Washington State Department of
Labor & Industries

Hazard Communication

WAC 296-800-170

Developed by the Division of Occupational Safety & Health (DOSH) for employee training

Meeting DOSH Training Requirements

This training module gives basic information on hazard communication as outlined in the Hazard Communication Rule – WAC 296-800-170.

To fully meet the training requirements for Hazard Communication, you must also include information specific to your worksite as indicated in Slides # 36, 37, 45 , 46 and 51 of this training module.

Preview this program and include your specific workplace information before conducting the training.

It is recommended you keep an attendance roster for your records to document training.

How to use this PowerPoint Program

Users with PowerPoint can download, edit, and use the program for training with a laptop and projector.

Additional information is found in the Notes section of this presentation. You can read the text in quotations or use your own words.

If you want to print out this program, the PDF file uses less computer memory and prints faster.

Hazard Communication

This training will cover the following:

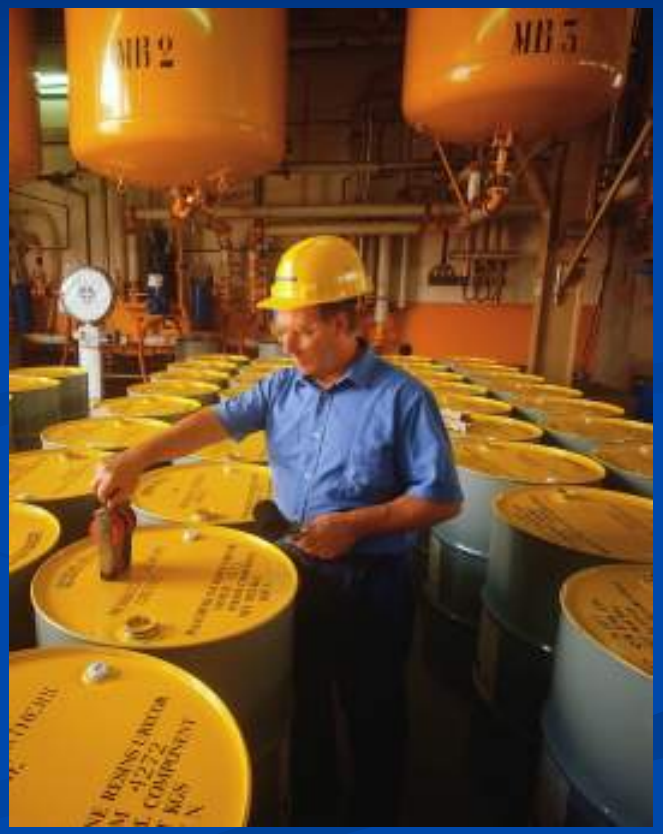
- What are hazardous chemicals,
- how hazardous chemicals affect the body,
- what are the different types of hazardous chemicals,
- what is on product labels,
- what are material safety data sheets,
- how to protect yourself from hazardous chemicals.

What is hazard communication?

Hazard communication or "hazcom" is our program where we tell you about the hazardous chemicals used in our workplace.

We will also train you on how to protect yourself from the effects of these hazardous chemicals.

Hazcom training is required by L & I - DOSH.

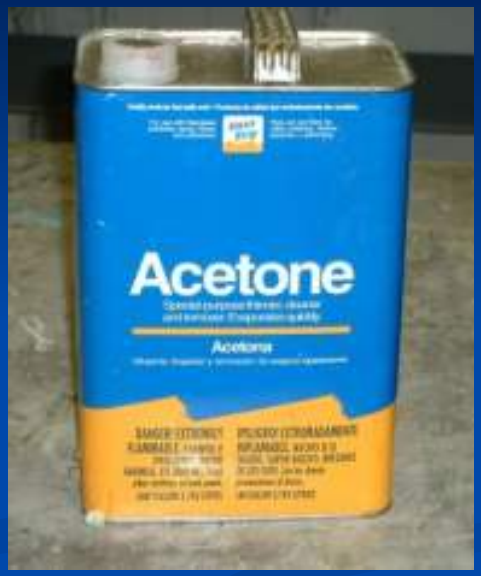


What is a “hazardous chemical”?

A hazardous chemical is any chemical that can do harm to your body.

Most industrial chemicals can harm you at some level.

It depends how much gets into your body.



How do hazardous chemicals affect the body?

It depends on several factors:

How the chemical enters the body

The physical form of the chemical

The amount of chemical that actually enters the body - the dose

How toxic (poisonous) the chemical is

How Chemicals Enter the Body

There Are Three Routes of Entry:

Ingestion – swallowing the chemical

Inhalation – breathing in the chemical

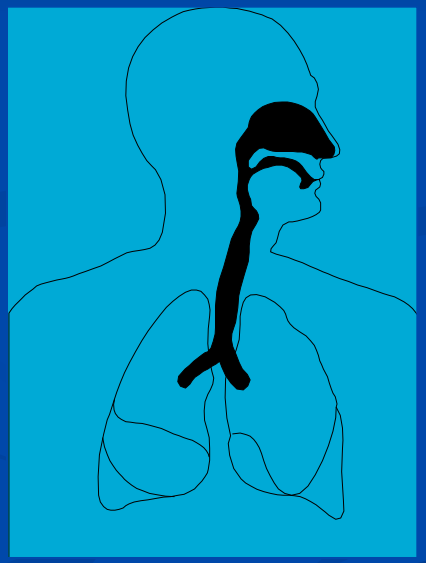
Absorption – the chemical soaks through the skin

Inhalation (Breathing)

Chemicals in the air are breathed in through the mouth or nose.

Gases & vapors are absorbed through the lungs directly into the bloodstream.

The size of dust particles or mist droplets can affect where the chemical settles in the respiratory tract.



Skin Absorption

Some chemicals can pass through the skin into the body.

These chemicals can then cause various health effects.

Ingestion (Swallowing)

Chemicals that are swallowed are absorbed in the digestive tract.

Chemicals can rub off dirty hands and contaminate food, drinks or tobacco products.

Chemicals in the air can settle on food or drink and be swallowed.

The Three Forms of Chemicals

All chemicals exists in one of three forms:

Solid

Gas

Liquid

Hazardous Chemicals - Dusts

Some chemicals are solids in the form of powders or dust.

Dust can be released into the air by cutting, drilling, grinding or sanding.

Dust can also be stirred up by dry sweeping and inhaled.

Hazardous Chemicals - Dust

Dust in the air can settle out on work surfaces, cups, plates, utensils, and food.

The settled dust can be swallowed with food or drinks.

If the dust is hazardous, it can cause health problems.

Solids – Fumes and Fibers

Fumes are extremely small droplets of metal formed when the metal has been vaporized by high temperatures (usually welding)

Some solids are fibers which can be similar to dusts but they have an elongated shape (like asbestos or fiberglass)

Hazardous Chemicals - Liquids

Liquid chemicals in direct contact with the skin can cause skin problems.

Some liquids can be absorbed into the body through the skin.

Liquids can be sprayed and form mists or evaporate and form vapors which can be inhaled.

Liquids (Mists)

Mists can also be inhaled.

Mists can settle on the skin and be absorbed into the body.

Airborne mists can also settle out and contaminate food or drink.

Gases and Vapors

Gases are chemicals that are in the gas phase at room temperature.

Vapors evaporate from substances that are liquids or solids at room temperature.

Gases and vapors enter the body by inhalation.

Toxicity: how poisonous are chemicals?

Dose - The effects of any toxic chemical depends on the amount of a chemical that actually enters the body.

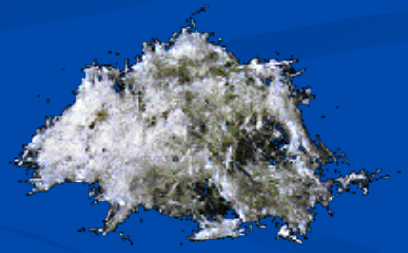
Acute Toxicity - the measure of how toxic a chemical is in a single dose over a short period of time.

Chronic Toxicity – the measure of the toxicity of exposure to a chemical over a long period of time.

Chronic Toxicity and Acute Toxicity

Some chemicals will only make you sick if you get an ‘acute” or high dose all at once. Example – ammonia

Some chemicals are mainly known for their chronic or long-term effects. Example – asbestos



Most chemicals have both acute and chronic effects. Example – carbon monoxide

Chemical Exposure Limits

Many chemicals have exposure limits, or allowable amounts of a chemical in the air.

These limits are often called "Permissible Exposure Limits" or "Threshold Limit Values".

They are based on 8-hour average exposure or ceiling or peak levels.

Levels must be kept below these limits for safety.

Carcinogens

Carcinogens are cancer-causing compounds.

Some chemicals are known human carcinogens, others are only suspected as carcinogens.

DOSH has regulations covering the general use of carcinogens, and has specific regulations for several known human carcinogens.

Carcinogens

DOSH has specific regulations on the following carcinogens:

- Vinyl Chloride
- Acrylonitrile
- 1,2,-Dibromo-3-chloropropane (DBCP)
- Arsenic
- Ethylene Oxide
- Cadmium
- Butadiene
- Methylene Chloride
- Benzene
- Hexavalent Chromium

Other Groups of Toxic Chemicals

Teratogens

Teratogens are compounds that can harm the developing fetus, causing birth defects or death.

Mutagens

Mutagens cause genetic mutations or changes. These mutations can cause birth defects or other problems in following generations or may lead to cancer in the exposed person.

Other Groups of Toxic Chemicals

Sensitizers

Sensitizers can “switch on” a reaction in an individual worker.

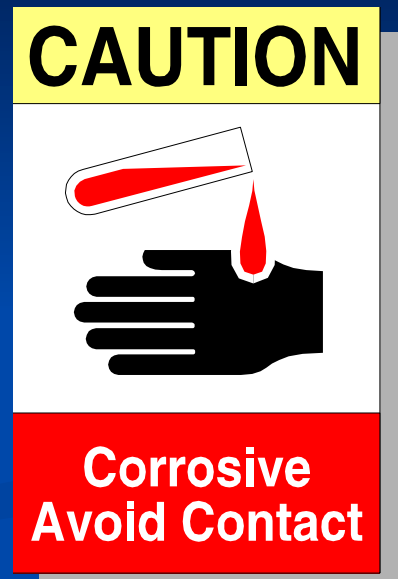
The reaction to a sensitizer depends upon the individual worker.

Once a worker becomes sensitized to a compound, smaller and smaller exposures can cause a reaction, and the reactions can become more severe.

Corrosive Chemicals

Acids and bases (caustics) are common corrosive chemicals.

Corrosive chemicals are capable of damaging eyes, skin and the respiratory system.



Corrosive Chemicals - Skin

Corrosives can cause visible skin burns or damage.

The extent of skin damage depends on how long the corrosive is on the skin and how concentrated the corrosive is.

Corrosive Chemicals - Inhalation and Eyes

Inhalation of corrosive mists or vapors can cause severe bronchial irritation.

Corrosives are especially damaging to the eyes.

Examples of Corrosive Chemicals

Sulfuric Acid

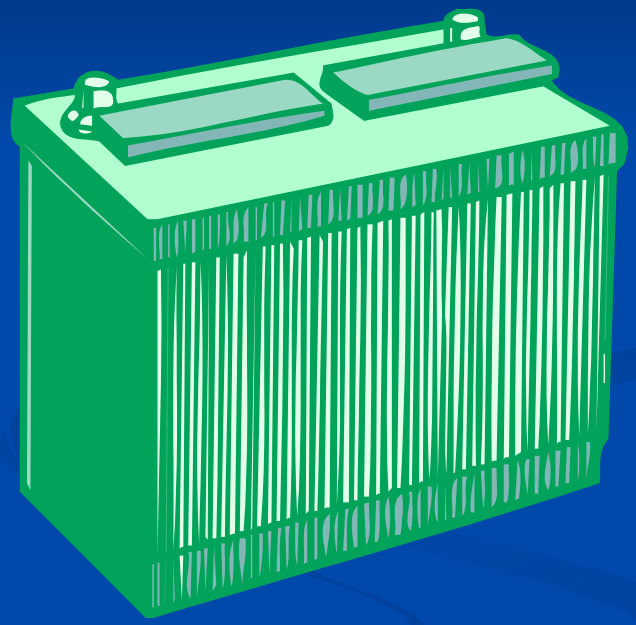
Ammonia

Chromic acid

Lye

Acetic Acid

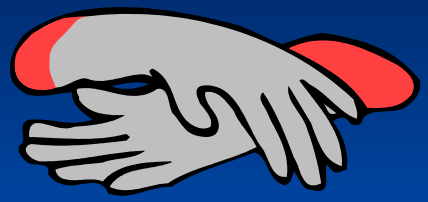
Chlorine



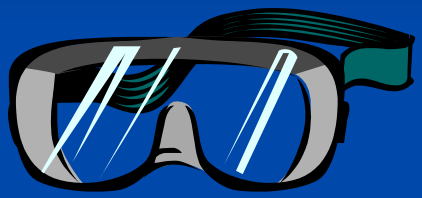
Batteries contain sulfuric acid

Protection from Corrosives

Protective gloves & clothing



Goggles



Eyewashes

Water (for splashes on the skin)

Properties of Flammable Liquids

The vapor of a flammable liquid ignites and causes fire or explosion – not the liquid itself.

The flammability of a liquid depends on its physical properties:

- Vapor Pressure
- Flash Point
- Limits of Flammability
- Vapor Density

Flammable Liquids –Vapor Pressure

Vapor pressure is a measure of how fast a liquid evaporates.

The higher the vapor pressure the more rapidly the liquid will evaporate.

Vapor pressure goes up and down with the temperature of the liquid.

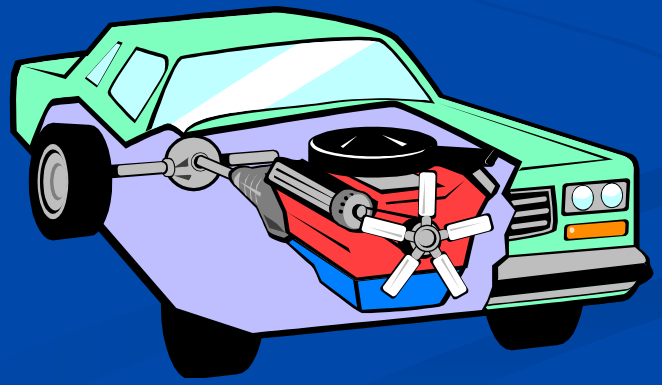
Flammable Liquids - Flashpoint

The flash point is the lowest temperature that a flammable liquid can generate enough vapor to form a mixture with air that will ignite.

Limits of Flammability

The limits of flammability is the range that a mixture of air and vapor is flammable.

Mixtures can be too lean (not enough vapor) or too rich (too much vapor) to ignite and burn.



Flammable Limits Example

Methane

LFL = Lower flammable limit UFL = Upper flammable limit

Flammable Liquids
Lower Flammable Limit (LFL)

In most work situations, the "lower flammable limit" (LFL) is the main concern.

Vapors from flammable liquids can be found in the workplace, but are often too diluted to catch fire or explode.

However, these vapors can quickly go above the LFL in small room or confined space like a tank.

Flammable Liquids - Vapor Density

"Vapor density" is a measure of how heavy a vapor is compared to air.

Vapors with a density greater than air can flow like a liquid collect near the floor.

This may create a fire or explosion hazard if the vapor flows to an ignition source.

Hazards of Metals

Metals can be both physical hazards and health hazards.

Some metals can ignite and explode – magnesium, or dusts/ filings of other metals such as aluminum

Some metals are almost non-toxic – iron, aluminum

Others are very toxic – mercury, lead, cadmium, beryllium

Training Break

This slide can be used to take a break or divide this training into two sessions.

Our Worksite Information

The following operations or work areas is where hazardous chemicals are present:

[List where hazardous chemicals are used]

Our Worksite Information

The following products are used at:

[list products and where used here]

How do you get information about hazardous chemicals?

You can get information two ways:

from the product label,

from the product material safety data sheet.

What is on the product label?

- The manufacturer,
- The name of the product,
- a hazard warning,
- a list of hazardous ingredients

What is a material safety data sheet?

Material safety data sheets or "MSDSs" are information sheets on products that:

- tells what chemicals are in the product,
- what the hazards of the chemicals are,
- how to protect yourself from the hazards.

Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET

Trade Name: **ACETONE**

Chemical Family: Acetone

Formula: C3 H6 O

Manufacturer: **Supplier:**

Emergency Phone #'s

Transportation EMG. Phone #'s CANUTEC

HAZARDOUS INGREDIENTS

ACETONE: 99% CAS # 67-64-1
Exposure limits, PPM : OSHA-PEL 750 , ACGIH - TLV 750
LD50 Orla rat 9750 MG/KG , Skin rabbit 20 G/KG, LC50 rat 16000 PPM

PHYSICAL DATA

Appearance & Odor: Clear colorless liquid, sweet odor
Vapor pressure: MM HG/20 DEG. c :184
Vapor density: (AIR 1) 2.0
Solubility in water: 100%
Specific gravity: (Water = 1) 0.79

FIRE AND EXPLOSION DATA

Flashpoint & Method 0% F (TCC)
Flammable Limits: LFL 2.0 , UFL 13.0
Extinguishing Media: water spray, dry chemical, CO_2, alcohol foam
Special equip. & procedures: Self contained breathing apparatus & complete protective clothing. Acetone is extremely flammable, any source of ignition will ignite it. Vapor is extremely explosive.

REACTIVITY DATA

Conditions Contributing to Instability: Heat, Sparks & Open Flame
Incompatible Substances: Acids, Oxidizing materials, Alkalis, Amines, Potassium T-Butoxide, Alkanolamines, Ammonia, Aldehydes, Chlorinated compounds.
Hazardous Decomposition Products: Carbon Monoxide, Carbon Dioxide
Hazardous Polymerization: will not occur.

MATERIAL SAFETY DATA SHEET

HEALTH HAZARDS DATA

NOTE: Health studies have shown that exposure to chemicals pose potential risks which may vary from person to person. Exposure to liquids, vapors, mists or fumes should be minimized.

PRINCIPAL HEALTH HAZARDS

Skin contact: contact will dry skin, irritate skin , dermatitis
Eye contact: irritation and may burn eye
Ingestion: large quantities causes headaches, nausea, vomiting. Can also cause liver and kidney damage.
Inhalation: may cause headaches, nausea, vomiting, dizziness, other central nervous system effects, (ie. convulsions)

FIRST AID PROCEDURES

Skin: Avoid direct contact with this chemical, wash with soap and water, seek medical attention if a rash persists.
Eyes: Flush with warm water for 20 minutes, obtain medical attention immediately.

Ingestion: If conscious, **immediately induce vomiting** by giving 2 glasses of water and sticking a finger down the throat. Get medical attention immediately.
Inhalation: Remove to fresh air. Give A/R if not breathing, get immediate medical attention.

PREVENTATIVE MEASURES

Skin: Wear impervious gloves (butyl rubber), coveralls and safety footwear.
Eyes: Chemical proof goggles or full face respirator if vapors cause eye discomfort.
Ingestion: Wash thoroughly before consuming food stuffs.
Inhalation: Use only in well ventilated areas or use NIOSH approved respiratory protection with organic vapor cartridges.

CONTROL MEASURES AND PRECAUTIONS

Keep container tightly closed. **DO NOT** consume food, drink or tobacco in work or material storage areas. **Flame or any source of ignition is to be kept away from this product.** Use caution and personal cleanliness to avoid skin and eye contact. Avoid breathing vapors.

SPILL, LEAK AND DISPOSAL METHODS

** **Review Fire and Explosion Hazards and Safety Precautions before proceeding with cleanup.** Restrict access to area. Remove all sources of ignition and ventilate area. Absorb spill with an absorbent material such as vermiculite or

MSDSs – what information do they have?

Names of hazardous chemicals in a product,

Acetone

Physical and chemical properties of the product,

Flammable & highly volatile

Physical hazards of working with the product,

Burns

Health hazards of working with the product (including signs and symptoms of overexposures),

Headaches, eye irritation

Material safety data sheets (continued)

The main way the chemical enters the body,	Inhalation
The legal limit allowed in the air	750 ppm
If the chemical is a carcinogen	No
Precautions for safe use of the hazardous chemical,	Use with adequate ventilation, keep away from open flame

Material safety data sheets (continued)

Exposure control methods, including personal protective equipment,	Wear respirator, rubber gloves
Emergency and first aid procedures,	Eyes: flush with water for 15 minutes
The date the MSDS was prepared or revised,	1996
Name, address and phone number of the person responsible for the information in the MSDS.	John Doe 1234 Maple St. Anywhere, USA

Our Worksite Information

Material Safety Data Sheets are located in the following locations, or contact [name] to see MSDSs

Our Worksite Information

We have done air sampling in the following locations:

Results of this air sampling can be found at the following location:

You can protect yourself from hazardous chemicals by:

Knowing what is in the product your work with,

Using the smallest amount of a chemical to do the job,

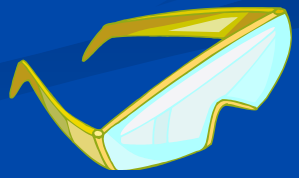
Maintaining machinery and equipment to prevent leaks or releases,

Protect yourself from hazardous chemicals by:

Using available ventilation to reduce amounts of chemicals in the air,

Keeping lids, doors or covers closed on chemical processes,

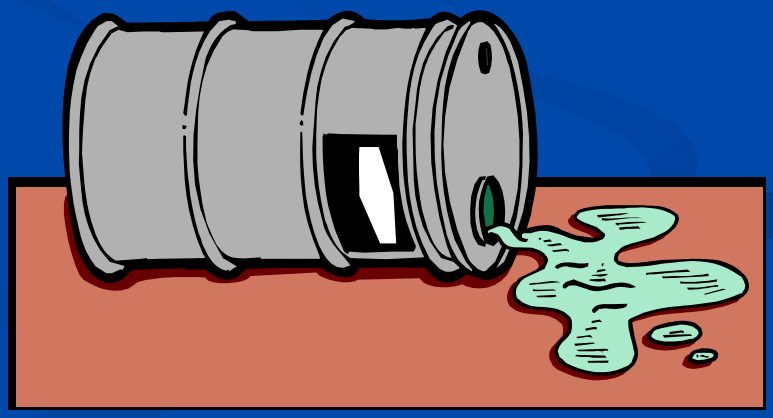
Wearing necessary personal protective equipment.



In the case of a leak or spill, protect yourself by:

Informing your supervisor of unusual odors, spills, or releases,

Leaving an area of a large spill or chemical release.



If you have been exposed to a chemical and feel sick:

Let your supervisor know,

Find out what the chemical was,

Follow the first aid directions in the MSDS,

Get medical attention as needed,

Check your PPE before going back to the area.

Our Worksite Information

Methods, equipment and work practices we have to protect you from chemical exposure:

Hazard Communication Quiz

The following questions are optional. They can be used to check your employees understanding of this training and promote discussion. You can add more questions for a short written or verbal quiz.

Question 1

What are the three routes of entry of chemicals into the body?

a) Ears, eyes and mouth

b) nose, mouth and skin

c) swallowing, inhaling and drinking

d) ingestion, inhalation and absorption

Question 2

What is acute toxicity of a chemical?

a) a good-looking chemical

b) the chemical is toxic only if you drink it

c) the chemical will harm you only after years of exposure

d) the chemical can harm you in a single dose over a short period of time

Question 3

When is a chemical vapor flammable?

a) Only if it is really hot

b) Only when the amount is above the UEL

c) When the amount in the air is above the LEL

d) Whenever there is an open flame

Question 4

How can you find out what chemical is in a product we use?

a) Ask your supervisor

b) Look on the label

c) Read the MSDS

d) ask your co-worker

Question 5

What should you do if there is a large chemical spill in your work area?

a) Run out of the building

b) Leave the area and inform your supervisor and coworkers

c) Clean it up right away

d) Call 911