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Occupational Safety & Health Training

# Confined Space Safety in Construction

In the construction industry, entering confined spaces is often necessary and dangerous. Compliance with OSHA's regulations and guidance will significantly improve the safety of construction workers who enter confined spaces, and could prevent at least five construction worker fatalities and many more rescuer fatalities. This course contains information on confined spaces in construction including safe entry procedures, the permit space program, duties and responsibilities, and best practices on a construction project.

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# OSHAcademy Course 816 Study Guide

## Confined Space Safety in Construction



This study guide is designed to be reviewed off-line as a tool for preparation to successfully complete OSHAcademy Course 815.

Read each module, answer the quiz questions, and submit the quiz questions online through the course webpage. You can print the post-quiz response screen which will contain the correct answers to the questions.

The final exam will consist of questions developed from the course content and module quizzes.

We hope you enjoy the course and if you have any questions, feel free to email or call:

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# Course Introduction

In 2014, two workers were asphyxiated while repairing leaks in a manhole, the second when he went down to save the first – which is not uncommon in cases of asphyxiation in confined spaces. Unfortunately, tragedies like this happen too often throughout the world, but confined space rescues can have a good outcome if effective confined space programs are developed.

In the construction industry, entering confined spaces is often necessary, but fatalities like these do not have to happen. Compliance with OSHA's regulations and guidance will significantly improve the safety of construction workers who enter confined spaces, and could prevent at least five construction worker fatalities and many more rescuer fatalities. It may also prevent nearly 800 serious injuries every year.

OSHA's 29 CFR 1 926, Subpart AA, Confined Spaces in Construction, sets forth requirements for practices and procedures to protect employees engaged in construction activities at a worksite with one or more confined spaces.

## Course Objectives

This course contains information on confined spaces in construction including safe entry procedures, the permit space program, duties and responsibilities, and best practices on a construction project.

This course has been developed to explain basic requirements detailed within OSHA Standard 29 CFR 1926, Subpart AA – Confined Spaces in Construction, which will assist employers in establishing and maintaining an effective construction confined space program. By implementing such a program, our employees will be able to:

- Recognize, evaluate, and control confined space hazards.
- Save lives and protect employees from job-related injuries and illnesses.
- Promote safe and effective work practices.
- Reduce preventable workers' compensation costs.
- Comply with company procedures and practices.

# Module 1: Construction Confined Space Basics

## What is a Confined Space?

Before we get into the requirements of a confined space program, let's discuss the basic characteristics of a confined space. In the United States, a confined space is a space that meets each of the following three conditions:

1. **It is large enough and so configured that an employee can fully enter the space and perform work.**

A space that is just large enough for a person to squeeze into, but not perform any work, is not a confined space. Similarly, a space that is too small for a person to enter completely is not a confined space. Note: In Canada, according to the Canadian Centre for Occupational Health and Safety (CCOHS), the size of the space does not matter. A confined space is an enclosed or partially enclosed space that:

- is not primarily designed or intended for human occupancy
- has a restricted entrance or exit by way of location, size, or means
- can represent a risk for the for the health and safety of anyone who enters

2. **It has limited or restricted means for entry, exit, or both.**

If a person must contort his or her body to enter or move around inside a space, it probably has a limited means of entry and exit. Climbing through a porthole or hatch to enter a space or crawling through a tunnel toward an exit are examples of spaces that have limited means of entry and exit.

Another way of measuring limited means of entry and exit is to determine how difficult it would be to remove an injured person from the space. If there is a need for a technical rescue to remove an injured person, you probably have a limited means entry and exit. Evaluate each space on a case-by-case basis.

3. **It is not designed for continuous human occupancy.**

What is the primary function and purpose of the space? A space that is designed for periodic occupancy is not the same as a space that is designed for continuous occupancy.
The presence of a fixed ladder, lighting, or ventilation does not always mean the space was designed for continuous occupancy. Is the space designed for a person to work there or is it

designed to house and protect equipment that needs to be monitored or occasionally maintained? For example, a space may have lighting for periodic occupancy that may be necessary to safely enter and exit, read gauges, or perform maintenance or repairs.

Ventilation may be necessary to keep equipment from overheating or to provide fresh air for temporary job assignments or tasks. In both cases, the work performed is intermittent or temporary.

### What is a permit space?

A permit space is a confined space that also has one or more of the following characteristics:

- It has — or could have — a hazardous atmosphere.
- It contains material that could trap or bury a person.
- It is shaped so that a person could become trapped or asphyxiated.
- It has other safety or health hazards that could harm a person.

Most accidents in permit spaces happen when workers and untrained rescuers do not recognize hazards in the spaces or they do not control the hazards before they enter. Never assume a permit space is safe to enter. Permit spaces can have two types of hazards: hazardous atmospheres and physical hazards.

To help identify the spaces on a worksite, see this sample checklist.

### Hazardous Atmospheres

A hazardous atmosphere affects the air in the space and can cause death or acute illness, or impair the ability of workers to escape. Hazardous atmospheres include:

- Corrosive atmospheres: Corrosive atmospheres accumulate from some manufacturing processes and biological or chemical reactions. Some cause immediate damage to the skin and eyes; some have no immediate effect, but cause cancer with prolonged exposure.
- Flammable or explosive gasses, liquids, vapors, mists, fibers, or dusts: Flammable gases such as acetylene, butane, propane, hydrogen, and methane are common in permit spaces. Grain, nitrated fertilizers, and ground chemicals can produce combustible dusts.

- Air or oxygen displacement: Some substances (such as inerting gasses) can displace air or oxygen in a confined space; examples include nitrogen, helium, steam, Freon, argon, and carbon dioxide.

- Oxygen deficiency. Oxygen-deficient atmospheres (oxygen concentration below 19.5 percent) affect heart rate, muscle coordination, and breathing. Unprotected workers cannot survive in an oxygen-deficient atmosphere.

- Oxygen enrichment: Oxygen-enriched atmospheres (oxygen concentration above 23.5 percent), which can be caused by welding and from the improper use of oxygen for breathing air, increase the risk of fire or explosions.

- Toxic dusts, mists, fumes, smoke, vapors, fibers, or gases: These can be released by manufacturing processes, stored materials, and work tasks. A hazardous atmosphere that poses a threat to life, would cause irreversible adverse health effects, or that would interfere with an individual's ability to escape from a confined space is called immediately dangerous to life or health (IDLH).

Some hazardous atmospheres (hydrogen fluoride gas and cadmium vapor, for example) may cause serious health effects that result 12 to 72 hours after exposure.

### Air-monitoring Equipment

Trained employees can use an air-monitoring meter to test for hazardous atmospheres. However, they must first calibrate the meter and use it according to the manufacturer's instructions.

Inaccurate instruments can expose workers to excessive levels of toxic gas or an oxygen-deficient atmosphere.

The only way to guarantee that an instrument will detect gas accurately is to test it every day before you use it using a "bump test".

A bump test verifies that an air-monitoring meter is properly calibrated. You perform a bump test by exposing the meter to a known concentration of test gas. Compare the instrument reading to the actual quantity of gas present. If the instrument's response is within an acceptable tolerance range of the actual concentration, then the meter is calibrated properly.

**Confined Spaces: Safe Yesterday, Deadly Today:** This is an excellent short video produced by WorkSafeBC.

## Physical Hazards

Physical hazards come in many different forms and can cause death or serious physical harm. Examples include:

**Access problems:** In an emergency, entrants may not be able to exit quickly.

**Absorbed chemicals:** Chemicals can be absorbed through the skin or other tissues or membranes such as the eyes.

**Corrosive chemicals:** Corrosive chemicals can cause severe eye or skin damage if exposed

workers are not wearing protective clothing or eyewear.

**Falling objects:** Objects can fall into the space because topside openings are unguarded or improperly guarded.

**Illumination problems:** Poor lighting makes it difficult for workers to enter, work in, and exit a permit space.

**Inwardly converging surfaces:** Inwardly converging walls and downward sloping floors that taper to a smaller cross section can trap a worker.

**Material that could trap or bury a person:** Loose materials drawn from the bottom of storage bins can suffocate or bury a worker. Liquids or materials that are suddenly released into the space can have the same effect.

**Mechanical, electrical, hydraulic, and pneumatic energy**: Mechanical and hydraulic equipment can move unexpectedly. Workers servicing mechanical and hydraulic equipment can be seriously injured or killed if the energy is not properly controlled.

**Noise:** Noise interferes with essential communication between workers in a confined space and those who are monitoring their work on the outside. High noise levels can impair hearing and cause hearing loss. Permit spaces can amplify sounds produced by tools and equipment.

**Radiation:** Sources of radiation include x-rays, isotopes, lasers, and welders.

**Slippery surfaces:** Wet, slippery surfaces increase the risk of falls. Leaks, spills, and condensation are common in permit spaces.

**Extreme temperatures:** Hot environments put workers at risk for heat stress, especially when they do strenuous work or are wearing protective clothing. Cold environments make their tasks more difficult to accomplish.

## Eliminating Physical Hazards

Ways to eliminate physical hazards in a confined space include:

- Locking out equipment (following the requirements in 191.147, The control of hazardous energy -Lockout/Tagout and
- 1926.417, Lockout and tagging of circuits
- Blanking and blinding piping systems (see definitions)
- Physically separating piping systems from the space
- Always evaluate the space in its normal state before eliminating hazards.

## Identifying Confined Spaces

When identifying confined spaces on a worksite, the employer should assume any confined space is a permit space, unless you determine the space to be a non- permit confined space. Before work begins at a worksite, each employer must:

- ensure a competent person identifies all confined spaces in which one or more of the employees it directs may work, and
- identify each space that is a permit space, through consideration and evaluation of the elements of that space, including testing as necessary.

A “Competent Person” is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

## Examples of Confined Spaces in Construction

Examples of locations where confined spaces may occur include, but are not limited to, the following:

## Confined Space in Crawl Spaces and Attics

| | | | |
|---|---|---|---|
| Bins | Air receivers | Vessels | Drilled Shafts |
| Boilers | Transformers | Cesspools | Digesters |
| Manholes | Bag houses | Sludge gates | Silos |
| Scrubbers | Pits | Turbines | Storm drains |
| Vaults | Tanks | Mixers/reactors | Chillers |
| Water mains | Crawl spaces | Incinerators | Attics |
| Blades (wind) | Ducts | Sewers | Lift stations |

Crawl spaces and attics can be both confined spaces and permit spaces under the new standard. For instance, working in an attic and applying a large amount of spray foam (or another chemical) in a short period of time can expose a worker to low oxygen levels or a hazardous atmosphere.

In addition, changes to the entry/exit, the ease of exit, and air flow could create a confined space or cause the space to become permit space.

Crawl spaces can present many confined space hazards, including:

- atmospheric hazards (e.g., flammable vapors, low oxygen levels)
- electrocution (e.g., using electrical equipment in wet conditions, unprotected energized wires)
- standing water
- poor lighting
- structural collapse
- asbestos insulation

Working in attics can also present confined space hazards, such as:

- atmospheric hazards (e.g., poor ventilation)
- heat stress
- mechanical hazards (e.g., attic ventilators, whole house fans)
- electrical hazards (e.g., damaged or frayed wires, open electrical boxes)
- slip, trip and fall hazards
- asbestos insulation

### Confined Spaces in Sewer Systems

Confined space hazards in sewer systems have led to worker deaths. Types of sewer systems include sanitary (domestic sewage), storm (runoff), and combined (domestic sewage and runoff). Sewer systems are extensive and include many different components that are considered confined spaces, including pipelines, manholes, wet wells, dry well vaults, and lift/pump stations. Therefore, employers conducting work in sewer systems will likely have workers who will encounter confined spaces.

Sewer systems can present a host of common confined space hazards, including:

- atmospheric hazards (low oxygen, toxic or flammable gases)
- chemicals in piping and from roadway runoff (may harm lungs, skin, or eyes)
- engulfment and drowning
- electrocution (e.g., using electrical equipment in wet working conditions)
- slips, trips, and falls
- falling objects
- high noise levels, low visibility, limits to communication, and long distances to exits

Construction work can create confined spaces and permit spaces, even if there are none at the start of a project. Changes to the entry/exit, the ease of exit, and air flow could produce a confined space or cause one to become permit space.

## Employer Actions

The employer who identifies or receives notice of one or more permit spaces on a worksite must:

**Post danger signs.** Inform exposed employees by posting danger signs warning of the existence and location of, and the danger posed by, each permit space. The employer may use any other equally effective means to inform exposed employees. A sign reading "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or using other similar language can be used.

**Inform employees and contractors**. Inform its employees' authorized representatives and the controlling contractor of the existence and location of, and the danger posed by, each permit space. The Controlling Contractor is the employer that has overall responsibility for construction at the worksite. Notice must be given in a timely manner and in a manner other than posting.

**Prevent unauthorized entry.** Take effective measures to prevent any unauthorized employees from entering permit spaces.

**Develop a Permit Space Program.** Develop and implement a written permit space program if any of its employees are directed and authorized to enter permit spaces. The written program must be available prior to and during entry for inspection by employees and their authorized representatives.

## Module #1 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

1. **In the United States, which of the following is one of the criteria for a confined space?**

    a. it is designed for human occupation
    b. it allows full entry and work within the space
    c. it allows unrestricted entry into the space
    d. it is too small for a person to enter the space

2. **Which of the following is NOT one of the four criteria for a permit space?**

    a. It has — or could have — a hazardous atmosphere.
    b. It contains inadequate space for two persons.
    c. It is shaped so that a person could become trapped or asphyxiated.
    d. It has other safety or health hazards that could harm a person

3. **Which of the following might reclassify a crawl space as a permit space?**

    a. low oxygen level
    b. dry conditions
    c. too much lighting
    d. noise levels

4. **Sewer systems can present a host of common confined space hazards, including:**

    a. excessive light
    b. structural collapse
    c. asbestos insulation
    d. engulfment and drowning

5. **When an employer identifies or receives notice of one or more permit spaces on a worksite the employer must _____.**

    a. post a notice on the safety bulletin board
    b. report it to OSHA
    c. inform employees and contractors
    d. post a "Warning - Enter at Own Risk" sign

# Module 2: Permit Space Program (PSP)

Confined space operations in construction are guided by a formal written Permit Space Program (PSP) that sets policies, processes, procedures, practices that:

- identify confined spaces and the hazards they may contain;
- allow employers to organize the work to avoid entry into a potentially hazardous space;
- remove hazards prior to entry to avoid
- employee exposure;
- restrict entry through a permit system where employers cannot remove the hazard;
- provide appropriate testing and equipment when entry is required; and
- arrange for rescue services to remove entrants from a confined space when necessary.

## Employee Participation

Employers must consult with affected employees and their authorized representatives on the development and implementation of all aspects of the PSP. They must also make available to each affected employee and his/her authorized representatives all required PSP information by OSHA.

## Program Development

Under the PSP, the employer must develop and implement means, procedures, and safe practices necessary to assure safe permit space operations and prevent unauthorized entry to confined spaces. They must also Identify and evaluate the hazards of permit spaces before employees enter them.

## Means, Procedures, and Practices

The employer must develop and implement the means, procedures, and practices in the PSP

that, as a minimum, do the following:

- specifies acceptable entry conditions;
- provides each authorized entrant or that employee's authorized representative with the

- opportunity to observe any monitoring or testing of permit spaces;
- Isolates the permit space and physical hazard(s)
- within the space;
- uses purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards. When an employer is unable to reduce the atmosphere below 10 percent of the Lower Flammability Limit (LFL),
- the employer may only enter if the following three conditions are met:
    - the employer inerts the space so as to render the entire atmosphere in the space non- combustible,
    - employees use PPE to address any other atmospheric hazards (such as oxygen deficiency), and
    - the employer eliminates or isolates all physical hazards in the space.
- determines that, in the event the ventilation system stops working, the monitoring procedures will detect an increase in atmospheric hazard levels in sufficient time for the entrants to safely exit the permit space;
- provides pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards;
- verifies that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry;
- ensures that employees are not allowed to enter into, or remain in, a permit space with a hazardous atmosphere unless the employer can demonstrate that personal protective equipment (PPE) will provide effective protection for each employee in the permit space and provides the appropriate PPE to each employee; and
- Eliminates any conditions (for example, high pressure) that could make it unsafe to remove an entrance cover.

## Confined Space Equipment

The employer must provide PSP equipment at no cost to each employee, maintain that equipment properly, and ensure that each employee uses that equipment properly. Equipment for use under the PSP includes:

- Hazardous atmosphere testing and monitoring equipment;
- Ventilating equipment needed to obtain acceptable entry conditions;
- Communications equipment including any necessary electronic communication equipment for attendants assessing entrants' status in multiple spaces;
- Personal protective equipment insofar as feasible engineering and work-practice controls do not adequately protect employees;
- Lighting equipment that meets the minimum illumination requirements and is approved for the ignitable or combustible properties of the specific gas, vapor, dust, or fiber that will be present, and that is sufficient to enable employees to see well enough to work safely and to exit the space quickly in an emergency;
- Barriers and shields as required;
- Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;
- Rescue and emergency equipment;
- Any other equipment necessary for safe entry into, safe exit from, and rescue from, permit spaces.

## Permit Space Evaluation Procedures

The employer must use the following procedures to evaluate permit space conditions whenever entry operations are conducted.

Test conditions in the permit space to determine if acceptable entry conditions exist before

changes to the space's natural ventilation are made, and before entry is authorized to begin. If the employer proves that isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), the employer must:

- Perform pre-entry testing to the extent feasible before entry is authorized; and,
- If entry is authorized, continuously monitor entry conditions in the areas where authorized entrants are working.
- If the employer can prove that equipment for continuously monitoring that hazard is not commercially available, periodic monitoring of the permit space atmosphere may be used in accordance with 1926.1204(e)(2);
- Provide an early-warning system that continuously monitors for non-isolated engulfment hazards. The system must alert authorized entrants and attendants in sufficient time for the authorized entrants to safely exit the space.
- Continuously monitor atmospheric hazards unless it can be proved that the equipment for continuously monitoring a hazard is not commercially available or that periodic monitoring is of sufficient frequency to ensure that the atmospheric hazard is being controlled at safe levels. If used, periodic monitoring frequency enough to ensure acceptable entry conditions are being maintained during the course of entry operations.

### Testing for Hazardous Atmospheres

The employer should follow these procedures when testing for hazardous atmospheres within a permit space:

- Test for hazardous atmospheres in the following order:
  - **O**xygen level
  - **F**lammable/combustible gases and vapors
  - **T**oxic gases and vapors

To help you remember this order, just remember "***OFT***".

- Provide each authorized entrant or that employee's authorized representative an opportunity to observe the pre-entry and any subsequent testing or monitoring of permit spaces;

- Reevaluate the permit space in the presence of any authorized entrant or that employee's authorized representative who requests that the employer conduct such reevaluation because there is some indication that the evaluation of that space may not have been adequate; and,

- Immediately provide each authorized entrant or that employee's authorized representative with the results of any testing conducted.

### Entry Team Designation

The employer must to the following:

1. Designate each person who is to have an active role (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations,

2. Identify the duties of each such employee, and

3. Provide each team member adequate required training.

### Permit Space Attendants

The employer should provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations. Some important points to remember include:

- Attendants may be assigned to more than one permit space provided the duties can be effectively performed for each permit space.

- Attendants may be stationed at any location outside the permit space as long as the duties can be effectively performed for each permit space to which the attendant is assigned.

- If multiple spaces are to be assigned to a single attendant, the employer must include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of those permit spaces without distraction from the attendant's responsibilities.

- Note: Proving that an attendant can monitor multiple permit spaces without distraction will prove to be difficult. Don't attempt to do this unless you are certain that the procedures will work.

### Rescue and Emergency Services

Develop and implement procedures for summoning rescue and emergency services (including procedures for summoning emergency assistance in the event of a failed non-entry rescue), for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue.

### Administering Entry Permits

Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this standard, including the safe termination of entry operations under both planned and emergency conditions.

### Coordinating Multi-Employer Entry Operations

The employees of one employer must not endanger the employees of another employer while working in a permit space. When employees of more than one employer are working simultaneously in a permit space or elsewhere on the worksite the employer must:

- develop and implement procedures to coordinate multi-employer entry operations
- consult multi-employer permit space operations with the controlling contractor

### Concluding Work in the Space

The employer must develop and implement procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed.

### Confined Space Program Review

The employer must review entry operations when the measures taken under the permit space program may not protect employees. If deficiencies are found, the employer must revise the program to correct deficiencies found to exist before subsequent entries are authorized.

Examples of circumstances requiring the review of the permit space program include, but are not limited to:

- any unauthorized entry of a permit space,
- the detection of a permit space hazard not covered by the permit,
- the detection of a condition prohibited by the permit,

- the occurrence of an injury or near-miss during entry,
- a change in the use or configuration of a permit space, and
- employee complaints about the effectiveness of the program.

Review of the permit space program, using the canceled permits should occur within 1 year after each entry. The permit space program should be revised as necessary to ensure employees participating in entry operations are protected from permit space hazards.

Employers may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

## Module #2 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

1. **A formal written Permit Space Program (PSP) sets policies, processes, procedures, practices that _____.**

   a. remove hazards during team entry to reduce or avoid exposure
   b. report infractions directly to OSHA
   c. rely solely on employee rescue teams during emergencies
   d. restrict entry through a permit system where employers cannot remove the hazard

2. **What is the purpose of purging, inerting, flushing, or ventilating the permit space?**

   a. mitigate and control physical hazards
   b. eliminate or control atmospheric hazards
   c. ensure hazards are detected and addressed
   d. reduce inert gasses to acceptable levels

3. **What must be proven before permit space attendants may be assigned to monitor more than one permit space at a time?**

   a. They have been trained on multiple-space attendant duties.
   b. The employer has formally approved the procedure.
   c. They can do so without distraction from responsibilities.
   d. A suitable means of communication is available.

4. **Who must the employer consult with when conducting multi-employer entry operations?**

   a. the host contractor
   b. the controlling contractor
   c. the on-site safety supervisor
   d. OSHA representatives

**5. How often should the permit space program be reviewed by the employer?**

a. at least every 12 months
b. after each entry is completed
c. within two years of the first entry
d. as needed by the host employer

# Module 3: Permit Space Entry Procedures

Before workers enter a permit space, you must ensure that the hazards associated with the space have been eliminated or controlled.

A completed entry permit verifies that hazards have been eliminated or controlled and the permit space is safe. The entry supervisor must certify that the space is safe to enter, sign the entry permit, and post it on the space so that authorized entrants can see it.

## Permit Space Pre-Entry Communication and Coordination

**Host Employer Communications**: The host employer owns or manages the property where the construction work is taking place. Before permit space entry operations begin, the host employer must provide the following three items of information, if it has it, to the controlling contractor:

1. he location of each known permit space;
2. The hazards or potential hazards in each space or the reason it is a permit space; and
3. Any precautions that the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space.

**Controlling Contractor Communications:** The controlling contractor has overall responsibility for construction at the worksite. If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer. Before entry operations begin, the controlling contractor must:

- Obtain the host employer's information about the permit space hazards and previous entry operations; and
- Provide the following information to each entity entering a permit space and any other entity at the worksite whose activities could foreseeably result in a hazard in the permit space:
  - Information received from the host employer;
  - Additional information the controlling contractor has including information about the permit space, hazards, precautions and previous operations; and
  - Precautions that the host employer, controlling contractor, or other entry employers implemented to protect employees in the permit spaces.

If there is no controlling contractor present at the worksite, the controlling contactor's role and responsibilities must be fulfilled by the host employer or other employer who arranges to have employees of another employer perform work that involves permit space entry.

**Entry Employer Communications:** The entry employer is usually a subcontractor who decides that an employee it directs will enter a permit space. Before entry operations begin, each entry employer must:

- Obtain all the controlling contractor's information regarding permit space hazards and entry operations; and
- Inform the controlling contractor of the permit space program that the entry employer will follow, including any hazards likely to be confronted or created in each permit space.

**Coordination between the Controlling Contractor and Entry Employer:** The controlling contractor and entry employer(s) must coordinate entry operations when:

- More than one employee performs permit space entry at the same time; or
- Permit space entry is performed at the same time that any activities that could foreseeably result in a hazard in the permit space are performed.

## Safe Entry Conditions

Essential requirements to establish safe entry conditions into a permit space including:

**Guarding the space:** Use warning signs or barriers at entry locations to keep out unauthorized people and to protect entrants from falling objects.

**Isolating the space:** Disconnect, lock out, or tag out hazardous equipment in the space. If you lock out equipment, remember that “lock out” includes testing to ensure the lockout method works.

**Testing the space for hazardous atmospheres:** Test the atmosphere from outside the space for all potential atmospheric hazards, which may include oxygen; flammable gasses, dusts, or vapors; toxic gasses or vapors; and corrosive atmospheres. Provide entrants with test results. Re-test the space if an entrant believes that initial testing was inadequate.

**Eliminating or controlling hazardous atmospheres:** Eliminate or control the hazards in the space then document the method and the steps necessary to eliminate or control the hazards. Allow entrants to observe testing, monitoring, and any other activity necessary to eliminate or control hazards.

For permit spaces that are deep or have areas leading away from the entry point, the atmosphere may be layered or may be different in remote areas. For these spaces, testing must be done in the area surrounding the worker, which is considered four (4) feet in the direction of travel and to each side. If a sample probe is used to do the testing, then the worker must move slowly enough so that testing is completed, keeping the equipment "response time" in mind, before he/she moves into the new area.

**Providing necessary equipment:** Ensure the entrants have the equipment they need to do their jobs (including rescue equipment) and they know how to use the equipment.

**Planning for emergencies:** Attendants must know how to respond to emergencies, including who to contact and how to remove entrants.

## Equipment for Entry

You must have all necessary equipment to ensure safe entry into permit spaces. This equipment can include:

- Testing and monitoring equipment

- Ventilating equipment to maintain acceptable entry conditions
- Communication equipment, such as a two-way radio, for communication between the attendant and entrants, and to initiate a rescue
- Appropriate lighting, so they can see and can exit the space quickly in an emergency
- Barriers or shields to protect them from hazards outside the space such as pedestrians and vehicles
- Ladders or similar equipment so they can enter and exit the space
- Rescue equipment, if they are unable to evacuate in an emergency
- Appropriate personal protective equipment

The equipment must be available to the employees at no cost, must be used in accordance with the instructions from the manufacturer, and the employees must be trained to use it properly.

### Alternative Entry Preconditions

Before the employer can use alternate permit space entry procedures, the employer must prove with supporting monitoring and inspection data that:

- All physical hazards in the space are eliminated or isolated through engineering controls so that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;
- Continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry;
- If, in the event the ventilation system stops working, entrants can exit the space safely;
- If, in the event initial entry to a permit space is necessary to obtain supporting data, required entry will be performed in compliance with OSHA Standard 1926.1204 through 1211;
- All determinations and supporting data are properly documented and made available to each permit space authorized entrant and the authorized representative; and
- Permit space entry will comply with the requirements set forth in OSHA Standard

- 1926.1203(e)(1).

### Alternative Initial Entry Procedures

If the employer can meet the above conditions, entry into permit spaces is allowed using the following procedure:

- Ensure all the conditions making a permit space unsafe to enter are eliminated before the entrance cover is removed,

- After the entrance cover is removed, immediately guard it with a railing, cover or other temporary barrier to prevent falls into the permit space and to protect entrants from falling objects.

Prior to entry, test for each of these conditions in the following order:

1. oxygen content
2. combustible/flammable gases and vapors
3. potential for toxic air contaminants

Allow all permit space entrants to observe the pre-entry testing and results prior to entry.

### Continuous Forced Air Ventilation

Be sure to comply with the following requirements for using continuous forced air ventilation:

- Continuous forced air ventilation must be used whenever employees are inside a permit space.

- Make sure force air ventilation has eliminated all hazardous atmosphere conditions within a permit space prior to and whenever any employee is inside the space.

- Direct forced air ventilation in the permit space where employees are or will be present, and continue ventilating until all employees have completed work and left the space.

- Ensure the air supply for the forced air ventilation is from a clean source. Never place the intake for forced air ventilation near equipment or vehicles creating hazardous fumes.

## Monitoring the Permit Space

It's critically important to monitor the atmosphere within a permit space to make sure it's safe for employees. Monitoring must ensure forced air ventilation is preventing the development of a hazardous atmosphere.

Be sure to always continuously monitor the atmosphere within the space unless one of the following two conditions are met:

- the employer can prove that equipment for continuous monitoring is not commercially available, or
- the employer can prove periodic monitoring is sufficient.

Make sure the monitoring equipment has an alarm to notify all entrants if a specified atmospheric threshold is achieved, or that an employee will frequently check the monitor to make sure employees have time to escape. Periodic monitoring is always required if continuous monitoring is not used.

Ensure employees or their authorized representatives are able to observe monitoring and testing as desired.

## If a Hazard is Detected

It's important to quickly evacuate the space if any kind of hazard is detected. If a hazard is detected during entry or work be sure to do the following:

- Make sure all employees leave the space immediately
- (no exceptions).
- Evaluate the space to see how the hazard developed.
- Take measures to protect employees and eliminate the hazard.
- Do not allow reentry until the hazard is completely eliminated.

It's important to understand that control of atmospheric hazards through forced air ventilation does not constitute elimination or isolation of the hazards unless the employer can prove that forced air ventilation alone will control all hazards in the space.

### Safe Entry Methods

Make sure a safe method of entering and exiting the space is used. If a hoisting system is used, it must be designed and manufactured for personnel hoisting; however, a job-made hoisting system is permissible if it is approved for personnel hoisting by a registered professional engineer, in writing, prior to use.

### Verifying the Space is Safe to Enter

Prior to entry, certify in writing that the space is safe for entry and that required pre- entry measures have been taken.

- Verification should include the following three items:

1. date,
2. the location of the space, and
3. the signature of the person providing the certification.

- Make the certification available to each employee or authorized representative entering the space.

### Reclassifying a Non-Permit Space

Make sure a competent person reevaluates the non-permit space and, if necessary, reclassify it as a permit space when any of the following two conditions exist:

1. there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, or
2. some indication that the initial evaluation of the space may not have been adequate.

### Reclassifying a Permit Space

A permit space may only be reclassified as a non-permit confined space when a competent person determines that each of the following requirements are met:

- The entry employer must eliminate or isolate the hazards without entering the space, unless the employer can prove this is not feasible.

- The permit space poses no actual or potential atmospheric hazards and all other hazards within the space are eliminated or isolated without entry into the space, unless the employer can prove this is not feasible.

- The entry employer must certify in writing the basis for determining that all hazards in a permit space have been eliminated or isolated. Include the date, the location of the space, and the signature of the person making the determination.
- The certification is available to each employee entering the space or the employee's authorized representative.

- If hazards arise within a permit space that has been reclassified as a non-permit space, each employee in the space must exit the space. The entry employer must then reevaluate the space and reclassify it as a permit space as appropriate.

The permit space may be reclassified as a non-permit confined space for as long as testing and inspection demonstrates that the hazards within the permit space have been eliminated or isolated.

### Permit Space Post-Entry Communication and Coordination

**Controlling Contractor Communications:** The controlling contractor must debrief each entity that entered a permit space regarding the permit space program followed and any hazards confronted or created in the permit space(s) during entry operations.

The controlling contractor must also apprise the host employer of the information exchanged with the entrants.

**Entry Employer Communications:** The entry employer must inform the controlling contractor in a timely manner of the permit space program followed and of any hazards confronted or created in the permit space(s) during entry operations.

## Module #3 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

1. **What verifies that hazards have been eliminated or controlled and the permit space is safe?**

    a. the results of atmospheric testing
    b. a completed entry permit
    c. the written confirmation of the controlling contractor
    d. certification of compliance with the OSHA standard

2. **When testing for hazardous atmospheres in a space always check _____.**

    a. using air flow detectors
    b. after entry to the space is approved
    c. as soon as entry has been achieved
    d. from outside the space

3. **For permit spaces that are deep or have areas leading away from the entry point, testing must be done _____in the direction of travel and to each side.**

    a. every foot
    b. continuously within arm's reach
    c. every four (4) feet
    d. every six (6) feet

4. **During alternate entry procedures, forced air ventilation must be directed _____.**

    a. to the top to move air within the space properly
    b. where employees are or will be present
    c. towards the bottom so that lighter-than-air gases are removed
    d. within 6 feet from the entry point

**5. Which of the following must occur to reclassify a permit space as a non-permit confined space?**

a. The entry employer must certify the basis for determining that all hazards have been eliminated or isolated.
b. The permit space poses only hazardous atmospheric hazard that can be isolated.
c. The controlling contractor must certify that the entry employer has met all conditions for reclassification.
d. The certification must be available to all project employees authorized representative.

# Module 4: The Entry Permit Program

## The Entry Permit Process

The employer must also develop a procedure for issuing an entry permit that describes how to:

- Evaluate the space's hazards.
- Evaluate work-related hazards.
- Identify safe entry conditions.

Employees must have access to the completed permit before they enter a permit space so they can confirm that pre-entry preparations have been completed.

Before entry is authorized, each entry employer must document the completion of protective measures for permit space entry by preparing an entry permit. Use the following procedure when preparing the permit:

- Before entry begins, the entry supervisor identified on the permit must sign the entry permit to authorize entry.
- The completed permit must be made available at the time of entry to all authorized entrants or their authorized representatives, so that the entrants can confirm that pre- entry preparations have been completed. Provide the permit by posting it at the entry portal or by any other equally effective means.
- The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit.

## The Entry Permit

The entry permit complies with OSHA requirements and authorizes entry to a permit space must identify:

- The permit space to be entered.
- The purpose of the entry.
- The date and the authorized duration of the entry permit.

- The authorized entrants within the permit space, by name or through the use of rosters or tracking systems. If a roster or tracking system is used, indicate their use on the permit.
- The means of detecting an increase in atmospheric hazard levels in the event the ventilation system stops working.
- Each person, by name, currently serving as an attendant.
- The person, by name, currently serving as entry supervisor, and the signature or initials of each entry supervisor who authorizes entry.
- The hazards of the permit space to be entered.
- The measures used to isolate the permit space and to eliminate or control permit space hazards before entry. Those measures can include, lockout/tagout and procedures for purging, inerting, ventilating, and flushing permit spaces.
- The acceptable entry conditions.
- The results of tests and monitoring including the names or initials of the testers and when the tests were performed.
- The rescue and emergency services that can be summoned and the means for summoning those services.
- The communication procedures used by authorized entrants and attendants to maintain contact during the entry.
- Equipment being used, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment.
- Any other information necessary, given the circumstances of the particular confined space, to ensure employee safety.
- Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

You can view more examples of confined space permits.

### Duration of Testing

For each test required on the permit, you must allow enough time for the air from the space to be drawn into the equipment and for the sensor (or other detection device) to react to the chemical if it is present. This is considered the "minimum response time" and it will be noted by the manufacturer in the operator's manual. Be aware that you will need to add time to this "minimum response time" if you have attached hosing or a probe extension to the inlet. The additional time is needed to allow the air from the different depths of the space to be pulled into the equipment inlet.

### Terminating Permit Space Entry

The entry supervisor must terminate entry and take the following action when any of the following apply:

- When entry operations covered by the entry permit, cancel the permit.
- When a condition that is not allowed under the entry permit arises in or near the permit space and that condition is temporary in nature and does not change the configuration of the space or create any new hazards within, suspend or cancel the entry permit and fully reassess the space before allowing reentry; or
- When a condition that is not allowed under the entry permit arises in or near the permit space and that condition is not atmospheric hazards covered by 1910.1204(e)(2), cancel the entry permit.

### Recordkeeping and Review

**Permit entry:** The entry employer must retain each canceled entry permit for at least 1 year to facilitate the review of the permit space program. Review permits within one year of their cancellation to ensure that the procedures for issuing them are still effective and the information on them still protects employees who enter the space. Any problems encountered during an entry operation must be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

**Alternate entry:** The employer should keep the entry document where the space is located for the duration of the entry; after the entry, there is no requirement to keep it. However, the document may be helpful when you review the effectiveness of your confined space program.

## Module #4 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

1. **What is the limitation placed on duration of the confined space permit?**

    a. It may be valid until the construction project is completed.
    b. It may not exceed the time required to complete the assigned task or job.
    c. The permit may exceed the completion of the job if deemed appropriate by the host employer.
    d. There is no limitation placed on the permit as long as the project is active.

2. **Which of the following is required on the confined space permit?**

    a. measures used to isolate the permit space
    b. names of host and controlling employer
    c. communications methods used by local authorities
    d. means of detecting a decrease in atmospheric levels

3. **What is considered the "minimum response time" when testing a confined space for hazardous atmospheres?**

    a. time it takes for the entrant to feel symptoms from exposure
    b. time needed for the equipment to stabilize for accurate readings
    c. time used to exit the confined space after test equipment sounds an alarm
    d. time required for the air from the space to be drawn into the test equipment

4. **When a condition that is not allowed under the entry permit arises in or near the permit space, the entry supervisor must _____.**

    a. suspend the permit
    b. terminate the permit
    c. revise the permit
    d. update the permit

**5. The entry employer must retain each canceled entry permit for _____to facilitate the review of the permit space program.**

a. at least 1 year
b. at least six months
c. two years or longer
d. for the duration of the project

# Module 5: Confined Space Entry Team Training and Duties

## Confined Space Entry Team Training

The employer must provide training to each employee whose work includes confined space duties at no cost to the employee. The employer must also make sure each employee possesses the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this standard.

## Categories of Confined Space Training

There are six basic categories of confined space training, based on duties and potential exposure:

1. Awareness-level training provided to all employees potentially exposed to permit spaces, covering the following:

- The location and hazard of each space
- The company program for confined spaces
- Emphasis on not entering the space for any reason

2. Hands-on entry and exit training for the following team members:

- Entrants
- Attendants
- Supervisors
- Rescue team members

3. Training on how to manage confined space entries for entry supervisors.
4. Rescue training for rescue team members.
5. Pre-entry procedure training for all:

- entrants
- supervisors
- Attendants
- Rescue team members

6. Training on evaluating and testing confined spaces for:

- Entry supervisors
- Staff assigned to test and evaluate the space

### Training Program Elements

It's important to have a strong confined space safety program to make sure all employees working in or around confined spaces stay safe and healthful. The training must establish employee proficiency in their duties and in new or revised confined space procedures.

Some important elements in an effective training program include:

Training should be provided to each affected employee:

- In both a language and vocabulary that the employee can understand;
- Before the employee is first assigned duties under this standard;
- Before there is a change in assigned duties;
- Whenever there is a change in permit space entry operations that presents a hazard about which an employee has not previously been trained;
- Whenever the permit audit shows deficiencies
- Whenever there is any evidence of a deviation from the permit space entry procedures;
- Whenever there are inadequacies in the employee's knowledge or use of these procedures
- Employees entering confined spaces should be able to demonstrate adequate skills to perform procedures and use all equipment required during confined space operations.
- Employees must understand the specific hazards in each permit space and the methods used to isolate, control or in other ways protect employees from these hazards.
- Employees not authorized to perform confined space entry rescues must be instructed in the dangers of attempting such rescues.

- The employer must maintain training records to show that the training has been accomplished. The training records must contain each employee's name, the name of the trainers, and the dates of training.

- Training documents must be available for inspection by employees and their authorized representatives, for the period of time the employee is employed by that employer.

- Awareness training should be given to employees who work or may work in areas where permit spaces are present. It should explain the permit-space program, the entry permit system, the alternate entry procedures, if used, and how to recognize permit spaces in their work area. It provides a basic overview of the permit space program.

- Retraining for employees when you have any reason to believe they are not proficient at their confined space duties.

- Repeat training when there is a change in the written program and when there are new or previously unidentified permit spaces.

### Authorized Entrant Duties

The entry employer must ensure all authorized entrants:

- Are trained to be familiar with and understand the hazards that may be faced during entry. Training must include information on the mode, signs or symptoms, and consequences of the exposure.

- Properly use equipment during confined space entry.

- Communicate with the attendant to enable the attendant to adequately assess entrant status and to enable the attendant to alert entrants of the need to evacuate the space if required.

- Alert the attendant whenever:

- There is any warning sign or symptom of exposure to a dangerous situation; or

- The entrant detects a prohibited condition.

- Exit the permit space as quickly as possible whenever:

- An order to evacuate is given by the attendant or the entry supervisor;
- There is any warning sign or symptom of exposure to a dangerous situation;
- The entrant detects a prohibited condition; or
- An evacuation alarm is activated.

### Attendant Duties

The entry employer must ensure that each attendant:

- Is properly trained to be familiar with and understand the hazards that may be faced during entry. Training must include information on the mode, signs or symptoms, and consequences of the exposure.
- Is aware of possible behavioral effects of hazard exposure in authorized entrants.
- Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means to identify authorized entrants in the permit space is accurate.
- Remains outside the permit space during entry operations until relieved by another attendant. After an attendant has been relieved by another attendant, the relieved attendant may enter a permit space to attempt a rescue when the employer's permit space program allows attendant entry for rescue and the attendant has been trained and equipped for rescue operations.
- Communicates with authorized entrants as necessary to assess entrant status and to alert entrants of the need to evacuate the space.
- Assesses activities and conditions inside and outside the space to determine if it is safe for entrants to remain in the space.
- Orders authorized entrants to evacuate the permit space immediately under any of the following conditions:
  - If there is a prohibited condition;
  - If the behavioral effects of hazard exposure are apparent in an authorized entrant;
  - If there is a situation outside the space that could endanger the authorized entrants; or

- If the attendant cannot effectively and safely perform his or her duties.

- Summons rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.

- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

  - Warns unauthorized persons that they must stay away from the permit space;

  - Advises unauthorized persons that they must exit immediately if they have entered the permit space; and

  - Informs authorized entrants and entry supervisor if unauthorized persons have entered the permit space.

- Performs non-entry rescues as specified by the employer's rescue procedure; and

- Performs no other duties that might interfere with the attendant's primary duty to assess and protect the authorized entrants.

### Entry Supervisor Duties

The entry employer must ensure that each entry supervisor:

- Is properly trained to be familiar with and understand the hazards that may be faced during entry. Training must include information on the mode, signs or symptoms, and consequences of the exposure.

- Verifies, by checking that:

  - appropriate entries have been made on the permit;

  - all tests specified by the permit have been conducted; and

  - all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.

- Terminates the entry and cancels or suspends the permit as required.

- Verifies that rescue services are available and the means for summoning them are operable, and that the employer will be notified as soon as the services become unavailable.

- Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

- Determines at intervals dictated by the hazards and operations performed within the space that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained whenever responsibility for a permit space entry operation is transferred.

## Module #5 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

1. **Awareness training that is provided to all employees potentially exposed to permit spaces should emphasize ____.**

    a. warning signs of over-exposure
    b. not entering the space for any reason
    c. what to do in an emergency
    d. entering a space only if given permission

2. **Which of the following is one of the duties of the authorized entrant?**

    a. Perform non-entry rescues as specified by the employer's rescue procedure
    b. Summon rescue and other emergency services
    c. Terminate the entry and cancel or suspend the permit
    d. Properly use equipment during confined space entry

3. **Who must receive training on how to manage confined space entries?**

    a. controlling contractors
    b. host employers
    c. entry supervisors
    d. attendants

4. **Which of the following is one of the duties of the attendant?**

    a. Summon rescue and other emergency services
    b. Properly use equipment during confined space entry
    c. Make sure the entry team takes regular 15-minute breaks
    d. Terminate the entry and cancel or suspend the permit

5. **Which of the following is one of the duties of the entry supervisor?**

    a. Communicates with the attendant so the attendant can assess status
    b. Verifies that rescue services are available and the means for summoning them
    c. Perform rescues as specified by the employer's rescue procedure
    d. Summon rescue and other emergency services

# Module 6: Emergency Rescue

It's sad but true, but more than 60% of confined space fatalities occur among would-be rescuers. The reason why: lack of proper training. It's predictable that co-workers will attempt to rescue those who are in trouble in a confined space, and that why it's critical to make sure all confined space rescuers are adequately trained and familiar with the spaces on the worksite.

Watch this short WorkSafeBC video to see what can happen when things go wrong.

## Develop a Rescue Plan

Before employees enter a permit space, the employer must have a procedure for removing them when they are unable to evacuate.

- The procedure must include the process for summoning rescue services and transporting injured entrants to a medical facility.
- Safety Data Sheets (SDS) must be kept at worksites.
- If an entrant is exposed to a hazardous substance, that written material must be made available to the treating medical facility.

## Non-Entry Rescue

Non-entry rescue is required unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.

- The employer must designate an entry rescue service whenever non-entry rescue is not selected.
- Whenever non-entry rescue is selected, the entry employer must ensure that retrieval systems or methods are used whenever an authorized entrant enters a permit space.
- The employer must confirm, prior to entry, that emergency assistance would be available in the event that non-entry rescue fails.

## Retrieval Systems

Retrieval systems for non-entry rescue operations must meet the following requirements:

- Each authorized entrant must use a chest or full body harness. The retrieval line must be attached in one of the following locations:
  - at the center of the entrant's back near shoulder level,
  - above the entrant's head, or
  - at another point which the employer can establish presents a profile small enough for the successful removal of the entrant.
- Wristlets or anklets may be used in lieu of the chest or full body harness if the employer can prove that the use of a chest or full body harness:
  - is infeasible, or
  - creates a greater hazard and using wristlets or anklets is the safest and most effective alternative.
- The other end of the retrieval line must be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.
- A mechanical device must be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 meters) deep.
- Only equipment suitable for retrieval will be used. Examples of unsuitable equipment include:
  - retrieval lines that have a reasonable probability of becoming entangled with the retrieval lines used by other authorized entrants, or
  - retrieval lines that will not work due to the internal configuration of the permit space.
- If an injured entrant is exposed to a substance for which a Safety Data Sheet (SDS) or other similar written information is required to be kept at the worksite, that SDS or written information must be made available to the medical facility treating the exposed entrant.

For more information on confined space emergency retrieval systems check out Oregon OSHA's Tech Notes.

### Evaluating an Emergency Rescue Service

An employer who designates rescue and emergency services must evaluate a prospective rescuer's ability to respond in a timely manner, considering the hazard(s) identified.

What will be considered timely will vary according to the specific hazards involved in each entry:

- If the confined space involves hazards posing an immediate threat to life or health, rescue providers should be located outside the space ready for entry at a moment's notice.
- If the hazard involved is not immediately life-threatening, the employer may designate a rescue service capable of responding within a reasonable time commensurate with the nature of the hazard.
- Since OSHA cannot state in advance whether any specific response time is adequate, employers need to determine what a timely response time is for themselves after review of all the relevant factors.

The employer must also evaluate a prospective rescue service's ability to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified.

### Selecting a Rescue Team

The employer should select a rescue team or service that:

- Has the capability to reach the victim(s) within an appropriate time frame for the permit space hazard(s) identified;
- Is equipped for performing the needed rescue services; and
- Agrees to notify the employer immediately in the event that the rescue service becomes unavailable.

The employer should inform the selected rescue team or service of the specific hazards they may confront when called on to perform rescue in a permit space on the site.

The employer should provide the selected rescue team or service with access to all permit spaces from which rescue may be necessary so the team can develop appropriate rescue plans and practice rescue operations.

### Employee Team Rescue and Services

An employer that has designated employees to provide permit space rescue and/or emergency services must take the following measures:

- Provide all equipment and training at no cost to those employees.
- Provide each affected employee with the personal protective equipment (PPE) needed to conduct permit space rescues safely.

### Employee Rescue Team Training

Effective training an employee rescue team is absolutely critical and should include classroom as well as hands-on practice rescue operations. The employer should train each affected employee:

- so the employee is proficient in the use of PPE and in performing assigned rescue
- so the employee receives the same training as authorized entrants, attendants, and supervisors;
- in basic first aid and cardiopulmonary resuscitation (CPR). At least one member of the rescue team or service holding a current certification in basic first aid and CPR must be available.

### Rescue Team Practice

To make sure the rescue team can most effectively perform their critical duties, the employer must make sure all affected employees practice making simulated permit space rescues in the same types of confined spaces they will encounter before attempting an actual rescue. Important points to remember include:

- Simulated rescue operations should include removing dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces.

- Practice rescue is not required where the affected employees properly performed a successful rescue operation during the last 12 months in the same permit space the authorized entrant will enter, or in a similar permit space.

- Representative simulated permit spaces must have the same opening size, configuration, and accessibility as the actual permit spaces for which training is being conducted.

- Simulated permit rescues must be conducted at least once every 12 months. Training should also occur whenever there is a change in the nature of the hazards, configuration of the permit space, or deemed necessary by the employer.

### Rescue Drill Videos

Here are two good examples of a simulated rescue.

This was rescue drill conducted at a well-known Barossa Winery in August, 2013 after completing Confined Space, SCBA & Rescue training with MSS Safety.

This was a rescue training session by Neptune Special Operations Team. The team is comprised of Neptune Office of Emergency Management, Neptune Fire Department, Neptune EMS and Neptune Police.

## Module #6 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

1. **Which of the following confined space emergency rescue methods is to be used unless it is infeasible?**

    a. direct entry rescue
    b. non-entry rescue
    c. 911 emergency services
    d. local emergency rescue services

2. **When non-entry retrieval systems are used, each authorized entrant must _____.**

    a. use a chest or full body harness
    b. wear a safety belt
    c. wear anklets in addition to wristlets
    d. tie off using a bowline knot

3. **During confined space operations, when must a Safety Data Sheet (SDS) be provided to a medical facility?**

    a. whenever confined space entry is attempted and SDS-required hazardous substances are present
    b. when a confined space entrant has been exposed to the SDS-required hazardous
    c. substance
    d. when required by the medical facility upon notification of construction
    e. if an employee is injured to any physical hazard in the confined space

4. **What is the minimum number of members of a confined space rescue team that must be first aid and CPR trained?**

    a. 1
    b. 2
    c. 3
    d. All

**5. Simulated permit rescues must be conducted _____.**

a. within three months after initial confined space access
b. using computer-aided simulation
c. whenever the controlling contractor deems necessary
d. at least once every 12 months

## Endnotes

*29 CFR Part 1926, Subpart AA, Confined Spaces in Construction*, U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) (5/15). Retrieved from: https://www.osha.gov/FedReg_osha_pdf/FED20150504.pdf

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