosions, toxic fumes, gases, or vapors when heated, compressed, or mixed with water.
- **Toxicity** – wastes that are harmful or fatal when ingested or absorbed.

Why do we need to know this information?

- Everyone working around/with hazardous materials has the right And the Responsibility to be aware of the hazards and proper safe work procedures for hazardous materials used or produced in their work area.
- Primary objective is for you to know how and where to find specific hazard information.

The Benefits of a Haz/Mat Program

- Local fire and EMS benefits:



- Allows authorities to know what chemicals are present within their jurisdictions
- Allows authorities to remain proactive
- Gives the authorities an opportunity to teach private business and city departments haz/mat safety

The Benefits of a Haz/Mat Program

- The community benefits:
 - Better served by fire and EMS services
 - Better understanding of how volatile certain agents can be.



Preparation of a hazard communication program

- Labels and other forms of warning:
 1. The type of labeling system we will use is:-----
-----.
 2. The (job title of responsible person) is responsible for ensuring that all incoming containers are labeled.
 3. Each person is responsible for reporting unlabeled containers to-----.

Prepare a written hazard communication program (cont.)

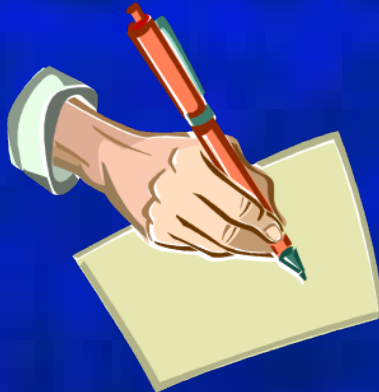
- Material Safety Data Sheets (MSDS)- ensure that all employees are aware of and have access to MSDSs.
- Review haz/mat procedures at monthly/weekly safety meetings.
- All new employees should be fully trained in haz/mat procedures before allowing exposure to any chemicals. Many states require annual refresher training.

Responsibilities

- Determine who is responsible for implementing these procedures in your workplace
- List team members
 - Name/Title
 - Name/Title
 - Name/Title

The importance of listing all known hazardous materials

- Make a list of all chemicals (materials) in the workplace by label identity.
 - Use an inventory worksheet (form in folder)



Labeling Hazardous Materials

- **Container label information should include:**
 - Safe handling/storage procedures
 - Health/physical hazard(s)
 - Primary hazards
 - First aid treatment
 - Manufacturer
 - Identity

Secondary containers

- **Are not** required to be labeled if used immediately by one person.
- Must be labeled if used by **more than one person**.
- Must be labeled if used/left for **more than one shift**.

General hazard classification

- Corrosives (Acids/Bases)
- Toxic
- Flammable liquid
- Oxidizer/reactive
- Compressed gas
- Explosive
- Radioactive
- Carcinogen

Health hazards from the classifications

- **Corrosives/Oxidizers:** injuries to tissue or skin
- **Toxic/flammables/compressed/gasses:** damage to respiratory system
- **Explosives:** over pressure/flying objects
- **Radioactive:** radiation sickness/cancer
- **Carcinogens:** cancer

Hazard Diamond



Hazard classifications



- The system is characterized by the "diamond shape" that is actually a "square-on-point" shape. It identifies the hazards of a material and the degree of severity of the health, flammability, and instability hazards. Hazard severity is indicated by a numerical rating that ranges from **zero (0)** indicating a minimal hazard, to **four (4)** indicating a severe hazard.

Hazard classifications



- The hazards are arranged spatially as follows: health at nine o'clock position, flammability at twelve o'clock position, and instability at three o'clock position. In addition to the spatial orientation that can be used to distinguish the hazards, they are also color-coded as follows: blue for health, red for flammability, and yellow for instability.

Hazard classifications



- The six o'clock position on the symbol represents special hazards and has a white background. The special hazards in use are W, which indicates unusual reactivity with water and is a caution about the use of water in either fire fighting or spill control response, and OX, which indicates that the material is an oxidizer.

Hazard Diamond

- Blue – Identification of Health Hazard

(type of possible injury)

0 = Materials that on exposure and or under fire conditions would offer no hazard beyond that of ordinary combustible material.

1 = Materials that on exposure would cause irritation but only minor residual injury.

2 = Materials that on intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury

3 = Materials that on short exposure could cause serious temporary or residual injury.

4 = Materials that on very short exposure could cause death or major residual injury

Hazard Diamond

- Red – Identification of Flammability

(susceptibility of materials to burning)

0 = Materials that will not burn

1 = Materials that must be preheated before ignition can occur.

2 = Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.

3 = Liquids and solids that can be ignited under almost all ambient temperature conditions.

4 = Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or that are readily dispersed in air and that will burn readily.

Hazard Diamond

- **Yellow – Identification of Reactivity**

(susceptibility to release of energy)

- 0 = Materials that in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.
- 1 = Materials that in themselves are normally stable, but which can become unstable at elevated temperatures and pressures.
- 2 = Materials that readily undergo violent chemical change at elevated temperatures and pressures or which react violently with water or which may form explosive mixtures with water
- 3 = Materials that within themselves are capable of detonation or explosive decomposition or reaction but require a strong initiating source or which must be heated under confinement before initiation or which react explosively with water.
- 4 = Materials that within themselves are readily capable of detonation or explosive decomposition or reaction at normal temperatures and pressures.

General definitions

- **Acids** – A corrosive chemical that proteinizes upon contact with body tissue and causes immediate pain.
- **Bases** – A corrosive chemical that does not proteinize upon contact with the body tissue and does not cause immediate pain.
- **Chemical** – Any element, chemical compound or mixture of elements/or compounds.

General definitions

- **Container** – Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank or anything of the like that contains hazardous chemicals.
- **Corrosive** – Any chemical or substance that by direct chemical action is injurious to body tissue or erodes metal.
- **Hazard warning** – Any words, pictures, symbols or combinations thereof appearing on a label or other appropriate form of warning which convey hazards the of the chemical(s) in the container(s).

General definitions

- **Hazardous warning** – Any chemical which is a physical or health hazard.
- **Identity** – Means any chemical or common name which is indicated on the material safety data sheet (MSDS) for the chemical. The identity used shall permit cross-references to be made among the required list of hazardous chemicals, the label, and the MSDS.
- **Label** – Any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

General definitions

- **Material safety data sheets (MSDS)** – Written or printed material from the manufacturer prepared in accordance with the OSHA 29 CFR 1910.1200. standard.
- **Oxidizer reactive** – any chemical that increases the burning rate of material yielding oxygen or other oxidizing gas; or enters into a violent reaction during which the spontaneous liberations of heat/gas is too rapid to be safely dissipated.
- **Physical hazard** – a chemical for which there is scientifically valid evidence to show that it is combustible, explosive, flammable, an organic peroxide, oxidizer, pyrophoric, unstable (reactive), or water reactive.

General definitions

- **Toxic** – Any chemical which when ingested, inhaled, absorbed, applied to, injected into or developed within the body in relatively small amounts, may cause damage to structure and otherwise disturb the body's functions.
- **Mode of entry** – commonly, toxic materials contact the skin, enter respiratory tract/digestive system.

General definitions

- Physical condition – are you ill? Has your body been damaged by a previous assault?
- Dose – How much of the chemical was absorbed by your body?
- Duration - how long were you exposed to the chemical?
- Sensitivity – How sensitive are you to the chemical?

Establish a protocol for hazard determination

- Prepare a written determination program which describes the procedures used to determine the hazards of the chemicals produced or imported
- There are numerous resources available that can assist the hazard determination process:
 - 29 CFR part 1910, subpart Z - Toxic and hazardous substances
 - Threshold Limit Values (TLVs) for Chemical Substances, and Physical Agents in the Work Environment, American Conference of Government Industrial Hygienists (ACGIH latest edition)

Establish a protocol for hazard determination (cont.)

- National Toxicology Program (NTP) Annual Report on Carcinogens – latest edition
- International Agency for Research on Cancer (IARC) Monographs latest edition

Establish a protocol for hazard determination (cont.)

- Add to the inventory worksheet chemicals (materials) produced in your workplace
 - Examples: Carbon monoxide and or other combustion processes
 - Welding fumes
 - Wood dust
 - Compressed air
 - Asbestos from pipes and ceilings, walls, floors, etc...

Determining which chemicals are not hazardous

- **Always assume that a chemical is hazardous**
- **However, some MSDSs have a direct statement telling you if a material is hazardous or not**
 - Consider that a material is hazardous if it is flammable, a combustible liquid, a compressed gas, an explosive, an organic peroxide, an oxidizer, pyrophoric, or water reactive

Material safety data sheets (MSDS)

29 CFR 1910.1200. Standard

- A written description prepared by a chemical's manufacturer or importer to provide detailed information about the chemical's characteristics, potential hazards and methods for safe use, handling, and storage of the material.

Maintaining safety data sheets

- Obtain current material safety data sheets (MSDS) from suppliers for all chemicals
 - MSDS are now required to be given upon initial shipment of any haz/mat or update of a chemical
 - You need not acquire MSDSs for chemicals that meet all of the following requirements:
 1. They are consumer products
 2. They are used for the purpose intended by the manufacturer
 3. They are not used more frequently, or for longer periods of time, than a consumer uses them

Material safety data sheets

- **Answer a series of four critical questions:**
 1. What is the material and what do I need to know about it?
 2. What should I do if a hazardous situation should occur?
 3. How can I prevent hazardous situations from occurring?
 4. Is there any other useful information about this chemical?

Outline of MSDS

- Section I Identification of Product
- Section II Hazardous Ingredients
- Section III Physical Data
- Section IV Fire and Explosion Hazard Data
- Section V Health Hazards
- Section VI Reactivity Data
- Section VII Spill and Disposal Procedures
- Section VIII Protection Information
- Section IX Handling and Storage Precautions
- Section X Miscellaneous Information

Signs and symptoms of exposure

- Employees should also be comprehensively trained in the bodily effects of chemicals.
- Employees need to know signs of exposure. Should know both short and long term effects of each chemical in there workplace.

Signs and symptoms of exposure

- **Always consider routes of entry and length of exposure**
 - External signs and symptoms:
 - Redness
 - Swelling
 - Itching/skin irritation/sensitization
 - Inexplicable pain

Signs and symptoms of exposure

- **Always consider routes of entry and length of exposure**
 - Internal signs and symptoms:
 - Nausea
 - Lightheadedness
 - Headaches
 - Difficulty breathing
 - Heart palpitations

Signs and symptoms of exposure

- Signs of exposure:
 - Dizziness, light headedness, headache, drowsiness
 - Irritation to eyes, nose, throat, lungs
 - Dermatitis, burns
 - Sick to stomach, nausea, vomiting
 - Fever, unconsciousness, death, affixation

Signs and symptoms of exposure

- **Employees should know the organs of the body that certain chemicals will affect.**
- **Damage to: (mostly short term/normally immediately recognizable)**
 - Eyes, nerves, muscles
 - Skin, kidneys, other organs
 - Lungs, bones, skin irritation/sensitization
 - Heart,
 - Blood

Signs and symptoms of exposure

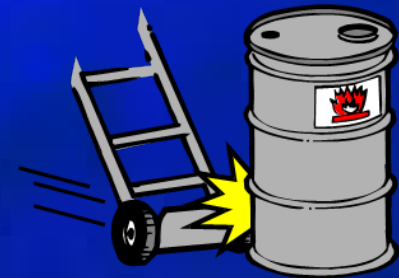
- **Employees should know the organs of the body that certain chemicals will affect.**
- **Disease caused by exposure: (mostly long term/not immediately recognized)**
 - Cancer
 - Death
 - Birth defects
 - Reproductive effects

Signs and symptoms of exposure

- Knowing signs and symptoms could save some ones life.
- Very beneficial to EMS to know type of call they may be responding to.

Proper chemical storage

- Purchase only quantities that can be used in a reasonably short time
- Limit amounts kept in labs/work areas
- Store according to chemical classification
- **DO NOT** store in alphabetical order
- Store in closed cabinets
- Store chemicals close to the floor



Proper chemical storage (cont.)

- If stored on shelves, keep chemicals to the rear of shelves
- DO NOT store inside hoods
- If not being used, Get Rid Of It!

Accidental spills

- Who do we call?
- What information should I have ready?
 - Your name
 - Where the spill is
 - Type of chemical spilled
 - When was it spilled
 - Your phone number
 - Your room number
- Remain in a safe area for instructions and decontamination if necessary

Summary

- Defined hazardous waste/material
- Considered a few characteristics of haz/mat and benefits of program
- LIMITED preparation of a haz/mat communication program
- Haz/mat labeling and hazard diamond
- Preparation of a hazard determination protocol

Summary

- Basics of MSDSs
- Basic symptoms of exposure
- Chemical storage tips

Resources

- TOSHA website
- EPA website
- RCRA website

