



Training Solutions, Delivered!

# **CONFINED SPACE ENTRY**

## ***General Industry and Construction***

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

**Item Number: 4770**

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

## **PREPARING FOR THE MEETING**

Here are a few suggestions for using this program:

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

## **CONDUCTING THE PRESENTATION**

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

# 4770 CONFINED SPACE ENTRY

## *General Industry and Construction*

### FACT SHEET

**LENGTH: 25 MINUTES**

#### **PROGRAM SYNOPSIS:**

By of their very nature, confined spaces pose unique problems to those who work in and around them. Just being in cramped quarters increases the likelihood of an accident occurring, because it brings workers closer to potential hazards than would normally be the case. Whether they will be doing general industry or construction work, employees need to know as much as possible about working safely in and around confined spaces. They also need to be familiar with the OSHA confined space regulations that help to keep them safe. To help address OSHA's concerns and provide the first level of training needed by employees under the regulations, this program is designed to present fundamental information on confined space entry.

Topics include confined space hazards, entry permits, atmospheric testing, safe work practices, duties of the entry team members, non-permit spaces and contract work considerations.

#### **PROGRAM OBJECTIVES:**

After watching the program, the participant should:

- Know what types of spaces are considered "confined spaces."
- Be aware of the types of hazards that can be encountered in confined spaces.
- Understand how a Permit Space Program reduces the risk of entering a confined space.
- Know the roles they may play on a Permit Space Entry Team.
- Know what safety procedures should be implemented before a confined space is entered.
- Know specific procedures for keeping themselves and their coworkers safe during a confined space entry.
- Be able to identify situations where a confined space must be evacuated.

#### **PROGRAM OUTLINE**

##### **CONFINED SPACES ARE DANGEROUS**

- **Most of the time, you routinely take your skills to wherever a job needs to be done and do it.**
  - But it's different when the work has to be done in a confined space, because those jobs are never routine.
- **Confined spaces are dangerous.**
  - Several hundred workers are killed every year while working inside them.
- **That's why OSHA (the Occupational Safety and Health Administration) created its General Industry and Construction Permit-Required Confined Space regulations.**
  - Whenever you're in a confined space these regulations apply to you.
  - And if you're doing "construction"- type work, building, altering or repairing the space, even if you're not a "construction worker" you have to comply with the construction version of the regulation.
- **Whatever you're doing, you need to pay attention, because the principles and practices contained in these regulations can help you avoid becoming a statistic.**
- **What are "confined spaces"?**
  - They're large enough for you to get into and out of, but entry and exit are physically limited or restricted.
  - They're also large enough for you to work in, but they're not designed for continuous use.
- **Confined spaces can take many forms, including:**
  - Tanks.
  - Vessels.
  - HVAC ducts.
  - Storage bins.
  - Water mains.
  - Vaults.
  - Pits.

## CONFINED SPACE HAZARDS

- **The hazards you can find in them fall into four general categories.**
- **The first is "hazardous atmospheres". These may contain:**
  - Too little or too much oxygen.
  - Flammable gases, vapors or dusts.
  - Toxic contaminants.
- **Hazardous atmospheres are the cause of many confined space fatalities.**
- **The next source of risk is something you would expect to find in confined spaces, that is, layouts that create tight areas where you could be trapped or asphyxiated.**
- **Some spaces may contain liquids or finely-grained solid materials that can engulf, crush or suffocate you, the third type of risk associated with confined spaces.**
- **The fourth risk category is a "catch-all" that includes any other serious safety or health risks that may be present in a confined space, such as:**
  - Unguarded machinery.
  - Exposed live wires.
  - Even heat stress.

## THE PERMIT-REQUIRED CONFINED SPACE PROGRAM

- **The best way to avoid these hazards is to bring your work outside of the confined space, but often that's not possible.**
- **The confined space regulations have established a set of standard "safe work practices" to help keep employees safe while working in these spaces.**
- **These procedures are used by a facility to develop its own "Permit-Required Confined Space Program", also known as a "Permit Space Program". This program is intended to:**
  - Control the access to confined spaces.
  - Control the hazards inside them.
  - Protect workers from these hazards.
- **An employer starts out by identifying all of the confined spaces within the workplace that have one or more of the four types of hazardous conditions.**
- **The next step is to inform employees about the spaces by posting "warning signs" by them.**
  - Some of these signs may say that the space is simply "off limits".
- **Other signs will say that a written "Entry Permit" is required to enter the space.**
  - This is known as a "Permit-Required Confined Space", or "Permit Space" for short.
- **When work needs to be done inside one of these Permit Spaces, a careful step-by-step process must be followed to prevent accidents and injuries.**
  - The "Permit Space Program" also ensures that all employees who might enter a Permit Space will receive the safety training they need to do it safely.
- **One of the things that a Confined Space Entry Program will discuss is the "Entry Team". This team consists of:**
  - "Entrants".
  - "Attendants".
  - An "Entry Supervisor".
- **While these are distinct roles, at times an employee will perform more than one of them in the course of an entry.**
  - This means that all team members need to know the hazards that are involved with a space, as well as the signs, symptoms and consequences of exposure to those hazards.

## ENTRY PERMITS

- **The document that prepares the team to enter a confined space safely is called an "Entry Permit".**
  - The permit that is required to enter a confined space is more than just a "permission slip".
  - It also helps guide the Entry Team in getting the job done safely.
  - It's an important source of information before, during and after the entry takes place.
- **The information on an Entry Permit includes:**
  - The location and nature of the confined space to be entered.
  - The reason for the entry.
  - The date and authorized duration of the entry.
- **The Permit must also identify the Entry Supervisor, Entrants and Attendants who have been okayed to work on the job.**
  - It will identify each of the hazards associated with the confined space, and the measures that will be taken to isolate, control or

eliminate them.

— It will specify what conditions have to exist inside the space before it can be entered.

• **When additional documents, such as "Hot Work Permits", are required for the work to proceed, the Entry Permit will list them too.**

— It also lists the personal protective equipment that should be worn, and includes details on any communications gear, atmospheric monitors and alarm systems that will be used.

• **The Permit will contain the contact information for local rescue squads, police and fire stations, as well as a list of any emergency equipment that must be on hand for the entry as well.**

• **Before the entry can begin, the Entry Permit has to be signed by the Entry Supervisor. It will then remain valid only until:**

— The project is completed.

— A condition arises which is prohibited by the Permit.

• **If work is stopped and the space is evacuated the Permit must be cancelled if the work that is being performed falls under the General Industry version of the Standard.**

• **If "construction" work is being done, then depending on the nature of the problem, the Permit may be suspended rather than cancelled while the prohibited condition is investigated.**

— If the problem can be fixed, the Permit can be reinstated, and work can resume in the space.

— If the problem can't be resolved, the Permit must be cancelled.

• **Details of any problems that occur during the entry will be recorded on the Permit so they can be studied later.**

• **Entry Permits from completed jobs will be kept on file for at least one year.**

— In addition to documenting the entry, they can also be used to help determine where the facility's Permit Plan can be improved.

## ATMOSPHERIC TESTING

• **Hazardous atmospheres in confined spaces can be lethal.**

— Not only can they kill Entrants, but they can also be fatal to people who rush in to assist Entrants who have been overcome.

• **Hazardous atmospheres can be invisible to the naked eye.**

• So testing for them is essential in determining what safeguards must be put in place before entering a confined space. The first atmospheric test that is required by OSHA measures oxygen levels.

— Having too much or too little oxygen can both make an atmosphere hazardous.

— When levels measure below 19.5 percent, a person can't breathe in enough oxygen to do physical work safely.

— Oxygen levels above 23.5 percent significantly increase the risk of a spark or other ignition source causing a fire or explosion.

• **The next tests that must be conducted are for flammable gases and vapors, from substances such as methane, acetylene, carbon disulfide and gasoline.**

— These can become flammable or explosive if enough of them build up in a space.

— When tests show that a gas or vapor has reached a concentration greater than ten percent of its "lower flammable limit" ("LFL") then the space must be ventilated.

• **"Combustible dusts" can present a similar hazard when their concentrations reach or exceed their LFLs.**

— As a rule of thumb, if dust obscures your vision at a distance of five feet or less, it has probably reached a dangerous concentration.

— But actual testing must be performed to accurately judge whether a dust concentration is unsafe.

• **The last atmospheric tests look for toxic contaminants in the atmosphere of a space.**

— Carbon monoxide and hydrogen sulfide are the two most commonly encountered contaminants, but a number of others must be tested for as well.

— Breathing in these substances can cause confusion, illness, loss of consciousness, even death.

• **To ensure the ongoing safety of the people who are entering a space, this atmospheric testing must continue throughout the entry.**

— The results and times of the initial and subsequent tests are recorded on a space's Entry Permit.

## SAFETY PROCEDURES

• **There are a number of things that can be done to make entering a confined space as safe as possible.**

• **A Permit Space Program will require that specific safety procedures be followed to reduce risks before anyone goes inside a space.**

— If testing reveals that there is a hazardous atmosphere in the space, continuous forced-air ventilation will be used to clear the air.

— Unfortunately, forced-air ventilation alone won't always protect Entrants from toxic gases and vapors.

— In these cases, the Entry Permit may require that Entrants wear respirators or self-contained breathing apparatus.

• **Even if tests show that the atmosphere in a space isn't hazardous to begin with, when tasks like welding, riveting, cutting, burning, and heating are performed in a confined space, they can cause caked-on residues to boil off and release toxic or**

### **flammable gases into the air.**

- Written authorization for any of these activities must be provided by the employer in the form of a "Hot Work Permit".
- Before signing off on the Entry Permit the Entry Supervisor must verify that the Hot Work Permit has been issued and appropriate respiratory precautions have been taken.
- **Some confined spaces contain equipment and heavy moving parts that could trap or crush an Entrant, or energized components that could cause electrocution, burns or other injuries.**
  - In these cases, all sources of energy should be shut off, and all mechanical linkages should be blocked before anyone enters the space.
- **Lock-out/tag-out procedures must be strictly followed to reduce the potential for someone restoring the power while the entry is in progress.**
  - In some instances, it may be impossible to lock-out certain types of essential equipment.
  - When this is the case, other safety measures must be taken.
  - If you have questions about electrical safety in a space you're working with, ask your supervisor.

### **DUTIES OF THE ENTRY TEAM MEMBERS**

- **As we've seen, a Permit Space Entry Program requires careful preparation before anyone sets foot inside a hazardous confined space.**
  - The Program takes a similarly cautious approach to the entry itself.
- **To start, the space's Entry Supervisor will make certain that rescue services are standing by, and that the systems that are used to contact them are working, too.**
  - Rescue personnel will have previously been informed about all potential rescue scenarios and given access to the facility's confined spaces to plan and practice in them ahead of time.

#### ***The Entry Supervisor***

- **The Supervisor will then check the notations that have been made on the Permit to verify that:**
  - All of the required safety tests have been made.
  - All required procedures and equipment are in place.
- **When the Supervisor is satisfied, they will sign off on the Permit.**
  - Now the entry may begin.
- **As the operation proceeds, the Entry Supervisor will also warn off any unauthorized individuals who attempt to enter the Permit Space.**
  - This prevents untrained workers from interfering with the entry or being exposed to hazards they aren't prepared for.
- **The Entry Supervisor will also monitor the progress of the work in the space, to ensure that it proceeds within the guidelines established by the Permit.**
  - If hazards develop at any time, he will stop the work, evacuate the space and suspend or cancel the Permit.

#### **The Entrants**

- **"Entrants" are the personnel who actually enter a space to perform the work.**
- **If you are called upon to work as an Entrant, you will be trained in all the safe work procedures that are required for confined spaces, including:**
  - How to put up barriers and shields around entry points.
  - How to install forced-air ventilation systems.
  - How to use ladders and other gear for entering and exiting a space.
  - How to work with lighting equipment, including explosion-proof varieties that are used in potentially flammable atmospheres.
- **You will also be trained in:**
  - The proper use of personal protective equipment.
  - How to monitor the air quality while you're inside a confined space.
  - The evacuation alarms on automatic monitoring devices (so you'll know when to get out).
- **In most cases, Entrants wear a chest or full-body harness with a retrieval line attached at the center of the back near shoulder level.**
  - The line may also be attached to wristlets or anklets, but only if conditions inside the confined space make wearing a harness impractical or dangerous.
- **If the space is over five feet deep, the other end of the retrieval line should be attached to either a fixed point outside the entrance or a retrieval device such as a tripod and winch.**
  - These "non-entry" retrieval systems enable the Attendant or other personnel to pull you out if you are incapacitated, without putting themselves at risk.
  - These systems must be in place unless they would actually increase the Entrants' risk during operations or fail to help in a rescue attempt.

- **Because communication is so important between Entry Team members, as an Entrant you'll also be trained to use communication equipment such as walkie-talkies to stay in touch with your Attendant.**

- In addition to updating them on the status of the entry, you may need to inform them of any hazards that may be developing.
- You also have to be able to receive an evacuation order from the Attendant or the Entry Supervisor, in case of an emergency.

#### **The Attendant**

- **If you are assigned to be a confined space "Attendant" you will have very different duties from Entrants.**

- For one thing, normally Attendants don't enter a confined space themselves.
- As an Attendant your job is to stay by the entrance and monitor what goes on both inside and outside the space.
- This allows you to make quick, informed decisions about whether it's safe for the entry to continue, or the work should be stopped and the Entrants evacuated.

- **Situations where you should immediately order an evacuation of a space include:**

- When you see that a new hazard is developing.
- When an Entrant tells you that a hazard is developing.
- When an Entrant is showing symptoms of oxygen deprivation or exposure to toxic substances.

- **It's critical for you to be able to recognize the signs of elevated toxicity or lack of oxygen in an Entrant.**

- **You'll also need to be thoroughly familiar with the Entry Permit, because if a "prohibited condition" arises, that will require an evacuation, too.**

- You must keep track of the number of Entrants in a space as well, so they all can be accounted for if something happens.

- **As an Attendant, you can be a very busy person. You may need to monitor more than one entry space at a time, and also perform other tasks, such as handing tools to Entrants or warning unauthorized personnel away from the operation.**

- These activities must never interfere with your ability to monitor entry personnel and keep an eye out for problems.

- **If at any time you feel you cannot safely and effectively perform all of your assigned duties, you should stop the work and get the Entrants out.**

- **If an emergency does occur when there are Entrants in a space and they need help to escape, you should call for rescue services immediately.**

#### **SPECIAL SITUATIONS**

- **It's also important to remember that whenever a Permit Space is evacuated, an evaluation must be conducted afterward to find out what went wrong.**

- Only after steps have been taken to prevent the situation that caused the evacuation from occurring again can the space be re-entered.

- A new Permit must be filled out and signed by the Entry Supervisor before anyone goes into the space again.

- **Special situations can sometimes come up in confined space entries as well.**

- You need to understand how they should be handled. For example, some confined spaces may only require a few safety precautions.

- When the only hazards that are found in a space have to do with its atmosphere, forced-air ventilation alone may be enough to control them, so additional precautions simply aren't needed.

#### **NON-PERMIT SPACES**

- **Not all confined spaces require an Entry Permit.**

- If it can be proven without entering a space that it is completely free of hazards, then it can be designated a "Non-Permit Space".

- Since it will no longer be regulated by the Permit- Required Confined Spaces Standards, work can proceed without following Permit-Space Program guidelines.

- This could mean that an Entrant would not need an Attendant and could work alone.

- **Some "Permit-Required" Spaces can also be re-classified as "Non-Permit" once their hazards or potential hazards have been removed.**

- In these cases, written certification showing that all hazards have been eliminated is required to reclassify the Permit Space.

#### **CONTRACTORS**

- **"Contractors" create other special situations, much of them involving "responsibilities" and "communication", things that all involved employees need to be aware of.**

- **If a contractor is being brought in to perform industrial work in a Permit Space, the host employer must inform the contractor of:**

- The location of the space.
- The hazards that will be found in the space.
- The precautions that have been previously used to enter the space safely.

- **For their part, the contractor must actively seek out this information before beginning their work.**
- **If both the host employer and the contractor will be working in or around the space at the same time, they must coordinate the activities of their personnel according to the Permit Space Program of the host employer.**
- **To ensure safety on "Multiple Employer Sites", where a number of sub-contractors may be involved, the construction version of the confined space entry regulation addresses the use of contractors differently.**
- **In the construction regulation:**
  - The "Host Employer" is defined as the owner or manager of the property where the work is being done.
  - The "Controlling Contractor" (often known as a "general contractor") has overall responsibility for the construction activity on the site.
  - "Entry Employers" (typically, "sub-contractors") are the companies that actually send their workers into the Permit Space.
- **The construction regulation requires a comprehensive communication of safety information among them all, before, during and after the confined space entry.**
  - After the entry has been completed, the "Controlling Contractor" must inform the "Host Employer" of the Permit Space Program that was used to comply with the Permit-Required Confined Space regulation, as well as report any hazards that were encountered during the entry.

**CONFINED SPACE ENTRY**  
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**ANSWERS TO THE REVIEW QUIZ**

1. g

2. a

3. c

4. b

5. a

6. a

**CONFINED SPACE ENTRY**  
**General Industry and Construction**  
**REVIEW QUIZ**

Name \_\_\_\_\_ Date \_\_\_\_\_

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

1. Which of the following are considered to be confined spaces?
  - a. Tanks
  - b. Vessels
  - c. HVAC ducts
  - d. Vaults
  - e. Storage bins
  - f. Pits
  - g. All of the above
  
2. "Engulfment" is a type of hazard that may be found in a confined space.
  - a. True
  - b. False
  
3. When testing a confined space for atmospheric hazards, what should be tested for first?
  - a. Flammable gases
  - b. Vapors and dust
  - c. Oxygen content
  - d. Toxic contaminants
  
4. In a confined space, forced-air ventilation alone can always protect Entrants from toxic gases.
  - a. True
  - b. False
  
5. Normally, an Attendant is not allowed to enter a confined space.
  - a. True
  - b. False
  
6. An Entry Supervisor must sign an Entry Permit before work can begin in a confined space.
  - a. True
  - b. False