Permit Required Confined Spaces for General Industry – Quick Tips

Confined spaces in the workplace can pose serious physical hazards to employees. Employees can become entrapped or engulfed within a confined space and/or they could be exposed to dangerous atmospheric conditions. All of which could result in tragic consequences.

The Occupational Safety and Health Administration (OSHA) defines a confined space as one that meets all three of the following conditions 29 Code of Federal Regulations (CFR) 1910.146(b):

1. Is large enough and so configured that an employee can bodily enter and perform assigned work;
2. Has limited or restricted means for entry or exit; and
3. Is not designed for continuous employee occupancy.

Examples of confined spaces include underground vaults, tanks, storage bins, manholes, pits, silos and pipelines.

According to OSHA, a permit-required confined space is a space that has one or more of the following characteristics:

- Contains or could contain a hazardous or potentially hazardous atmosphere
- Contains material that has the potential for engulfing the entrant
- Has or could have inwardly converging walls that could trap or asphyxiate an entrant
- Contains or could contain other serious physical hazards such as unguarded machines or exposed live wires
- Has or could have any other recognized safety or health hazards

A non-permit required confined space is a space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

There are several steps an employer should follow when beginning a confined space program. The first is to evaluate the workplace and determine whether it contains permit-required confined spaces as defined by OSHA. If it is determined that there are permit-required confined spaces, the employer must inform all exposed employees of the dangers by posting signs or some other equally effective means. Signs should read: “DANGER–PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER” or other similar language.

The next decision the employer must make is whether or not the confined space should be entered:

- If NO—The employer must take effective measures to prevent employees from entering the permit space.
- If YES—The employer must develop and implement a written permit space entry program.

The Confined Space standard requires the employer's written program to:

- Identify and evaluate permit space hazards before allowing employee entry;
- Establish and implement means to prevent unauthorized entry;
- Establish and implement means to eliminate or control hazards necessary for safe entry by:
  - Specifying acceptable entry conditions;
  - Isolating the space;
  - Purging, making inert, flushing or continuously ventilating the permit space as necessary to eliminate or control atmospheric hazards.
- Provide, maintain and require the use of personal protective equipment (PPE) and any other equipment necessary for safe entry;
- Test atmospheric conditions inside the space before entry and monitor the space during entry. Tests must be conducted for:
  - Oxygen (O^2), 19.5%–23.5% acceptable;
  - Lower Explosive Limit (LEL), <10% acceptable; and
  - Toxins that may be present.
- Ensure that at least one attendant is stationed outside during entry;
- Implement the procedures that any attendant who is required to monitor multiple spaces will follow during an emergency in one or more of the spaces;
- Coordinate with any contractors that are used;
- Implement rescue procedures;
- Establish, in writing, and implement a system for the preparation, issue, use and cancellation of entry permits; and
- Review the permit system annually and revise as necessary.

OSHA also requires training to ensure that employees involved in confined space work can perform their job functions safely before the initial work begins. Additional training is required when:

- The job duties change;
- A change occurs in the permit space program or the permit space operation presents any new hazard; and
- An employee's job performance shows deficiencies.

After completion of training, the employer must keep a record of employee training and make it available for inspection by employees and their authorized representatives. The record must include the employee's name, the trainer's signature or initials and dates of the training.

This training must cover specific requirements for the authorized entrant, the attendant and the entry supervisor.

Authorized Entrant responsibilities:

- Know the hazards involved in confined space entry
- Select the appropriate PPE for confined space entry
- Maintain communication with the attendant
- Leave the space immediately when:

    - Ordered by the attendant;
    - Authorized entrant recognizes the warning signs or symptoms of exposure;
    - A prohibited condition exists; or
    - An automatic alarm is activated.
- Alert the attendant immediately if a problem develops

Attendant duties:

- Remain outside unless relieved by another authorized attendant;
- Perform non-entry rescue when specified in procedure;
- Know existing and potential hazards of the confined space;
- Maintain communication at all times with entrants;
- Order evacuation of the space when conditions warrant;
- Summon rescue personnel when needed;
- Ensure unauthorized people stay clear of area; and
- Perform no other duties that may interfere with attendant duties.

Entry Supervisor responsibilities:

- Know the hazards involved with confined space entry;
- Verify emergency plans and specified entry conditions such as permits, tests, procedures and equipment before allowing entry;
- Terminate entry and cancel permits when entry operations are completed or if a new condition exists;
- Verify that rescue services are available and that the means for summoning them are operable;
- Take appropriate measures to remove unauthorized entrants; and
- Ensure that the company’s entry operations remain consistent.

When an employer has designated a rescue and emergency service to perform confined space rescue, the employer is responsible for:

- Evaluating a prospective rescuer’s ability to respond to a rescue summons in a timely manner, considering the hazards identified (i.e. what is considered timely will vary according to the specific hazards involved in each entry);
- Evaluating a prospective rescue service’s ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit confined space or types of permit confined spaces that have been identified;
- Selecting a rescue team or service from those evaluated that has the capability to reach the victims within a time frame that is appropriate for the hazard identified and is equipped for and proficient in performing the needed rescue services;
- Informing each rescue team of the hazards they may confront when called to perform rescue at the site; and
- Providing the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

NOTE

: *Non-mandatory* Appendix F— Rescue team or rescue service evaluation criteria has been added to 29 CFR 1910.146 to assist employers in their evaluation of rescue and emergency services.

According to OSHA, employers whose employees will perform rescue duties in confined spaces are responsible for:

- Providing affected employees with the PPE needed to conduct permit space rescues safely and the training of affected employees so they are proficient in the use of that PPE (PPE must be provided to the employee at no cost to them);
- Training affected employees to perform assigned rescue duties. The employer must ensure that such employees successfully complete the training required to establish proficiency as an authorized entrant as required by 29 CFR 1910.146(g) and (h);
- Training of affected employees in basic first aid and cardiopulmonary resuscitation (CPR). The employer must ensure that at least one member of the rescue team or service holding a current certification in first aid and CPR is available; and
- Ensuring that affected employees practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins or actual persons from the actual representative permit confined spaces or permit spaces. Representative permit confined spaces must, with respect to opening size, configuration and accessibility, simulate the types of permit confined spaces from which rescue is to be performed.

To facilitate non-entry rescue, retrieval systems or methods must be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant 29 CFR 1910.146 (k)(3). Each authorized entrant must use a chest or full-body harness with a retrieval line attached 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 may be used in lieu of the chest or full-body harness if the employer can demonstrate that the use of a chest or full-body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the space so the rescue can begin as soon as the rescuer becomes aware that rescue is necessary. If the space is vertical and more than 5′ deep, a mechanical device for removing the entrant must be available for use 29 CFR 1910.146(k)(3)(ii).

Employers should obtain a copy of 29 CFR 1910.146 to ensure that they are in full compliance with the standard. There are also several appendices to the standard that provide information and non-mandatory guidelines to assist employers and employees in meeting the appropriate requirements.

Commonly Asked Questions

Q: What air monitoring needs to be performed prior to entering a confined space?

A: Air monitoring should be performed prior to entry. At a minimum, oxygen and lower explosive limits (LEL) need to be monitored. If other toxins are suspected, then those levels also need to be monitored. Air should be monitored in the following order:

- **Oxygen**—Test for oxygen first in order to be sure you get an accurate LEL reading. Most combustible gas meters are oxygen dependent and will not provide reliable readings in an oxygen-deficient atmosphere. Oxygen levels should be between 19.5 and 23.5%.
- **LEL**—Test flammable gas and vapor levels due to the threat of fire or explosion, which can be immediate and life threatening.
- **Toxic air contaminants**—Test for impurities such as carbon monoxide (CO), hydrogen sulfide (H^2S) and chlorine (Cl^2).

Q: What is an immediately dangerous to life and health (IDLH) atmosphere?

A: IDLH is an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Q: If I perform air monitoring prior to entry and my readings are OK, do I need to continue monitoring while I'm in the confined space?

A: 29 CFR 1910.146 paragraph (c)(5)(ii)(F) requires periodic testing as necessary to ensure the space is maintained within the limits of the acceptable entry conditions. This is critical. OSHA states that all permit space atmospheres are dynamic due to variables such as temperature, pressure, physical characteristics of the material posing the atmospheric hazard, variable efficiency of ventilation equipment and air delivery system, etc. The employer must determine and document on an individual permit space basis what the frequency of testing is and under what conditions the verification testing is done.

Q: What is the difference between a two-way and a three-way confined space retrieval winch?

A: The two-way winch is used for hoisting people and/or equipment into or out of the confined space. A three- way winch, which has a braking mechanism, is used for fall protection. The only time a three-way winch should be used to hoist someone is if a fall has occurred and a rescue needs to be performed. Otherwise, the two-way winch should be used so the teeth on the three-way winch do not become worn and nonfunctional should a rescue need to be performed.

Sources

OSHA Confined Space Standard, 29 CFR 1910.146