

Teamsters Hazardous Waste Worker Training



HAZWOPER 8-Hour Refresher



Developed for Department of Energy

Electronic Version is Section 508 Compliant

International Brotherhood of Teamsters — IBT Worker Training Program

Teamsters Initial Hazardous Waste Worker Refresher Course
Electronic version is 508 Compliant
2026 Edition

The project described was supported by Award Number U45ES014084 and U45ES014103 from the National Institute Of Environmental Health Sciences. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute Of Environmental Health Sciences or the National Institutes of Health.

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Preface



This manual covers the topics that OSHA requires for the annual refresher of workers involved in the clean up of uncontrolled hazardous waste sites.

[OSHA 29 CFR 1910.120(e)(3)(i) and 29 CFR 1926.65(e)(3)(i).

This manual was prepared by the Worker Training Program of the International Brotherhood of Teamsters - the Teamsters Union - with grant funds from the National Institute of Environmental Health Sciences.

About the Teamsters

Workers founded the International Brotherhood of Teamsters (IBT) in 1903. Today the Teamsters are a diverse union representing 1.4 million workers in transportation, construction, warehousing, and in almost every other type of employment. The IBT Training and Grants Department includes professionals in safety, industrial hygiene and adult education.

Teamster Training

The Teamsters offer safety and health training throughout the United States for:

- Construction Workers
- Hazardous Waste Workers
- Industrial Workers
- Hazardous Materials Transportation Workers
- Emergency Responders
- Radiological Workers

Teamster instructors use effective and participatory adult education methods, real equipment, and realistic hands-on activities.

Teamster Instructors

IBT instructors have experience doing the same types of jobs that trainees perform, including construction, remediation, warehousing and hazmat transportation. Instructors have completed the Department of Energy (DOE) Basic Instructor Training Program and the OSHA 500 Construction Trainer Course. The Teamsters certify each instructor after a period of supervised teaching and evaluation. To maintain certification, each instructor attends an annual Instructor Development Program that includes new regulations and work procedures, and practice teaching. Each Instructor is certified in first aid and CPR as well.

Teamster Training Centers have classrooms and outdoor areas for realistic hands-on activities. The Training Centers also have mobile units that can transport instructors and equipment to hold courses at hazardous waste sites, remediation projects, construction sites, company locations and union halls ... anywhere.

Teamster Training Centers

For more information, or to schedule a course, contact:

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For More Information

Chapter

1

Rights, Responsibilities, and Lessons Learned



Learning objectives

This chapter discusses the legal standards that apply to worker safety and health at hazardous waste sites, and the rights and responsibilities of workers and employers with regard to occupational safety and health.

After completing this chapter, you will be able to demonstrate your ability to:

1. DEFINE which federal government agency is responsible for regulating:
 - a. Safety and health in the workplace.
 - b. Transportation of hazardous materials.
 - c. Protection of the environment.
2. UNDERSTAND recent changes to pertinent regulations including EPA, OSHA, and DOE Standards.
3. IDENTIFY the training requirements for hazardous waste workers.
4. IDENTIFY the rights and responsibilities of workers and employers with regard to safe and healthy working conditions.
5. DEFINE:
 - a. HAZWOPER.
 - b. Uncontrolled site.
6. IDENTIFY lessons learned from incidents which occurred on job sites to demonstrate the use of good work practices.

Safety and Health at Hazardous Waste Sites

A Teamster driver pulled their end dump into a hazardous waste site to pick up a load of soil. This was their first trip to this type of project. It looked like a lot of other construction sites the driver had been to before. However, they noticed that other workers in the area where the soil was loaded were wearing respirators and plastic suits.

The driver wondered: Why are these other workers wearing respirators and suits? Is there something unusual about the dirt they're loading? Do I need a respirator and protective clothing too?

It happens that this was the site of a former chemical factory. The soil was heavily contaminated with solvents, some of which are extremely irritating; some of which are known to cause damage to the nervous system, liver and kidneys, and others which are known to cause cancer. It was because of this contamination that the soil was being removed.

This driver should have been trained before they ever entered the site. They should have been told what hazards were present, and what protective equipment to wear.

Government Agencies You Should Know

OSHA: The Occupational Safety and Health Administration is the federal agency that enforces safety and health standards to protect workers on the job. In 29 states there are state safety and health agencies that do this job instead of federal OSHA.

DOT: The Department of Transportation is the federal agency that enforces regulations for safe transportation of hazardous materials. Most states have a state agency that also enforces transportation regulations.

EPA: The Environmental Protection Agency is the federal agency that enforces regulations to protect the environment. Most states have a state agency that also enforces environmental regulations.

NIOSH: The National Institute for Occupational Safety and Health is a federal agency that studies safety and health problems, recommends standards, and distributes information to workers and employers.

DOE: The Department of Energy is the federal agency that controls the facilities used to make nuclear weapons. Clean-up of hazardous and radioactive waste is a major project at these sites.

LANL: Los Alamos National Laboratory is a DOE research facility. It has legacy hazardous waste from early research

Congress passed the **Occupational Safety and Health Act** in 1970.

This law created **OSHA, the Occupational Safety and Health Administration**.

The OSHA law says that every employer is required to do two things:

1. Provide to each of its employees: “employment and a place of employment that are free from recognized hazards that are causing or are likely to cause death or serious physical harm.”
2. Comply with all OSHA standards.

The OSHA law tells OSHA to:

1. Write standards to protect workers.
2. Listen to workers’ complaints about unsafe or unhealthy conditions.
3. Conduct inspections and enforce OSHA standards.
4. Protect workers from retaliation if they report safety and health problems.

The safety and health rules that OSHA writes to protect workers are called **OSHA Standards**.

Each OSHA standard has a number, which is called its citation. The citation helps you find the standard in a law book, and it makes it easy to refer to a particular standard.

For example, the OSHA standard to protect hazardous waste workers is 29 CFR 1910.120.

CFR means Code of Federal Regulations.

The OSHA HAZWOPER Standard

This manual is for
workers who work at
uncontrolled sites.

This is different from a
treatment, storage and
disposal site where
hazardous waste is
handled in a controlled
manner.

There is an OSHA standard called **Hazardous Waste Operations and Emergency Response**. If you take the first letters of these words you can spell the name **HAZWOPER**, which is what everyone calls this standard.

HAZWOPER covers three categories of workers:

1. Workers at hazardous waste clean-up sites, which OSHA calls **uncontrolled sites**.
2. Workers at hazardous waste Treatment, Storage and Disposal (TSD) facilities.
3. Workers engaged in emergency response.

An uncontrolled site means that hazardous waste was put on the site without complying with current safety requirements. The hazardous waste creates a threat to the health and safety of people or the environment.

Some **examples of uncontrolled sites** include:

- A construction or demolition site where hazardous waste was left from previous activities.
- A landfill where chemicals were dumped without safeguards to prevent contaminating the water or the air. This may have been legal at the time, but does not comply with current requirements.
- A site where hazardous waste was illegally dumped without any regard for the environment.
- The scene of an emergency release of hazardous materials after the emergency has been resolved but where chemicals still remain to be cleaned up.

The HAZWOPER Standard has 17 sections (“a” through “q”).

The OSHA HAZWOPER Standard

The OSHA HAZWOPER Standard

- (a) Scope, application and definitions.
- (b) Safety and health program.
- (c) Site characterization and analysis.
- (d) Site control.
- (e) Training.
- (f) Medical surveillance.
- (g) Engineering controls, work practices, and personal protective equipment.
- (h) Monitoring.
- (i) Informational programs.
- (j) Handling drums and containers.
- (k) Decontamination.
- (l) Emergency response by employees at uncontrolled hazardous waste sites.
- (m) Illumination.
- (n) Sanitation and temporary work places.
- (o) New technology programs.
- (p) Operations conducted under the Resource Conservation and Recovery Act (RCRA).
- (q) Emergency response to hazardous substance releases.

OSHA has a set of standards for the construction industry, and another set of standards for general industry.

The same HAZWOPER standard is in both, but it has two different numbers:

**General Industry:
29 CFR 1910.120**

**Construction:
29 CFR 1926.65**

HAZWOPER Training Requirements

HAZWOPER has different training requirements for different kinds of workers at uncontrolled sites.

Training Requirements for Workers at Uncontrolled Sites

General Site Workers	40 hours: Initial training
	24 hours: Supervised on-site experience
	8 hours: Annual refresher

Occasional Site Workers and Workers with minimal exposure	24 hours: Initial training
	8 hours: Supervised on-site experience
	8 hours: Annual refresher

Training Requirements for Supervisors and Managers

Supervisors and managers must have the same training as the workers they supervise, plus eight hours of additional training in the management of hazardous waste sites.

This course provides the 8hr. annual refresher training for general site and Occasional site workers at uncontrolled sites.

In order to continue doing hazardous waste work, **you must take an 8-hour Refresher Course every year.**

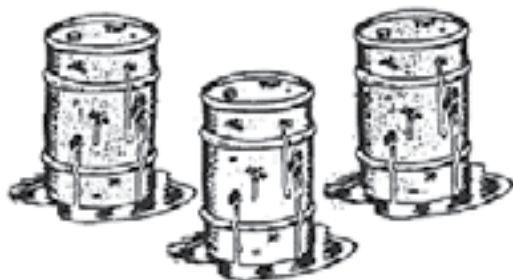
RCRA (“Rick Rah”) is the federal law regulating the proper handling of hazardous waste – in order to protect the environment and the community. RCRA requires:

- **Regulations:** The EPA makes regulations for those who generate, store, ship, recycle, treat or dispose of hazardous waste.
- **Cradle to Grave Tracking:** Keeping records of what happens to hazardous waste from when it is created to when it is properly disposed of.
- **Uniform Hazardous Waste Manifest:** A special shipping paper for transporting hazardous waste.
- **Registration** for generators, **licenses** for transporters and **permits** for recyclers and disposal facilities.
- Requirements for **Underground Storage Tanks**.

Superfund is a federal program that provides money to clean up the worst hazardous waste sites, called **Superfund Sites**. The Superfund law is called **CERCLA**.

There is another federal law called **SARA**. One part of SARA tells OSHA to write a standard to protect hazardous waste and emergency response workers. This is why OSHA made the HAZWOPER Standard.

LANL P-409 is the procedures for managing hazardous waste at Los Alamos.



RCRA, Superfund, and SARA

RCRA: Resource Conservation and Recovery Act of 1976.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act of 1980.

SARA: Superfund Amendments and Reauthorization Act of 1986.

Discuss recent changes to pertinent regulations.

Your OSHA Rights

OSHA requires your employer to:

- **Provide a safe and healthy workplace.**
- **Comply with OSHA standards.**

As an employee you have legal rights, and you also have the responsibility to work in a safe manner that is in compliance with OSHA standards.

Your OSHA rights include:

1. **The right to a safe and healthy workplace.**
2. **The right to receive safety and health training.**
 - a. Hazard communication training.
 - b. HAZWOPER emergency response training.
 - c. Respirator training (if applicable).
 - d. Confined space training (if applicable).
3. **The right to information.**
 - a. Safety Data Sheets (SDSs).
 - b. Your employer's Log of Work-Related Injuries and Illnesses (the "OSHA 300 Log").
 - c. Results of workplace monitoring and surveys.
 - d. Your own medical records.
 - e. Your employer's written Site Safety and Health Plan.
 - f. Copies of any OSHA citations.
4. **The right to take part in safety and health activities.**
 - a. Point out hazards and suggest corrections.
 - b. Discuss safety and health concerns with your fellow workers and your union representative.

5. **The right to participate in OSHA inspections.**
 - a. You or your union representative participate in the opening and closing conferences.
 - b. You or your union representative accompany the OSHA inspector during the inspection.
 - c. Respond to questions from the OSHA inspector.

6. **The right to file an OSHA complaint if a hazard exists.**
 - a. Have your name kept confidential by OSHA.
 - b. Be told by OSHA of actions on your complaint.
 - c. Be notified if your employer contests a citation.
 - d. Object to an abatement period proposed by OSHA.

7. **The right to refuse to do work that would expose you to imminent danger of death or serious injury.**

8. **Protection from retaliation or discrimination because of your safety and health activities.**

File a discrimination complaint with OSHA if you have been discriminated against for discussing safety and health, pointing out hazards, filing an OSHA complaint, or refusing dangerous work.

9. **The right to necessary personal protective equipment paid for by your employer.**

If you file a complaint with OSHA, put it in writing, be specific, and cite the exact standard that's being violated. Keep a copy for your records. Be sure to also contact your union representative.

Your Responsibilities Under OSHA

As an employee, you have the responsibility to comply with all OSHA standards which apply to your job.

However, OSHA cannot impose any legal sanctions – such as fines – on workers who violate OSHA standards. OSHA does not issue citations against workers. When Congress wrote the OSHA law, it gave employers the full legal responsibility for safety and health in the workplace.

As an employee, you are expected to comply with the instructions issued by your employer. These can include following safe work practices and wearing personal protective equipment such as a respirator. If you fail to follow your supervisor's instructions, you might be disciplined or terminated.

Later in this chapter, we will discuss the special situation in which a worker believes that it is unsafe to do an assigned task.

The Right to Refuse Dangerous Work

As an employee, you are expected to do your job the way your supervisor tells you. However, sometimes a situation may arise where you believe it is unsafe to do a task- for example, if the truck that you are assigned has faulty brakes. Usually, you or your union steward will be able to resolve the problem by discussing it with the supervisor.

The union contract and the law give you certain rights if you are ever in the situation where you feel that you must refuse to do dangerous work. In order to preserve your rights make sure that you:

1. **Don't act alone.** Talk with your fellow workers. If you are a union member, contact your shop steward or union representative.
2. **Point out the danger** to the supervisor and to your fellow workers.
3. **Make it clear that you are not insubordinate.** Explain that you are willing to do the job if it can be done safely.
4. **Offer to do other work.**
5. **Don't walk off the job.** Don't leave the site unless ordered to do so by the supervisor.

LANL also has procedure for Unsafe situations. Referred to as Work Pause and Work Stop.

[LANL P-101-18]

The Right to Stop Work at DOE Sites

For Drivers, Mechanics and Freight Handlers: Section 405

DOE Order 440.1B says that workers at DOE facilities can “decline to perform an assigned task because of a reasonable belief that, under the circumstances, the task poses an imminent risk of death or serious bodily harm to that individual, coupled with a reasonable belief that there is insufficient time to seek effective redress through the normal hazard reporting and abatement procedures.”

The employee protections, or whistle blower provisions, of the Surface Transportation Assistance Act (STAA), 49 U.S.C. § 31105 (previously referred to as “Section 405”) protects drivers, mechanics, and freight handlers from discrimination or discharge for:

- Refusing to operate a vehicle if to do so would violate a safety regulation.
- Refusing to operate a vehicle if the employee has a reasonable apprehension of serious injury, or injury to the public, because of the unsafe condition of the equipment.
- Complaining or testifying about violations of vehicle safety requirements.

If you feel that you must refuse to operate the vehicle, make sure that you first ask your supervisor to correct the problem, or give you another, safe vehicle to use.

If you believe that you have been penalized for refusing to drive an unsafe vehicle, you can file a STAA complaint with a regional or local OSHA office. Any complaint must be filed within 180 days.

If you belong to a union, you should talk to your shop steward or union representative.

The Department of Transportation (DOT) has training requirements for workers involved in the transportation of hazardous materials, including hazardous waste. The DOT training requirements apply to workers who:

- Load, unload or handle hazmat.
- Drive a vehicle used to transport hazmat.
- Prepare hazmat for transportation.
- Are responsible for hazmat transportation safety.
- Recondition or test hazmat packaging.

DOT requires five kinds of training for hazmat workers:

1. **General awareness training.**
1. **Function-specific training.** (Specific safe practices that apply to the hazmat activities of your job.)
1. **Safety training.**
1. **Security awareness training.**
1. **In-depth hazmat security training.**

In transportation-related job sites it is often confusing whether OSHA standards or DOT regulations apply. The Teamsters follow the rule of thumb that says most truck driving-related work is under DOT jurisdiction, while loading, unloading, and warehousing are covered by OSHA standards.

DOT will respond to safety complaints, but they may be slow to do so. You do not have the same rights to participate in DOT inspections as you do under OSHA. If you file a complaint with DOT, put it in writing, be specific, and cite the exact DOT regulation that's being violated. Keep a copy for your records. Be sure to also contact your union representative.

DOT Training Requirements for Transportation Workers

**Workers will critique
hazmat or hazwaste
incidents that occurred
over the last year.**

Activity 1: Regulatory Agencies

Instructions: Match the agency (on the left) with it's role (on the right).



Worker safety and health



Protecting the environment



Transportation safety



Studying safety and health problems and giving advice



Maintaining nuclear weapons facilities

Activity 2: Review Questions

1. List three types of training that you are required to receive as a general hazardous waste site worker.

2. List six types of safety and health information that you have a right to obtain.

3. List nine categories of safety and health rights.

4. What should you do if you believe that a task is so unsafe that you need to refuse to do it?

5. What is an uncontrolled site?

- Notes -

Chapter

2



Hazard Communication

Learning objectives

This chapter discusses the OSHA Hazard Communication Standard, which provides workers with information about hazardous chemicals.

After completing this chapter, you will be able to demonstrate your ability to:

1. **IDENTIFY** the five major requirements of the OSHA HAZCOM Standard.
2. **IDENTIFY** the kinds of information about a chemical that you can find on its SDS.
3. **LIST** six types of information which must be on a chemical label.
4. **IDENTIFY** the sections of the Emergency Response Guidebook
5. **IDENTIFY** the four types of information provided by a National Fire Protection Association (NFPA) label.

The **OSHA Hazard Communication Standard (HAZCOM)** requires employers to have:

1. **Written HAZCOM program** to inform workers of chemical hazards.
2. **Safety Data Sheet (SDS)** for each hazardous chemical in the workplace, and make these SDSs available to workers on all shifts.
3. **Labels** on all containers of hazardous chemicals.
4. **List of hazardous chemicals** in the workplace, and make this list available to workers.
5. **Training** for workers about:
 - The Hazard Communication Standard.
 - The employer's HAZCOM program.
 - The operations or locations in the workplace where hazardous chemicals are present.
 - What hazardous chemicals are present.
 - How to use SDSs.
 - How to interpret chemical labels.
 - How to detect the presence of chemicals.
 - The physical, health, simple asphyxiation, combustible dust and pyrophoric gas hazards as well as hazards not otherwise classified of the chemicals in the work area.
 - Safe work practices, protective equipment and emergency procedures for the chemicals.

**The OSHA
HAZCOM
Standard**

[29 CFR 1910.1200 and 1926.59]

The chemical inventory list should reference chemicals by using the name found on the container label and the name listed on the SDS

Training on HAZCOM must be provided at the beginning of each new assignment involving hazardous chemicals or whenever a new physical or health hazard is introduced.

Chemical Labels

See the next page for the OSHA Pictograms

A Chemical Abstract Service (CAS) Number is a unique number assigned to every chemical, regardless of its name. This is helpful because many chemicals have more than one name.

There is an exception: If the secondary container is only used by one worker for only one shift, then it doesn't have to be labeled.

Labels on chemical containers must include:

1. Product identifier
2. Signal word
3. Hazard statement
4. Pictograms
5. Precautionary statement
6. Name, address and telephone number of the chemical manufacturer, importer, distributor, or other responsible party.

The label may include a CAS number, which is a unique “social security” number for each chemical. This is helpful because most chemicals have more than one name. If you look in another information source you can be sure that you are getting information about the right chemical if you verify the CAS number.

The label might also include a UN/NA identification number, which is the DOT number for the chemical, or for the group of chemicals it belongs to.

If you transfer a chemical to a secondary container, HAZCOM requires the secondary container to be labeled also. For example, if you fill a one-quart can and take it to the repair shop, this secondary container also needs a label.

HAZCOM Pictograms

Health Hazard



- Carcinogen
- Respiratory Sensitizer
- Reproductive Toxicity
- Target Organ Toxicity
- Mutagenicity
- Aspiration Toxicity

Flame



- Flammables
- Self-Reactives
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Organic Peroxides

Exclamation Mark



- Irritant
- Dermal Sensitizer
- Acute Toxicity (harmful)
- Narcotic Effects
- Respiratory Tract Irritation
- Hazardous to Ozone Layer (Non-Mandatory)

Gas Cylinder



- Gases Under Pressure

Corrosion



- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

Exploding Bomb



- Explosives
- Self-Reactives
- Organic Peroxides

Flame Over Circle



- Oxidizers

Environment
(Non-Mandatory)



- Aquatic Toxicity

Skull and Crossbones



- Acute Toxicity (Fatal or Toxic)

Safety Data Sheet (SDS)

SDSs must be:

- available to all workers
 - available on all shifts
 - available in each work area
 - printed in English
-

Your employer is required to have a **Safety Data Sheet (SDS)** for every hazardous chemical used in the workplace.

The SDS must provide the following information in the order listed below:

1. Identification;
2. Hazard identification;
3. Composition/information on ingredients;
4. First-aid measures;
5. Fire-fighting measures;
6. Accidental release measures;
7. Handling and storage;
8. Exposure controls/personal protection;
9. Physical and chemical properties;
10. Stability and reactivity;
11. Toxicological information;
12. Ecological information;
13. Disposal considerations;
14. Transport information;
15. Regulatory information; and
16. Other information including date and preparation or last revision.

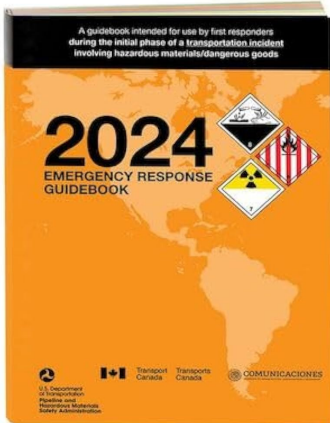
The US Department of Transportation (DOT) has requirements for placards, labels and markings on hazardous materials in transportation. These can help you identify the chemical hazards in your workplace.

DOT Placards, Labels and Markings

Placards are attached to the outside of a vehicle, bulk container, or rail car. They are diamond-shaped, and include the class/division number, name and symbol.



Emergency Response Guidebook



The ERG is intended to assist emergency responders during the first half-hour of their response. After that, it is assumed that more complete information, such as expert consultation and computer databases will be available.

The DOT Emergency Response Guidebook (ERG) provides information to **identify hazardous materials (hazmat) and make decisions about response and evacuation during the initial response to a hazmat incident.**

The ERG contains **guides**, which are two-page descriptions of how to respond. Each guide is for a different set of circumstances. The guides are the “guts” of the book.

The ERG has six color-coded sections:

**White:
(front)**

The white section at the front of the book has pictures of all the different placards, and pictures of different kinds of vehicles.

The purpose of the white section is to help you find the right guide if you only know the placard or the type of vehicle.

Yellow:

The yellow section is a list of all of the UN/NA identification numbers. For each number it tells the name of the hazmat and also tells which guide to use.

The purpose of the yellow section is to help you identify the hazmat and find the right guide to use – if you know the UN/NA identification number.

Blue:

The blue section is a list of the names of different hazmats. For each name it tells the UN/NA identification number and also tells which guide to use.

The purpose of the blue section is to help you identify the hazmat and find the right guide to use – if you know the name.

Emergency Response Guidebook

Orange: The orange section contains the guides. Each guide gives information about:

- Health hazards.
- Fire hazards.
- Protective clothing.
- Evacuation.
- Fire response.
- Spill response.
- First aid.

Green: The green section contains more detailed information about isolation and protective distances for certain hazmat.

The green section also has a list of hazmat that produce toxic gases if they react with water. This is important information that firefighters need before they use water to suppress a fire or to dilute a spill.

**White:
(back)** The white section at the back of the book contains a glossary of words used to describe hazmat and emergency response.

This white section also has information about protective clothing, fire and spill control, and indications of a chemical, biological, or radiological incident.

You should be familiar with the ERG – and practice using it – so that you can quickly get information if you are involved in a hazmat incident.

Keep the ERG with you when you transport hazmat.

If the name and UN/NA number of the hazmat was highlighted in the yellow and blue sections, then there is more information about that hazmat in the green section.

Both the front and back white sections contain a list of emergency phone numbers

NFPA Hazard Identification System

The NFPA Hazard Identification System is intended to provide information to fire fighters during an emergency.

The higher the number, the greater the hazard. "4" is the most extreme hazard.

The NFPA label does not identify the chemical, the specific health effects, or the manufacturer.

The NFPA Hazard Identification System is intended to provide information to firefighters in an emergency. You will find the diamond-shaped NFPA labels on containers, storage tanks, doors and walls.

Numbers from 0 to 4 in the three top diamonds indicate how dangerous the material is in terms of fire hazard, health hazard and chemical reactivity. "0" means no hazard. "4" means the most severe hazard. The bottom diamond is for special information, such as "radioactive", or "water reactive".

Blue diamond:
health hazard rating

Red diamond:
fire hazard rating



White diamond:
special hazards or other information

Yellow diamond:
reactivity hazard rating

In the example, the health hazard rating of "4" indicates an extreme acute health hazard. The fire rating of "0" means not flammable. The reactivity rating of "4" means that the material may react very violently or explode. The "W" with a line through it indicates that the material reacts dangerously with water, the "OX" means the material is an oxidizer that also reacts dangerously with water, so don't use water to fight a fire here. The complete definitions of the hazard ratings are found on the next page.

The NFPA label does not identify the chemical. It does not give specific health effects. It also does not identify the manufacturer. These are all things which OSHA requires on product labels.

NFPA Hazard Identification System

Health Hazard Color Code: Blue	Flammability Color Code: Red	Reactivity (Stability) Color Code: Yellow
<p>4 Materials which on very short exposure could cause death or major residual injury even though prompt medical treatment was given.</p> <p>3 Materials which on short exposure could cause serious temporary or residual injury even though prompt medical treatment was given.</p> <p>2 Materials which on exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.</p> <p>1 Materials which on exposure would cause irritation but only minor injury if no treatment is given.</p> <p>0 Materials which on exposure would offer no hazard beyond that of ordinary combustible material.</p>	<p>4 Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or which are readily dispersed in air and which will burn readily.</p> <p>3 Liquids and solids that can be ignited under almost all ambient temperature conditions.</p> <p>2 Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.</p> <p>1 Materials that must be pre-heated before ignition can occur.</p> <p>0 Materials that will not burn.</p>	<p>4 Materials which in themselves are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.</p> <p>3 Materials which in themselves are capable of detonation or explosive reaction but require a strong initiating source or which must be heated under confinement before initiation, or which react explosively with water.</p> <p>2 Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate. Also materials which may react violently with water or which may form explosive mixtures with water.</p> <p>1 Materials which in themselves are normally stable, but which can become unstable at elevated temperatures and pressures or which may react with water with some release of energy but not violently.</p> <p>0 Materials which in themselves are normally stable, even under fire exposure conditions and which are not reactive with water.</p>

NIOSH Pocket Guide

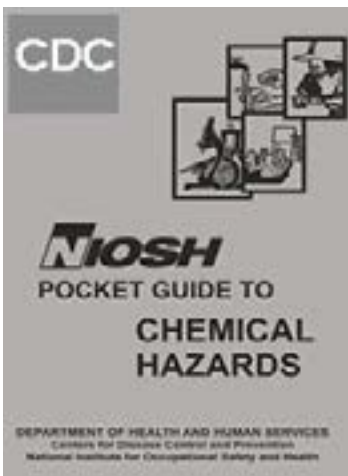
The **NIOSH Pocket Guide to Chemical Hazards** describes more than 600 chemicals. These are all the chemicals for which OSHA has a Permissible Exposure Limit (PEL), plus some others for which NIOSH has recommended a standard.

In order to pack a lot of information into one book, the NIOSH Pocket Guide uses many abbreviations. These are all explained in the front part of the book.

The Guide gives an **Immediately Dangerous to Life or Health (IDLH)** level for many chemicals. This is the **airborne concentration that “is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such environment.”**

“Carcinogen” means something that causes cancer.

If the chemical is a **carcinogen**, you will find “**Ca**” written in the IDLH column. NIOSH believes that any exposure to a carcinogen increases your risk of cancer, which is a permanent adverse effect. Therefore, no other IDLH value is listed for carcinogens.



If you can't find the chemical you're looking for, look in the “Synonym and Trade Name Index”, the “CAS Number Index”, or the “DOT ID Number Index” at the back of the book. These indexes give the page on which the chemical is listed.

The **IBT Safety and Health Department** has many Fact Sheets about hazardous materials and other safety and health hazards. To obtain copies, go to the Teamsters internet site www.teamster.org and click on "Members" and then "Safety and Health." You can also call the IBT Safety and Health Department between the hours of 9:00 AM and 5:00 PM (EST) at **(202) 624-6960**.

There are hundreds of internet sites with health and safety information. Here are just a few sites to help you get started. All have links to other useful sites.

- **U.S. Occupational Safety and Health Administration (OSHA):**
www.osha.gov
- **U.S. Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration:**
www.phmsa.dot.gov/hazmat
- **National Institute for Occupational Safety and Health (NIOSH):**
www.cdc.gov/niosh
- **New Jersey Department of Health:**
www.state.nj.us/health/eoh/rtkweb

**For More
Information
about Health
and Safety
Hazards**

Activity 1: HazMat Match

Instructions: Match the classes(left) below with the right label (right).

Class 1 _____



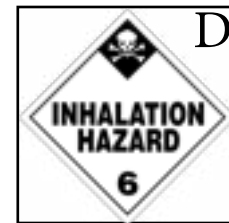
Class 2 _____



Class 3 _____



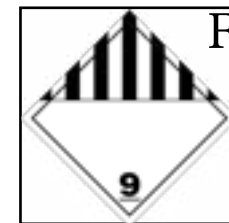
Class 4 _____



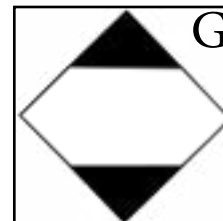
Class 5 _____



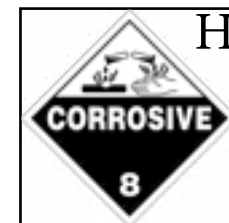
Class 6 _____



Class 7 _____



Class 8 _____



Class 9 _____



Limited Quantities _____



Activity 2: Dirty Dozen

Instructions: Using the ERG, fill in the information below with the information provided

1. What is the guide number?

2. What is the name of the material?

3. Are these vapors flammable?

4. Will this material float or sink when mixed with water?

5. What are routes of entry of this chemical?

6. Name a symptom that results from exposure to vapors?

7. How do we protect the public?

8. How do we protect responders?

9. Name the chemical form (family of hazards)?

10. Will vapors rise or sink in air?

11. What is the evacuation distance of a tanker truck on fire?

12. What first aid is needed if a worker is soaked to the skin?

Activity 3: Review Questions

1. List the five requirements of the OSHA Hazard Communication Standard (HAZCOM).

2. List the information that must be included on a Safety Data Sheet (SDS).

3. List six types of information that must be on the label of a chemical container.

4. True or false

___ a. An NFPA label has four parts.

___ b. An NFPA label identifies the chemical.

___ c. An SDS must say if the chemical is a carcinogen.

___ d. Only supervisors are required by law to be able to look at an SDS during working hours.

___ e. SDS's usually don't tell the routes of entry.

___ f. Each CAS number is unique (each chemical has a different CAS number).

___ g. It is possible for more than one chemical to have the same UN/NA number.

5. What are the four types of information provided by a National Fire Protection Association (NFPA) label.

- Notes -

Chapter

3



Confined Spaces

Learning objectives

This chapter provides awareness training about the hazards of **confined spaces** so that you will be able to **recognize** and **avoid** them.

If your job requires that you enter a confined space, then you must first receive more detailed training including site specific information about your employer's confined space entry and rescue procedures.

After completing this chapter, you will be able to demonstrate your ability to:

1. **IDENTIFY** five characteristics that make a confined space hazardous.
2. **IDENTIFY** three hazardous atmospheres found in confined spaces.
3. **IDENTIFY** five other hazards found in confined spaces.
4. **IDENTIFY** the requirements for a confined space permit.
5. **IDENTIFY** two reasons why a confined space permit is important.

This chapter provides awareness training - how to recognize and avoid confined spaces. If your job requires you to enter a confined space, then you need additional confined space training, including your employer's entry and rescue procedures.

Confined space work is dangerous and results in many injuries and deaths each year. It is important that you know how to recognize a confined space and understand how hazardous it can be. Before you do work in a confined space you need to know the procedures and equipment that are required for safe entry. You also need to know the rescue procedures.

Confined Spaces Are Hazardous

29 CFR 1910.146 and
1910.120((b)(4)(ii)(I))

This is awareness training. It teaches you to recognize and avoid confined spaces.

If you need to work in a confined space you need additional training.



What Is A Confined Space?

Any health or safety hazard might exist in a confined space.

If anything bad occurs, it will be worse, because it's in a confined space.

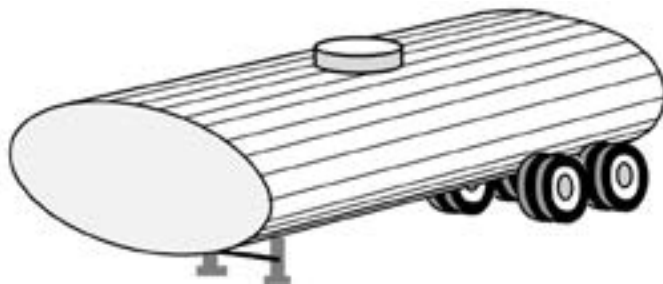
Many confined spaces are easy to recognize: tanks, tank trucks, tank cars, boilers, pipelines, septic tanks, manholes, utility vaults, sewers and ventilation ducts.

In some cases, it might be less obvious whether a work area is a confined space. For example, sumps and pits must be treated as confined spaces even though they appear to be open to the air.

Any type of health or safety hazard might be present in a confined space. However, if an accident or hazardous exposure occurs, the consequences are often worse because they occur in a confined space.

For example, using a chipping hammer to remove slag or corrosion is a noisy operation. Inside a steel tank the noise is even louder. When using a solvent to remove grease, toxic vapors may be released. In a sump pit the concentration of vapors will be greater because there is less air to dilute them.

Also, if an accident occurs in a confined space, it is more difficult to escape or to be rescued.



Several characteristics make confined spaces dangerous:

- **Restricted entry and exit.**
It's hard to get in or out, and difficult for rescue personnel to respond quickly.
- **Not designed for continuous work.**
The space was made for some other purpose, not for people to work there.
- **Poor ventilation.**
It's hard for fresh air to get in or contaminants to get out.
- **May contain a hazardous atmosphere.**
There may be **oxygen deficiency, toxic air contaminants, or flammable gases and vapors.**
- **May contain other hazards.**
Moving machinery, electrical hazards, process liquids, engulfment hazards, extreme hot or cold temperatures.

Hazardous atmospheres are the most common cause of death in confined space accidents. Because of poor natural ventilation, fresh air does not come in easily, oxygen is not replaced and the level of toxic or flammable materials in the air may build up.

What Makes Confined Spaces Dangerous ?

Three types of
hazardous atmospheres:

1. Oxygen deficiency
2. Flammables/Vapors
3. Toxic contaminants

Oxygen Deficiency

Normal air contains 21% oxygen. This is the level that our bodies are designed to live with. Any level below 19½% is oxygen deficient and is unsafe for entry without an atmosphere supplying respirator.

You won't die at 19½%. However, you will probably begin to experience tiredness, delayed reflexes and poor coordination. At lower levels more serious effects occur.

The oxygen levels of any confined space must be tested before anyone enters. It must also be tested during the time that workers are inside, because conditions may change.

- Welding or other activities can use up oxygen.
- Running mechanical equipment using up oxygen
- Other gases such as carbon dioxide or nitrogen might displace oxygen.

It is also possible to have too much oxygen. Greater than 23.5% is also not allowed. Extra oxygen is an extreme fire hazard because it makes combustible materials burn much more easily.

Oxygen Levels

More than 23.5% is Oxygen Enriched

23.5% OSHA maximum for safe entry

21% Normal

19.5% OSHA minimum for safe entry

Less than 19.5% is Oxygen Deficient

Flammable gases and vapors can accumulate in a confined space. They may come from material stored in the space. They might also be generated by workers in the space, for example, using cleaning solvents.

If there is the right concentration of a flammable material in the air, then the concentration is in the explosive (or flammable) range. Any ignition source, even a small spark, can start a fire or explosion. In a confined space the result can be deadly.

OSHA does not allow entry into a confined space if the concentration is greater than 10% of the LEL. Use the Combustible Gas Indicator (CGI) or a multigas meter to measure the flammable concentration.

What if the actual concentration were above the UEL? That doesn't mean it's safe to enter. Activity in the space might allow some vapor to escape and more air to come in. The concentration would drop into the explosive (or flammable) range.

Any toxic air contaminant might be encountered in a confined space, depending on what the space was used for, or what products workers bring into the space:

- Gases produced by decomposition or decay.
- Residues and sludges from stored materials.
- Cleaning solvents.
- Welding or hot processes that releases toxic fumes.
- Materials that enter the space through pipes that have not been properly disconnected.
- Running internal combustion engines.

Flammables

No entry is allowed if the concentration is greater than one tenth of the LEL.

Toxic Atmospheres

Toxic contaminants come in two forms:

- 1. Gases / vapors**
- 2. Particulates**

Safety With Hazardous Atmospheres

To know it's safe,
air monitoring must be
done:

1. Before anyone enters.
 2. During the time that workers are inside.
-

Never enter a confined space unless proper monitoring is being done. **Stay out, or get out, if there is:**

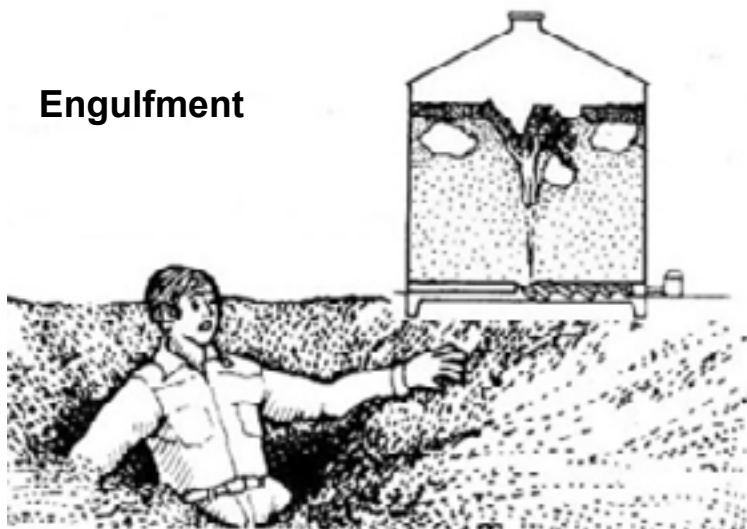
- **Oxygen Level:**
 - **Less than 19.5% oxygen.**
Unless you are wearing an SCBA or an air-line respirator with escape cylinder.
 - **More than 23.5% oxygen**
- **More than 10% of the LEL of a flammable material.**
- **More than 50% of the PEL of an air contaminant.**
Unless you are wearing the proper respirator.
- **More than the IDLH of a toxic air contaminant.**
Unless you are wearing an SCBA or an air line respirator with escape cylinder.

Do not enter to do the initial testing. Use equipment with a hose or other remote capability.

Continue monitoring while workers are inside.
Conditions may change!

All monitoring must be done by a properly trained person using the appropriate, calibrated equipment.

Engulfment



Other Confined Space Hazards

Electrical Hazards: Electrically-operated equipment such as pumps, heating coils, electric tools and temporary lighting create the risk of electric shock. The risk is greater if there are wet surfaces or standing water.

Sparks: Electrical equipment can create sparks that ignite a flammable atmosphere. If there is any possibility of a flammable atmosphere, use explosion-proof lighting and wiring, and air driven-tools.

Moving Machinery: All moving parts such as mixing blades must be properly locked out so that the equipment does not start up accidentally.

Process Liquids: Liquids create hazards of drowning or toxic exposure. Pipes must be blocked off so that liquids cannot accidentally enter while workers are inside.

Engulfment Hazards: Loose material such as sand, grain, or coal can engulf and suffocate a person. The material can “bridge over”, creating what looks like a safe surface, but which breaks and swallows a worker who steps on it.

Extreme Temperatures: Extremely hot or cold temperatures can be a hazard. If the space has been steam-cleaned, allow it to cool before workers enter. Any heating or cooling equipment should be properly locked out so that it cannot activate accidentally.

Noise: Reverberation makes noise even louder in a confined space. Loud noise can damage hearing and interfere with communication.

Falling Objects: Watch out for the possibility of falling objects, especially in spaces with overhead openings.

Confined Space Program

The OSHA Standard for Confined Spaces in general industry is 29 CFR 1910.146.

Working in a confined space is dangerous. Your employer must provide you with the proper training, equipment and supervision to reduce the risks involved in confined space entry. This means that your employer must have a comprehensive Confined Space Program.

OSHA requires a Confined Space Program that includes:

- Identifying and labeling confined spaces.
- A Confined Space Permit System.
- Evaluation of the hazards before anyone enters.
- Air monitoring before and during the entry.
- Specific safe work practices.
- All necessary safety equipment.
- Standby personnel to monitor workers inside and to summon the rescue team if an accident occurs.
- Training for all workers and supervisors involved.
- Close-out procedures to make sure that all workers have left safely and it is OK to return the space to its intended purpose.
- A rescue plan.
- Procedures for sharing information about confined spaces if there are multiple contractors.

OSHA requires your employer to determine if there are any confined spaces in the workplace. Each confined space must be posted with a sign. This is an example:



Although not specifically required by OSHA, a confined space sign might also include specific work practices such as what type of respirator to wear. The sign might also include an emergency phone number.

Entry means putting any part of your body into the confined space. If you stick your head through the opening to get a quick look or to sniff the air inside, you have just entered the confined space. These are unsafe work practices unless all safe entry procedures have been followed, including, if necessary, wearing the proper respirator.

Labeling and Posting

29 CFR 1910.120 (b) (4) (ii) (I)

In many cases, it is appropriate to lock the confined space to prevent unauthorized entry.

What Does “Entry” Mean?

Never stick your head inside to get a quick look or sniff the air. One breath could be fatal.

Confined Space Permits

All confined spaces should be treated as permit spaces until it is determined otherwise.

A Confined Space Permit takes time to fill out properly.

Don't cut corners. Failure to carefully complete the permit could cost lives.

If the work will be continued by a different crew, or by the same crew on a different shift, this is a new entry and a new permit should be issued.

The Confined Space Permit authorizes the work to be done and certifies that all necessary safety procedures are in place. The permit must include:

- The location of the confined space.
- The purpose of the entry.
- The date and duration of the entry.
- Names of all workers who will enter.
- Names of standby personnel.
- Supervisor's name and signature.
- Identification of all present or potential hazards.
- Specific procedures such as lock-out, ventilation and purging.
- Air testing to be done before and during entry.
- How to summon the Rescue Team.
- Communication procedures.
- List of all required PPE, including respirators.
- If "hot work" such as welding is to be done, an additional Hot Work Permit must be issued.

The permit is not just a piece of paper. It serves two very important purposes:

- Assures that time is taken to identify all hazards and to take all necessary precautions to protect the lives of workers. It's like the checklist that a pilot goes through before taking off.
- Requires the supervisor to take responsibility, in writing, for assuring that safe work practices are followed. It holds the supervisor accountable.

If monitoring reveals oxygen deficiency, toxic contaminants, or flammables then the space must be ventilated and tested again before workers enter.

Ventilation works best if clean air is blown into the space at one end and allowed to exit at the other end. If the space has only one opening, blow air in through a hose located as far into the space as possible. Fresh air will travel through the space and push out contaminants on its way out.

Use clean air. Make certain the blower's intake is not near a source of contaminants such as vehicle exhaust.

Sometimes an inert gas such as argon or carbon dioxide is used to purge a confined space. Even if the material used for purging is not toxic, it can cause oxygen deficiency by displacing the air inside the space. Ventilate with fresh air and monitor before entering.

Why Is The Permit So Important?

Ventilation and Purging

For example, to ventilate a manhole, run the hose to the bottom so that contaminated air is forced up and out.

Lock-Out/ Tag-Out

Each worker should have their own lock. Equipment can only be turned on after each worker has removed their own lock.

Standby Attendant

More than 50% of all the workers who die in confined space accidents are would-be rescuers who enter without the proper equipment and training.

It is essential to isolate a confined space from sources of hazardous energy. The best method is lock-out:

- Lock-out electrical circuits by removing circuit breakers and putting locks on the switches.
- Lock-out pipes by removing a section of pipe and sealing both exposed ends with solid plates. This is called “double blank and block.”
- Lock-out mechanical equipment by removing gears, drive shafts or chain drives.

Also tag-out the equipment with a sign to alert others that the equipment must remain out of service.

Remember that tag-out by itself – without lock-out – does not prevent an accidental start-up.

A trained attendant (standby person) must be assigned to remain outside the confined space while workers are inside. The attendant should not have any other duties such as operating equipment or moving supplies that prevent giving his or her full attention to the workers inside the confined space.

The attendant is responsible for starting the rescue procedure that is described in the employer’s Site Safety and Health Plan. Usually this means calling the rescue team.

The attendant should only enter the confined space if he or she is part of the rescue team and is properly trained and equipped. If they do enter the confined space, they must be replaced with someone with the same knowledge/training.

Rescue

More than one-half of all the workers who die in confined space accidents are would-be rescuers. They die because they do not have the training or equipment to perform a safe rescue. It is normal to want to help your fellow worker. However, you are not helping if you only add to the list of fatalities.

The only effective way to protect confined space workers is to have a Rescue Plan and specially-trained and equipped rescue personnel.

The rescue team must practice or drill regularly in the various situations which might occur. This includes entering different kinds of confined spaces and extracting actual workers or mannequins.

In many cases, it is best to provide for non-entry rescue. This means that the workers entering the confined space are equipped with harnesses that will allow them to be extracted without anyone else actually entering.

OSHA allows the employer to rely on an off-site rescue team such as a fire department. However, these rescuers might arrive too late.

Many confined space accidents result in multiple deaths when would-be rescuers enter without the right training and equipment.

You have the best protection if your employer maintains a properly trained and equipped on-site rescue team.

Activity 1: Confined Space Permit

Instructions: In the space provided below, write what section of the confined space permit (on the next page) each piece of information can be found in.

- ____ The location of the confined space.
- ____ The purpose of the entry.
- ____ The date and duration of the entry.
- ____ Names of all workers who will enter.
- ____ Names of standby personnel.
- ____ Supervisor's name and signature.
- ____ Identification of all present or potential hazards.
- ____ Specific procedures such as lock-out, ventilation and purging.
- ____ Air testing to be done before and during entry.
- ____ How to summon the Rescue Team.
- ____ Communication procedures.
- ____ List of all required PPE, including respirators.
- ____ If "hot work" such as welding is to be done, an additional Hot Work Permit must be issued.

Activity 2: What's Wrong with this picture?

Instructions: In the pictures below, circle any safety hazards you see and write down what is wrong in the space provided below.



Activity 3: Review Questions

1. Identify five characteristics that make confined spaces hazardous.

2. Identify three hazardous atmospheres that might be found in a confined space.

3. Identify five other hazards that might be found in a confined space.

4. Identify eight requirements for a proper confined space program.

Activity 3: Review Questions

1. Identify five characteristics that make confined spaces hazardous.

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3. Identify five other hazards that might be found in a confined space.

4. Identify eight requirements for a proper confined space program.

5. Identify two reasons why a confined space permit is important.

- Notes -