

## Hazard Communication

WAC 296-800-170



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

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## 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.

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## 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.

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## 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.

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## 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.



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## 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.



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## 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



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## 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



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## 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.



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## Skin Absorption

Some chemicals can pass through the skin into the body.



These chemicals can then cause various health effects.



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## 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.

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## The Three Forms of Chemicals

All chemicals exist in one of three forms:

Solid



Gas



Liquid



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## 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.



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## 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.



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## 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)



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## 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.



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## 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.



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## 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.



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## 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.



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## 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**



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## 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.



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## 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.



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## 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

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## 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.



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## 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.



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## Corrosive Chemicals

Acids and bases (caustics) are common corrosive chemicals.

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



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## 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.



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## Corrosive Chemicals - Inhalation and Eyes

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



Corrosives are especially damaging to the eyes.



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## Examples of Corrosive Chemicals

Sulfuric Acid

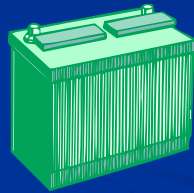
Ammonia

Chromic acid

Lye

Acetic Acid

Chlorine



Batteries contain sulfuric acid

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## Protection from Corrosives

Protective gloves & clothing



Goggles



Eyewashes



Water (for splashes on the skin)



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## 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



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## 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.



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## 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.



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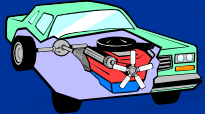
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## Limits of Flammability

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.



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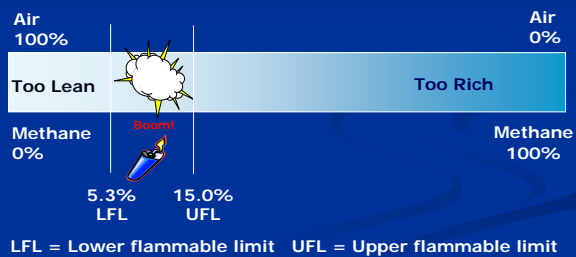
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## Flammable Limits Example

### Methane



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## 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.

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## 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.



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## 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



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## Training Break

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

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### Our Worksite Information



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

[List where hazardous chemicals are used]

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### Our Worksite Information



The following products are used at:

[list products and where used here]

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### 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.



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## What is on the product label?

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



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## 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.



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## Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET	
Trade Name: ACETONE	
Chemical Family: Acetone	
Formula: C <sub>3</sub> H <sub>6</sub> O	
Manufacturer:	Supplier:
Emergency Phone #:	
Transportation EMC: Flammable Liquid	
<b>HAZARDOUS INGREDIENTS</b>	
ACETONE: 99% CAS # 67-64-1	
Exposure Limits: OSHA: 1000 PPM; ACGIH: TLV 500	
LC50: 0.5 ml/kg (MORG); Skin: 100 mg/kg (LD50) rat 10000 PPM	
<b>PHYSICAL DATA</b>	
Appearance & Color: Clear colorless liquid, non-toxic	
Vapor pressure: 240 mm Hg @ 20°C (68°F)	
Boiling point: 56°C (133°F)	
Melting point: -94.8°C (-138.6°F)	
<b>FIRE AND EXPLOSION DATA</b>	
Flash point: 10°C (50°F)	
Auto-ignition: 460°C (860°F)	
Explosion limits: 2.5% - 13% (LFL, UFL)	
Oxidizing: None	
Corrosive: None	
Incompatible: None	
Stability: Stable under normal conditions	
Reactivity: None	
Hazardous decomposition products: Carbon monoxide, Carbon dioxide	
Hazardous polymerization: None	
<b>HEALTH HAZARD DATA</b>	
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.	
<b>CHRONIC HEALTH HAZARDS</b>	
Irritation: Contact with dry skin, irritate skin, dermatitis	
Eye irritation: Irritation and may burn eyes	
Respiratory: Large quantities cause headaches, nausea, vomiting. Can also irritate nose and induce dizziness.	
Inhalation: May cause headaches, nausea, vomiting, dizziness, other central nervous system effects. (In concentrations)	
<b>FIRST AID PROCEDURES</b>	
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.	
Inhalation: If irritation, immediately induce vomiting by giving 2 glasses of water and sticking a finger down the throat. Get medical attention immediately.	
Ingestion: Remove to fresh air. Give AIR if not breathing, get immediate medical attention.	
<b>PREVENTATIVE MEASURES</b>	
Skin: Wear impervious gloves (butyl rubber, nitrile) and safety footwear.	
Eyes: Chemical proof goggles or full face respirator if vapors cause eye irritation.	
Respiratory: Wash thoroughly before consuming food stuffs.	
Inhalation: Use only in well-ventilated areas or use NIOSH approved respiratory protection with organic vapor cartridges.	
<b>CONTROL MEASURES AND PRECAUTIONS</b>	
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.	
<b>SPILL, LEAK AND DISPOSAL METHODS</b>	
Review Fire and Explosion Hazards and Safety Precautions before proceeding with cleanup. Shielded access to areas. Remove all sources of ignition and ventilation areas. Absorb spill with an absorbent material such as vermiculite or	

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## 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

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## 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

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## 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

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## Our Worksite Information



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

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## Our Worksite Information



We have done air sampling in the following locations:



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

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## 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,



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## 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.



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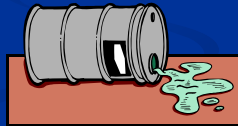
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## In the case of a leak or spill, protect yourself by:

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



Leaving an area of a large spill or chemical release.



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## 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.



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## Our Worksite Information



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

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## 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.

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### 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

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### 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

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### 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

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### 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

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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

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