



Training Solutions, Delivered!

HAZWOPER: Understanding Chemical Hazards

**Leader's Guide, Fact Sheet
& Quiz**

This easy-to-use Leader's Guide is provided to assist in conducting a successful presentation.

PREPARING FOR THE MEETING

Here are a few suggestions for using this program:

- a) Review the contents of the Fact Sheet that immediately follows this page to familiarize yourself with the program topic and the training points discussed in the program. The Fact Sheet also includes a list of Program Objectives that details the information that participants should learn from watching the program.
- b) If required by your organization, make an attendance record to be signed by each participant to document the training to be conducted.
- c) Prepare the area and equipment to be used for the training. Make sure the watching environment is comfortable and free from outside distractions. Also, ensure that participants can see and hear the TV screen or computer monitor without obstructions.
- d) Make copies of the Review Quiz included at the end of this Leader's Guide to be completed by participants at the conclusion of the presentation. Be aware that the page containing the answers to the quiz comes before the quiz itself, which is on the final page.

CONDUCTING THE PRESENTATION

- a) Begin the meeting by welcoming the participants. Introduce yourself and give each person an opportunity to become acquainted if there are new people joining the training session.
- b) Introduce the program by its title and explain to participants what they are expected to learn as stated in the Program Objectives of the Fact Sheet.
- c) Play the program without interruption. Upon completion, lead discussions about your organization's specific policies regarding the subject matter. Make sure to note any unique hazards associated with the program's topic that participants may encounter while performing their job duties at your facility.
- d) Hand out copies of the review quiz to all of the participants and make sure each one completes it before concluding the training session.

5136 HAZWOPER: Understanding Chemical Hazards FACT SHEET

LENGTH: 21 MINUTES

PROGRAM SYNOPSIS:

Hazardous materials and waste are a part of many work situations and can be found in many types of facilities and job sites. It is very important for employees to know how to recognize these potentially dangerous substances, and how to handle and dispose of them properly. In 1976, the EPA issued the Resource Conservation and Recovery Act (RCRA) to regulate the handling of hazardous waste "from cradle to grave". Since then, other regulations have followed, including OSHA's Interim Final Rule for Hazardous Waste Operations and Emergency Response (HAZWOPER) that gave OSHA the task of protecting HAZMAT workers. As part of these HAZWOPER regulations, there are varying requirements for employee training, depending on the employee's specific level of involvement with hazardous materials. This program will help employees understand the nature and behavior of hazardous chemicals. More importantly, the information provided in this training program will help employees work safely around hazardous materials.

Topics include information found on Safety Data Sheets and container labels, technical terms regarding exposure, routes of entry, exposure limits, characteristics of the major types of hazardous chemicals, preventing exposures and responding to exposures and spills or leaks.

PROGRAM OBJECTIVES:

After watching the program, the viewer should:

- Have an overall understanding of the basis for hazard communication/"Right-To-Know" laws and regulations.
- Understand the general concepts regarding potential hazards presented by chemicals in the workplace.
- Know the terms and language used in discussing chemical hazards.
- Be able to recognize the major types of hazardous chemicals.
- Have a good knowledge of the characteristics of each type of chemical.
- Understand the potential hazards associated with each type of chemical and the effects they can have.
- Know how to obtain and use chemical safety data.

PROGRAM OUTLINE

BACKGROUND

- **You may have heard of hazard communication and "Right-To-Know" before, but you may not have thought about how it affects you.**
 - An ordinary cleanser can actually be toxic, flammable and explosive.
- **You have the "right-to-know" about potentially hazardous materials that may be encountered in your workplace.**
 - That is the reason for OSHA's Hazard Communication Standard and similar state laws.
 - The goal of these laws is to make sure that you have the information, training and equipment needed to work safely around hazardous materials.
- **Chemical hazard information is communicated to you in three different ways:**
 - Safety Data Sheets (SDS).
 - Container labels.
 - Your facility's written "hazard communication program."

SAFETY DATA SHEETS

- **The SDS is a guide for the safe use of a specific chemical.**
 - Chemical manufacturers and distributors provide an SDS for each of the products they sell.
 - Your facility keeps copies of each SDS on file for reference.
- **The Safety Data Sheet is the primary source for information about a chemical product. The SDS lists:**
 - All of the names which the chemical is known by.
 - The manufacturer.
 - Any hazardous ingredients.
- **The SDS also describes:**
 - The types of hazards that the chemical may present.
 - First aid procedures for chemical exposures.

- Techniques for cleaning up spills.
- **To help you work with the chemical safely, the SDS also contains information about:**
 - How to handle and store the chemical properly.
 - What types of exposure controls and personal protective equipment (PPE) should be used for protection.
- **SDS's can come in different formats, but they all contain the same information.**
 - Become familiar with the SDS before working with a potentially hazardous material.
 - The few minutes this takes could prevent serious problems in an emergency.

CONTAINER LABELS

- **Another place to look for "Right-To-Know" information is on a chemical's container label. The label will provide:**
 - The material's name and potential health, fire and reactivity hazards.
 - Specific precautions to take, or situations to avoid, when working with the chemical.
 - What PPE to wear when handling the chemical.
- **Like SDS's, all labels do not present information in the same way. They can:**
 - Be written.
 - Use shapes, numbers or letters as warnings.
 - Use "symbols" or "pictures" to represent hazards or the required PPE.
- **Whichever labeling system that your facility uses, read the label carefully before working with any chemical.**
 - If a chemical is transferred to another container, make sure that the "secondary" container is also labeled properly.

THE HAZARD COMMUNICATION PROGRAM

- **Another place where information about hazardous chemicals is located is your facility's "hazard communication program."**
 - It lists the hazardous materials present in your workplace.
 - Other important information is also given.

EXPOSURE TERMS

- **There are some technical terms which are used in communicating hazard information that you need to understand.**
- **The "duration of exposure" is the time that you are exposed to a substance.**
 - For example, the time between spilling a chemical on your arm and when you wash it off.
 - This type of spill would be referred to as a "short-term exposure."
- **"Short-term exposure" to some hazards can cause sudden reactions or "acute effects" such as a rash or a burn.**
 - In most cases, short-term exposure will cause no long-term health problems.
- **"Long-term exposure" to some hazardous chemicals can cause long-term, or "chronic", health effects.**
 - For example, the chronic effect of smoking for many years might be emphysema or lung cancer.
- **The "dose" (amount) of the substance that you are exposed to is also important when determining possible health effects.**
 - The larger the dose, the more serious your reaction may be.

ROUTES OF ENTRY

- **"Routes of entry" are the ways that a substance can get into your body. These include:**
 - Skin contact.
 - Inhalation.
 - Ingestion.
- **Solids, liquids and gases can all be absorbed through the skin.**
 - Liquids pose the biggest threat because they are most easily absorbed.
- **"Inhalation" is when a hazardous substance is breathed in. Substances that can be easily inhaled include:**
 - Dusts.
 - Mists.
 - Fumes.
 - Vapors.
 - Gases.
- **The third route of entry is "ingestion" (swallowing). This happens when:**
 - Food contaminated with a hazardous material is eaten.
 - A material is transferred to your mouth or face (with your hands).

EXPOSURE LIMITS

- **Remember that the effects of exposure depend upon both the "dose" and the "duration of exposure".**
 - If these are low enough, a hazardous material may cause no negative health effects at all.
- **Government agencies have set limits for how much of any substance you can be exposed to safely. These limits are called:**

- "Threshold limit value"(TLV).
- "Permissible exposure limit"(PEL).
- TLVs and PELs are listed on a chemical's SDS.

TOXINS & POISONS

- **Hazardous chemicals have been grouped into classes, based on two things:**
 - The hazards they present.
 - The safety precautions needed when working with them.
- **Unlike many other chemicals, "toxic substances" have the potential to disrupt physical processes such as:**
 - Breathing.
 - Coordination.
 - Other bodily functions.
- **Toxic materials can often be found around the home as well as in the workplace. They include:**
 - Pesticides.
 - Cleaners.
 - Solvents.
 - Gases.
 - Polymers.
- **Toxic gases include the fumes produced when heating, burning or welding some metals.**
- **"Poisons" are considered toxic substances.**
 - A poison can cause serious illness or death, even with a very small dose.
 - There are very few true poisons.
 - Their use in the workplace is limited.
- **Remember that not all toxic substances are poisonous.**
 - Most are not harmful in small amounts.
 - The danger lies in larger doses and longer durations.

CORROSIVES & IRRITANTS

- **"Corrosives and irritants" are two types of chemicals commonly found in many facilities.**
 - Corrosives can cause serious, even permanent, damage to any part of the body coming into contact with the chemical.
- **Most "acids" are considered corrosive substances. Sulfuric acid is one of the most widely used corrosives, and can be found in:**
 - Dyes.
 - Paints.
 - Petroleum processing.
 - Automobile batteries.
- **Many "bases" are also corrosives, such as caustic soda, which is commonly used in:**
 - Soaps.
 - Detergents.
 - Water treatment plants.
- **Skin contact with corrosive substances can cause redness, swelling, blisters and even severe burns.**
 - Contact with the eyes can result in permanent eye damage, even blindness.
- **Inhaling corrosive chemicals can seriously damage the delicate tissues of the:**
 - Nose.
 - Mouth.
 - Throat.
 - Lungs.
- **Swallowing corrosives ("ingestion") is rare in the workplace, but can result in:**
 - Extreme pain.
 - Severe internal injuries.
 - Death.
- **"Irritants" are often diluted forms of corrosive substances, and include:**
 - Ammonia.
 - Antifreeze.
 - Thinners.
 - Degreasers.
 - Acids.
- **Other irritants are by-products generated during combustion.**
 - Such as nitrogen dioxide found in automobile exhaust.

- Irritants generally cause only minor, temporary inflammation or swelling at the point of contact.

FLAMMABLES & COMBUSTIBLES

- **"Flammables and combustibles" are another common group of hazardous chemicals, which include:**
 - Gasoline.
 - Kerosene.
 - Acetylene.
 - Toluene.
- **The key in determining whether a chemical is flammable or combustible is its "flashpoint".**
 - This is the temperature at which the chemical releases vapors that can burn.
 - It is not the liquid that burns, but the vapor.
- **Liquids that have a flashpoint of less than 100 degrees Fahrenheit are considered flammable.**
 - Gasoline, for example, has a flashpoint of -45 degrees, almost always giving off vapors which can ignite.
- **A combustible liquid must have a flashpoint between 100 degrees and 200 degrees Fahrenheit.**
 - Combustibles are easier to control because they have to be heated before they will produce burnable vapors.
- **Liquid fuels are not the only flammables and combustibles we have to watch out for.**
 - Smoking near an open can of paint or a bottle of rubbing alcohol could cause a fire.
 - These and other materials can also ignite easily.
- **"Flammable gases" come with their own unique set of hazards, and include:**
 - Hydrogen.
 - Methane.
 - Propane.
 - Butane.
 - Acetylene.
- **Most gases are usually stored in compressed gas cylinders.**
 - The pressure inside these containers is enormous.
 - The rupture or heating of a cylinder or valve can result in a sudden, violent release of pressure.
 - The cylinder or valve could even become a flying projectile.

CARCINOGENS & SUSPECTED CARCINOGENS

- **Another group of hazardous chemicals which we need to be aware of are "carcinogens and suspected carcinogens".**
 - These chemicals are often linked to cancer.
 - Normal cells in the human body follow a pattern to reproduce and grow.
 - Carcinogens disrupt this pattern, causing cells to grow abnormally, which is why cancer is often fatal.
- **Although carcinogens can affect nearly all areas of the body, they most frequently "target" specific organs, such as the:**
 - Lungs.
 - Liver.
 - Kidneys.
 - Reproductive system.
- **Unfortunately, there are not usually any immediate symptoms of exposure to these substances.**
 - This is why it is extremely important to know about any carcinogen you may encounter.
- **One carcinogen that has received a lot of attention is asbestos. At one time, asbestos was used in:**
 - Pipe insulation.
 - Floor tiles.
 - Fire-proofing.
 - Automotive brake and clutch linings.
- **When inhaled, microscopic asbestos fibers can damage the lungs and eventually cause cancer.**
- **"Suspected carcinogens" are commonly believed to increase the chance of getting cancer.**
 - Unlike confirmed carcinogens, no direct link has been established.
- **Examples of "suspected carcinogens" include**
 - Formaldehyde.
 - PCB's.
 - Carbon tetrachloride.
- **There is more to preventing cancer than simply avoiding exposure to carcinogens.**
 - Other "risk factors" affect the chances of getting cancer.
 - For instance, smoking increases the chances of getting cancer by tens or even hundreds of times.
 - Quitting is the biggest step in preventing cancer.

RADIATION HAZARDS

- **Another potential workplace hazard is "radiation".**
 - Radiation is not usually associated with chemicals.
 - But it can cause serious damage to the body's cells and tissues.
- **Radiation hazards include:**
 - Infrared radiation.
 - Ultraviolet (UV) radiation.
 - X-rays.
 - Gamma rays.
- **If you work around radiation hazards, you will need to take steps to protect yourself.**
 - Talk to your supervisor to find out more about any radiation hazards in your workplace.

PREVENTING EXPOSURES

- **Hazard communication goes beyond simply exercising your "right-to-know".**
 - You must act on what you have learned about potential hazards on the job.
- **Protection begins with selecting and using the appropriate personal protective equipment, such as:**
 - Goggles.
 - Face shields.
 - Gloves.
 - Acid suits.
- **"Respiratory protection" is especially important when working around many hazardous materials.**
 - There are many different types of respirators.
 - It is vital to use the right kind for the job.
 - Make sure your respirator fits properly.
- **When storing hazardous chemicals, a number of other things must be considered, such as:**
 - Ventilation (in case of fumes).
 - Lighting (for reading labels).
 - Identification of storage locations.
 - Strong, stable shelving.
 - Safe and easy access.
- **Small quantities of flammables or combustibles should be stored in U.L. approved cans with spring-loaded caps.**
 - These contain vapors and prevent spills.
 - Larger quantities of flammable materials need to be stored in a flammable materials cabinet.
- **Compressed gas cylinders have special storage considerations as well.**
 - They must be stored upright, with a safety cap over the valve.
 - A safety chain or bracket is required to prevent the cylinder from falling over.

RESPONDING TO EXPOSURES

- **In "exposure situations", you need to act quickly to minimize the damage from hazardous materials.**
 - Always know the nearest location of running water (water is usually the first line of defense against chemical injuries).
 - For small chemical splashes, immerse the affected area in running water for at least 15 minutes.
 - For larger exposures, get to a safety shower quickly.
 - Remove contaminated clothing and stay in the shower stream for at least 15 minutes.
- **Getting chemicals in your eyes can cause severe damage. Get to an eye wash station immediately.**
 - Keep your eyes open and flush them for at least 15 minutes.
- **Inhaling hazardous materials can be dangerous, even deadly.**
 - If someone is overcome by fumes, get them out of the area and into fresh air.
 - Check the container label or SDS to see if immediate medical attention is needed.
- **Swallowing a hazardous substance is extremely dangerous.**
 - Consult the SDS immediately.
 - It may be necessary to dilute the chemical with water or milk or induce vomiting.
 - In some cases, however, vomiting may cause more damage.
- **Seek medical attention after any exposure to a hazardous material, no matter how minor.**
 - Some chemicals have delayed or long-term effects.
 - Supply medical personnel with the chemical's SDS.

SPILL & LEAK RESPONSE

- **In the event of a leak or a spill of a hazardous chemical, you must act quickly.**
 - The first concern is people's health and safety.
 - Tend to injuries immediately.
 - Evacuate the area if necessary.
 - Notify appropriate personnel.
- **If the spill is of a flammable or combustible substance, you should immediately remove sources of heat or ignition.**
 - But do not unplug machinery or equipment (this could cause sparks).
- **If you are going to be involved in cleaning up a hazardous spill, make sure to use the proper PPE and cleanup equipment.**
 - Check the SDS or your company's hazard communication plan.
- **First, work to contain the spill and minimize contamination.**
 - Create a barrier around the spill with an absorbent material.
 - Use a cleanup kit, if available.
 - In most cases you will need to absorb the spill with a neutral material.
- **Spills of some substances require special procedures.**
 - For example, use non-sparking tools when cleaning up a Flammable.
- **Hazardous materials cannot just be thrown into the trash.**
 - Many chemicals are classified as regulated waste.
 - They must be removed by licensed disposal companies.
 - Check with your supervisor or your facility's safety manager.
- **OSHA's Hazard Communication Standard and other "Right-To-Know" laws are there to get us the information we need to work safely.**
 - But only you can take the necessary steps to protect yourself from hazardous chemicals.

HAZWOPER: Understanding Chemical Hazards

ANSWERS TO THE REVIEW QUIZ

1. e

2. a

3. a

4. b

5. b

6. b

7. b

HAZWOPER: Understanding Chemical Hazards
REVIEW QUIZ

Name _____ Date _____

The following questions are provided to determine how well you understand the information presented in this program.

1. Which of the following information can you find on a chemical's Safety Data Sheet?
 - a. Chemical name
 - b. Potential hazards
 - c. Cleanup procedures
 - d. Recommended PPE
 - e. All of the above

2. Which type of chemical is generally considered to be the most hazardous?
 - a. Corrosive
 - b. Irritant

3. Most chemicals do not burn in their liquid state, it is their vapors that burn.
 - a. True
 - b. False

4. All toxins are poisons.
 - a. True
 - b. False

5. What is the health hazard most often associated with corrosive chemicals?
 - a. Nausea
 - b. Burns
 - c. Shock

6. What is the term used for how chemicals enter the body?
 - a. Methods of absorption
 - b. Routes of entry
 - c. Paths of infection

7. What is the term for a cancer-causing chemical?
 - a. Hemoglobin
 - b. Carcinogen
 - c. Supertoxin