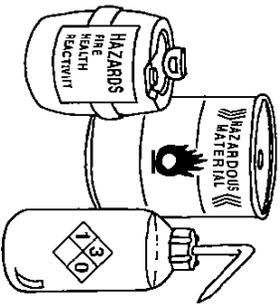




## “Right-To-Know” Deals With Chemical Hazards

OSHA created the Hazard Communication Standard (“Right-To-Know”) to ensure that employees are informed about any chemical hazards that they face in their jobs... as well as how to protect themselves from these hazards.



- OSHA wants to make sure employees understand:
- Why the chemicals they work with might be hazardous.
  - How to get all the information they need about the chemicals.
  - What PPE and other controls are needed when working with the chemicals.

Since OSHA defines a “potentially hazardous chemical” as any substance that can physically harm an employee or be hazardous to their health, there are any number of hazardous chemicals in most job environments.

Under the standard employers must provide their employees with information about working with hazardous chemicals by:

- Making a copy of the standard available.
- Creating a “Hazard Communication Plan”, detailing how the facility will meet the standard’s requirements.
- Letting employees know what sources of information are available for chemicals they may encounter.

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## Know How To Use MSDSs And Container Labels

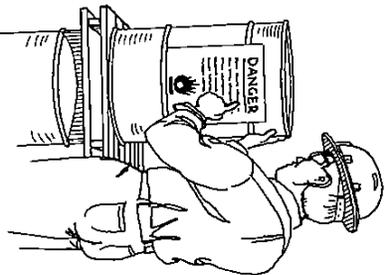
There are two major sources of information about any hazardous chemical... the chemical’s Material Safety Data Sheet (MSDS) and the label on the chemical’s container.

An MSDS is divided into a number of sections, on the chemical’s uses... characteristics... potential hazards... first aid... spill/cleanup procedures... and the personal protective equipment that should be used when working with the chemical.

A chemical’s container label also provides helpful information, including:

- Name and synonyms.
- Health hazards.
- Fire hazards.
- Other hazards.

(Be sure that there are labels on any containers of hazardous substances in your work area, so you will have the information you need).



Education is a major part of the Hazard Communication Standard. Employees must be given information on:

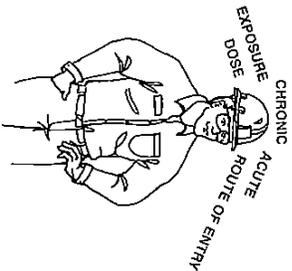
- Hazards associated with various types of chemicals.
- Cautions to be observed when using chemicals.
- Safe work procedures for using chemicals.
- MSDSs, labels and other reference materials.

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## It Is Important To Understand Chemical Terms

When you are working with potentially hazardous chemicals it's important to understand the terms that appear on MSDSs, container labels and other references. One important term is duration of exposure. This is the time that you are exposed to a chemical's specific hazard.

- Two other terms deal with the amount of a chemical you might be exposed to:
- Dose - the quantity of chemical hazard you are exposed to.
  - Dose/response - The relationship between the magnitude of your exposure and the reaction you have.



Other terms relate to what happens to you because of an exposure to a potentially hazardous chemical:

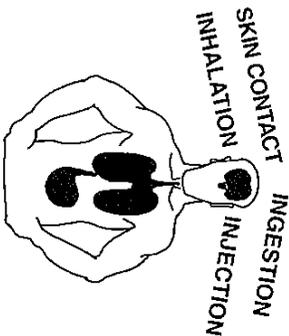
- Acute effect - Caused by a sudden, short-term exposure.
- Chronic effect - Occurring over a long period of time, usually due to repeated exposure.

Remember, you will only be harmed by a chemical if your exposure is of sufficient intensity and duration. OSHA feels that this is such an important concept that they have established "permissible exposure limits" (PELs) for various chemicals. These indicate the amount of exposure that OSHA feels can be safely tolerated by most people.

## There Are Several Routes Of Entry Chemicals Can Take

It is also important to understand the way in which potentially hazardous substances can enter the body.

These are called routes of entry, and include skin contact, inhalation, swallowing or injection.



The most common route of entry is through the skin. Here, the "state" of the chemical is important. The skin provides an effective barrier against many chemicals, but liquids, oils or pastes are much more easily absorbed than other forms of a chemical.

Inhalation is also a frequent route of entry. The lungs have no natural barriers to protect them, which makes inhaling a hazardous chemical extremely dangerous.

Swallowing is a third route of entry. This often happens when food is contaminated, either because it has been stored close to a hazardous chemical, or from not washing your hands before eating.

Injection is not as common as other routes of entry. But it can occur through a puncture wound from something that has a hazardous chemical on it, such as a broken piece of glass... a sharp tool... or even a nail.

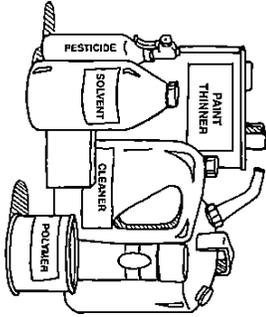
## Toxins And Poisons Can Be Especially Dangerous

Chemicals that are toxic or poisonous can be especially hazardous. A toxic substance has the potential to disrupt physical processes, like breathing.

Alcohol is a common example of a toxic substance. It affects the respiratory system and can disrupt kidney functions, or even signals from the brain.

Many toxins are commonly found in the workplace. They include:

- Cleaners.
- Solvents.
- Pesticides.
- Gasses.
- Polymers.
- Fumes from welded or heated metal.



Most toxins are not poisons. A poison is a substance which can cause severe illness, or even death, when taken in small amounts. There are very few actual poisons.

Like many chemicals, toxic substances can be beneficial when used properly. We are all exposed to toxins every day. In most cases they are not harmful, since they occur in small doses that our systems can easily handle.

Toxins are only dangerous when they overwhelm our natural defensive systems, because we have gotten too large a dose or been exposed for too long a time.

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## Corrosives And Irritants Are Found In Many Places

There are a number of corrosives and irritants used in the workplace. Corrosives are most often concentrated acids or bases, found in products and processes such as:

- Dyes and paints.
- Automobile batteries.
- Soaps and detergents.
- Water treatment.
- Petroleum and chemical processing.

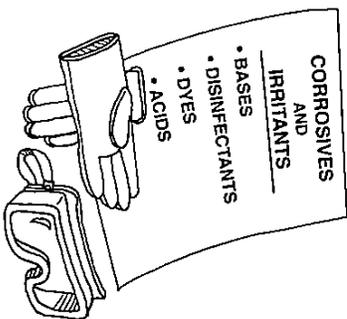
Contact with corrosives can cause severe burns to the skin. Eye contact can even result in blindness. Breathing corrosive fumes can cause lung damage.

While corrosives are typically "concentrated", irritants can be diluted forms of chemicals... or by-products of combustion.

Irritants are found in materials such as:

- Exhaust fumes.
- Ammonia.
- Antifreeze.
- Degreasers.
- Disinfectants.

Because irritants are typically much less concentrated than corrosives, they most often cause "localized" inflammation where they have contacted the body.



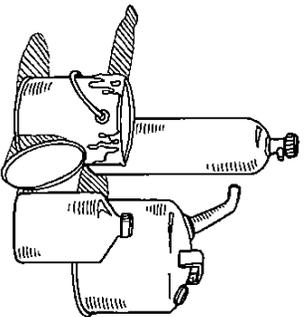
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## Flammables And Combustibles Are Also Common

Flammable and combustible chemicals are also common to most facilities. They include gasoline, kerosene, xylene, toluene and alcohol. They are also found in products such as paints, sealers and welding supplies.

A chemical's "flashpoint" determines whether it is a flammable or a combustible. Flashpoint is the temperature at which a chemical produces vapor that will burn.

Flammables give off vapors at relatively low temperatures. Combustibles produce vapors at higher temperatures. As a result, combustibles must be heated before they will burn, which allows them to be more easily controlled.



Many facilities use several different types of flammable gases for heating, welding and other purposes.

- These gases include:
- Hydrogen.
  - Methane.
  - Butane.
  - Propane.
  - Natural gas.

The principle hazards associated with flammables and combustibles are "physical". They can ignite easily, burn rapidly, and even explode.

## Radiation And Carcinogens Present Unique Hazards

There are several types of radiation hazards that can be found in the workplace. The most common is ultraviolet radiation, which can change the structure of atoms and harm living tissue.

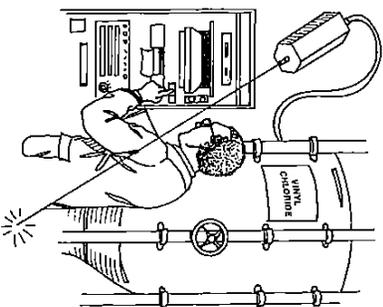
Infrared radiation, which can burn skin and other tissue, is typically given off by heating elements.

The eyes are particularly vulnerable to radiation damage. They have no pain cells to provide a warning... and few blood vessels to help to repair any damage.

Carcinogens, mutagens and teratogens have hazards that are different from most chemicals. They can damage cell growth patterns, which often results in cancer... and in some cases birth defects.

One of the problems with these cancer causing chemicals is that it can take years to detect their effects.

Asbestos is a well known carcinogen that has been used for many things over the years, including insulation. Other confirmed cancer-causing materials include vinyl chloride, uranium, chromium, and nickel.



## Many Factors Can Contribute To Cancer

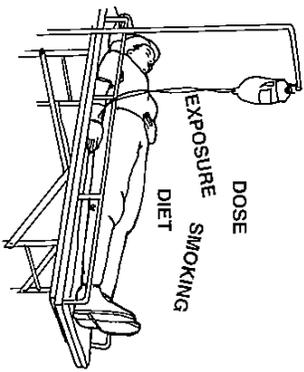
Many factors can contribute to the development of cancer. The "dose" of the chemical to which you have been exposed is particularly important.

Studies find that the risk of contracting cancer increases dramatically for people who have a higher exposure to carcinogenic chemicals.

A number of "contributing factors" that can influence the development of cancer are not necessarily work related at all. These include cigarette smoking and poor diet.

Both of these factors greatly increase the effects of exposure to other cancer hazards. If you are a smoker, it is especially important to "kick the habit" if you are exposed to any other potential cancer hazards at work.

Cancer-causing chemicals enter the body the same way as other chemicals, through skin absorption, swallowing and breathing.



Fumes from these chemicals frequently attack the:

- Reproductive system.
- Lungs.
- Liver.
- Kidneys.

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## Use Personal Protective Equipment On The Job

To reduce the potential for problems when we are working with hazardous chemicals, we need to know as much about the chemicals and their hazards as possible.

First, look for information on the container label. Especially important are:

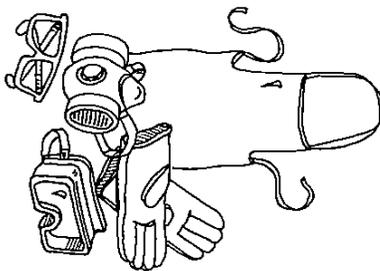
- The chemicals characteristics.
- Hazards associated with the chemical.
- Handling instructions.
- Personal protective equipment (PPE).

If the label doesn't provide all the needed information, consult the chemical's MSDS (Material Safety Data Sheet).

Knowing what PPE to use is especially important. This equipment is often divided into three groups:

- Eye Protection - Safety glasses, goggles and face shields.
- Hand and Body Protection - Gloves, aprons and other clothing.
- Respiratory Protection - Masks, respirators and self-contained breathing apparatus (SCBAs).

Being acquainted with this equipment... what hazards it can best protect you from... and where it is kept in your work area... is all very important.



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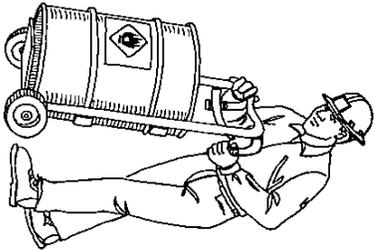
## Know How To Store Chemicals When Not In Use

It is important to store hazardous chemicals properly as well. Storage locations should be clearly identified. Shelving should be strong, stable and corrosion-resistant. Areas should be well ventilated and lighted.

Flammables and combustibles should be stored in UL approved cans and kept in flammable materials cabinets. Compressed gases should be kept in cool, dry areas... away from heat or ignition.

If someone is exposed to a hazardous chemical, you should know what to do:

- Eye Contact - Flush with water for 15 minutes.
- Skin Contact - Remove contaminated clothing and wash thoroughly.
- Inhalation - Get the victim to fresh air and restore normal breathing.
- Ingestion - Consult the MSDS to determine whether to "dilute" the chemical, or induce vomiting.
- Burns - Cool the area with water, and wrap in clean cloths.



In all cases, once you have provided first aid make sure to get medical attention immediately.

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## Dealing With Leaks And Spills Is Also Important

If a spill or leak occurs in your facility, your first concern should be the health and safety of any employees in the area. Consult your facility's "Emergency Plan" (you should know where a copy is located), as well as the MSDS for the chemical in question.



Once you determine what potential hazards you are dealing with, you should proceed to:

- Take care of injuries requiring immediate treatment.
- Notify appropriate personnel.
- Evacuate the area, if necessary.

Keep any spilled chemicals from flowing into drainage or sewer systems. If the spilled materials are flammable or combustible, be sure to remove sources of heat or ignition from the area.

If you are involved in a clean-up, protect yourself with appropriate PPE. Don't use tools that create sparks, heat or flames. Soak up liquid spills with an absorbent solid.

Remember, some chemicals may have to be removed by a licensed disposal company. Be sure to consult the MSDS and your supervisor (or Safety Manager) about proper disposal procedures.

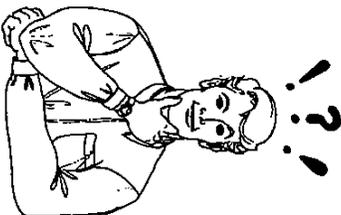
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**Remember . . .**

- There are many different types of hazardous chemicals in most work environments.
- To find information about hazardous chemicals, look at container labels, MSDS and other references.
- The harm that a chemical can cause is affected by both the duration and type of exposure that you have.
- Chemicals can enter the body in four ways... inhalation... ingestion... injection... and through the skin.
- Know what PPE to use with chemicals you work with.
- If you are splashed with a chemical, proceed to the closest safety shower or eye wash immediately.
- Know what storage conditions are required for the chemicals you work with. Separate chemicals that are incompatible.

Although chemicals are part of our everyday world, they can present hazards.

Knowing how and where to find information about chemicals... and what to do in event of a problem... will help all of us to work safely with the chemicals we encounter!



**QUIZ**

1. Which of the following information about a chemical can you find on a Material Safety Data Sheet?
  - Chemical name
  - Cleanup procedures
  - Potential hazards
  - Recommended PPE
2. Which type of chemical is generally considered to be the most hazardous?
  - Corrosive
  - Irritant
3. True or False... Most chemicals do not burn in their liquid state. It is their vapors that burn?
 

\_\_\_\_\_ True      \_\_\_\_\_ False
4. True or False... All toxins are poisons?
 

\_\_\_\_\_ True      \_\_\_\_\_ False
5. What is the health hazard most associated with corrosive chemicals?
  - Nausea
  - Burns
  - Shock
6. The ways chemicals enter the body are called...?
  - Methods of absorption
  - Routes of entry
  - Paths of infection
7. Cancer-causing chemicals are called...?
  - Hemoglobins
  - Carcinogens
  - Supertoxins