

CONFINED SPACES

Reference: 29 CFR, 1910.146

Summary:

“Confined Spaces” and “Permit-Required Confined Spaces” are defined differently. A Confined Space has limited or restricted means of entry or exit, is large enough for an employee to enter and perform assigned work, but is not designed for continuous occupancy. A Permit-Required Confined Space is a Confined Space coupled with a hazard that could pose serious illness or injury by:

- containing or having the potential to contain a hazardous atmosphere,
- containing a material with the potential to engulf an entrant,
- having an internal configuration that could entrap or asphyxiate an entrant, or
- having any other recognized serious safety or health hazards.

Examples of confined spaces include: manholes, pipes, storage tanks, trailers, tank cars, and pits. OSHA does not have a list of confined spaces; rather, they are identified by whether they meet the definition. Therefore, everyone would agree that acetylene generators and stand tanks are confined spaces. Hydrostatic retest pits present a more debatable issue but in some circumstances, they clearly *could* be.

Since permit-required spaces are much more hazardous, unless specified otherwise, reference to confined spaces are presumed to be “permit-required.”

As the name implies, permit-required confined space entry requires issuance of a permit that outlines the conditions under which entry may be made. Issuance and adherence to the requirements of the permit is the key to controlling potential hazards.

In facilities where confined spaces exist, you are required to create and maintain a Confined Space Program to address potential hazards and conditions of entry.

Definitions

- Authorized Entrant – An employee who is authorized by the employer to enter a permit space.
- Entry Supervisor – The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this action.

- Attendant – An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant’s duties assigned in the employer’s program.
- Rescue Service – The personnel designated to rescue employees from permit spaces.

Hazardous Atmosphere

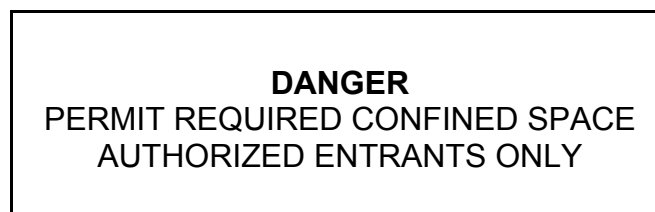
A hazardous atmosphere in a permit required confined space is one that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from:

- 1) Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit;
- 2) Airborne combustible dust at a concentration that meets or exceeds its lower flammable limit (usually when dust obscures vision at a distance of 5 feet or less);
- 3) Atmospheric oxygen concentration below 19.5% or above 23.5%;
- 4) Atmospheric contamination (by a substance for which an OSHA Permissible Exposure Limit is published, or other sources of information providing limited exposure data – See §33 and specific material MSDS) at a concentration which can cause death, incapacitation, impairment of ability to self-rescue, injury, or acute illness;
- 5) Any other atmospheric condition that is immediately dangerous to life or health.

Survey and Identification

You must perform a survey of the facility to determine whether confined spaces exist and, if so, advise employees of the existence, location, and danger posed by the space(s).

Post a sign at the location with language similar to:



Written Program

If employees are required to enter a permit space, you must develop and make available to employees a written program to cover the following:

- Identify and evaluate permit space hazards before allowing employee entry.
- Test conditions in the permit space before entry and monitor the space during entry.
- Perform, in the following sequence, appropriate testing for atmospheric hazards:
 - 1) oxygen content
 - 2) combustible gases or vapors
 - 3) toxic gases or vapors
- Implement necessary measures to prevent unauthorized entry.
- Establish and implement means, procedures and practices necessary to eliminate or control hazards to safe permit-space entry operations, such as specifying acceptable entry conditions, isolating the permit space, providing barriers, verifying acceptable entry conditions, purging, making inert, flushing, or ventilating the permit space.
- Identify employee job duties.
- Provide, maintain, and require the use of personal protective equipment and any other equipment necessary for safe entry (e.g., testing, monitoring, ventilating, communications, and lighting equipment, barriers, shields, etc.).
- Ensure that at least one attendant is stationed outside the permit space for the duration of entry operations.
- Coordinate entry operations when employees of more than one employer are to be working in the permit space.
- Implement appropriate procedures for summoning rescue and emergency services.
- Establish in writing, and employ, a system for the preparation, issuance, use, and cancellation of entry permits.
- Review established entry operations and annually revise the permit space entry program, as required.

- When an attendant is required to monitor multiple spaces, define the procedures to be followed during an emergency in one or more of the permit spaces being monitored.

Confined Space Permit

The permit verifies that pre-entry preparations have been completed and that the space may be entered. It must be signed by an entry supervisor and posted at entrances or otherwise made available to entrants before they enter the confined space.

The duration of entry permits must not exceed the time required to complete the work and the entry supervisor must terminate entry and cancel permits when the assignment has been completed or when new conditions exist. New conditions must be noted on the canceled permit and used in revising the permit space program.

Canceled permits must be retained for at least one year.

The permit 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
NOTE: This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.
- the attendants, by name;
- the individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized 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;
NOTE: Those measures can include the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.
- the acceptable entry conditions;

- the results of initial and periodic tests performed under paragraph (d)(5) of this section, accompanied by the names or initials of the testers and by an indication of when the tests were performed;
- the rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;
- the communication procedures used by authorized entrants and attendants to maintain contact during the entry;
- equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this section;
- any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and (15) any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

Avoid Confusion

Sample entry permits are in the appendix to the section. If your permit involves more than one sheet of paper, you should number the pages, with each page indicating the total number of pages (e.g., p. 1 of 3, p. 2 of 3, p. 3 of 3). This will allow everyone to know that nothing is missing.

Do not leave permit spaces blank. If an item does not apply, write “N/A” in the space. Entrants and supervisors need to *know* that each item has been considered; assumptions lead to accidents.

Training

All personnel involved in confined space entries must receive training in their specific duties prior to performing those duties; this includes the entry supervisor, attendant(s), entrant(s), and rescue team members. Training must include any changes in duties or conditions of the space.

Rescue teams must receive the same training as authorized entrants, plus receive training in the use of personal protective and rescue equipment and be trained in CPR and first-aid. They must practice simulated rescue at least once every 12 months rescuing using dummies, manikins, or actual persons from representative spaces.

Authorized Entrants

Entrants must know the hazards that may be faced during entry, including modes, symptoms and consequences of exposure, how to properly use equipment, and how to communicate with the attendant.

The attendant must be notified whenever the entrant notices any warning sign or symptom of exposure to a dangerous condition or detects a condition prohibited by the permit. The space must be evacuated as soon as possible.

Entrants 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. (If the harness is infeasible or creates a greater hazard, wristlets may be used.) A mechanical device must be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.

Attendants

Attendants must remain outside the space unless the permit allows them to enter to perform rescue operations. (If an attendant is allowed to perform rescue operations, he must receive the same training as rescue teams.) It is their job to remain in communication with the entrants and know who is in the space at all times. Attendants must receive the same training as entrants and be aware of signs that an entrant may have become overexposed to a hazard. The attendant must be able to order an evacuation of the permit space, if necessary, and summon rescue and other services in an emergency.

Attendants must also warn unauthorized persons to stay away from the area while the permit space is opened. If an unauthorized person enters the space, he must alert the entrant(s) and the Entry Supervisor but cannot take any action that distracts from his primary duty attend the authorized entrant(s).

Entry Supervisor

Entry supervisors must know the hazards that may be faced during entry including exposure information, check that permits are properly completed and appropriate tests have been made and ensures that all equipment is available and all procedures are in place before signing the permit. He must also verify that rescue services are available and that the means for summoning them are operable.

The entry supervisor must also remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

Emergency and Rescue

As a part of your program, you must develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue. A prospective rescuer's ability to respond in a timely manner must be evaluated. (Note: "timely" depends upon the particular hazards involved and in many cases, hazards of a permit-space are potentially life-threatening.)

In addition to a timely response, your rescue service must be properly equipped and able to respond to whatever emergency that may arise.

If you operate your own rescue service for permit-spaces, you must train and equip your team to respond appropriately.

Non-entry rescue via chest or full-body harness is always preferable, whenever possible. Review the section, "Authorized Entrants."

Alternate Program

If you can demonstrate through monitoring and inspection data that the only hazard posed by the permit space is an actual or potential hazardous atmosphere and that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry, you may be exempted from permits, training specific to the Confined Space Standard (other OSHA-required training still applies), attendants, entry supervisors and emergency and rescue services. Your determination and supporting data must be made available to every employee who intends to enter the space.

Note: If initial atmospheric testing or evaluation requires entry into space, it must be treated as a permit-required confined space for that entry.

Under this alternative program, any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed. After the cover has been removed, appropriate railings, temporary cover, etc. shall be installed to prevent someone or something from accidentally falling into the space.

Before entrance into the space, the atmosphere must be tested with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. You must use clean, continuous forced air ventilation until you confirm that no hazardous atmosphere is within the space. No employee may enter the space until you have confirmed this. The ventilation must continue, directed in the vicinity of the employee's work area, throughout the time the employee is in the space. In addition, the atmosphere must be periodically retested as necessary, to ensure that the ventilation remains sufficient to prevent an accumulation of hazardous gases or vapors.

To use this alternate program, you must maintain and make available to entrants, a written certification that:

- an evaluation of the space has been made;
- monitoring has been conducted to ensure that the space does not contain a hazardous atmosphere; and
- ventilation has been provided.

The certification must contain the date, the location of the space, and the signature of the person providing the certification.

Converting Permit Spaces

A space classified as a permit-required confined space may be reclassified as a non-permit confined space if the space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space.

Note: If entry is required to eliminate hazards or confirm the lack of hazards, the space must be presumed to be a permit-required space and the Standard applies, accordingly.

Note: *Control* of atmospheric hazards through forced air ventilation does not constitute *elimination* of the hazards; therefore, mere control of hazards would not justify a reclassification of the space.

When reclassifying a space, you must document the basis for determining that all hazards in a permit space have been eliminated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space

Important: Employees should be instructed to always be alert to hazards that may arise during entry of any confined space. Conditions are subject to change in a space whose hazards are controlled through forced-air ventilation or one whose hazards have been eliminated and reclassified as a non-permit space. Such change in conditions may require an immediate exit of the space and a reevaluation of the space's status.

Contractors

If you have a contractor perform work involving confined space entry, you must:

- inform the contractor of the existence of the confined space and necessity of following a written confined space program;
- inform the contractor of any known hazards within the space and experiences you may have had that cause the space to be classified a “permit-space”;
- inform the contractor of any precautions you have implemented;
- coordinate entry operations with the contractor; and
- discuss, at the conclusion of the work, any problems or hazards that were encountered or hazards that may have been created.

More Detailed Information and Help

Before you allow entrance into confined spaces, you are encouraged to consult with the following:

- OSHA Confined Space Standard, 29 CFR, 1910.146, available from any U.S. Government Bookstore or online at
- OSHA’s Confined Space Advisor software, available online at <http://www.osha-slc.gov/dts/osta/oshasoft/csa.html> Once installed, this software will interview the user about a work space to determine whether and how it is subject to the Permit Required Confined Spaces Standard. It will tell you what aspects of the standard apply to you, based on your answers.

Confined Spaces Checklist

- Are confined spaces thoroughly emptied of any corrosive or hazardous substances, such as acids or caustics, before entry?
- Are all lines to a confined space, containing inert, toxic, flammable, or corrosive materials valved off and blanked or disconnected and separated before entry?
- Are all impellers, agitators, or other moving parts and equipment inside confined spaces locked-out if they present a hazard?
- Is either natural or mechanical ventilation provided prior to confined space entry?
- Are appropriate atmospheric tests performed to check for oxygen deficiency, toxic substances and explosive concentrations in the confined space before entry?
- Is adequate illumination provided space?
- Is the atmosphere inside the confined space frequently tested or continuously monitored during conduct of work? Is there an assigned safety standby employee outside of the confined space. when required, whose sole responsibility is to watch the work in progress, sound an alarm if necessary, and render assistance?
- Is the standby employee appropriately trained and equipped to handle an emergency?
- Is the standby employee or other employees prohibited from entering the confined space without lifelines and respiratory equipment if there is any question as to the cause of an emergency?
- Is approved respiratory equipment required if the atmosphere inside the confined space cannot be made acceptable
- Is all portable electrical equipment used inside confined spaces either grounded and insulated, or equipped with ground fault protection?

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Confined Spaces Checklist (con't)

- Before gas welding or burning is started in a confined space, are hoses checked for leaks, compressed gas cylinders forbidden inside of the confined space, torches lighted only outside of the confined area and the confined area tested for an explosive atmosphere each time before a lighted torch is to be taken into the confined space?
- If employees will be using oxygen-consuming equipment-such as salamanders, torches, and furnaces, in a confined space, is sufficient air provided to assure combustion without reducing the oxygen concentration of the atmosphere below 19.5 percent by volume?
- Whenever combustion-type equipment is used in a confined space, are provisions made to ensure the exhaust gases are vented outside of the enclosure?
- Is each confined space checked for decaying vegetation or animal matter which may produce methane?
- Is the confined space checked for possible industrial waste which could contain toxic properties?
- If the confined space is below the ground and near areas where motor vehicles will be operating, is it possible for vehicle exhaust or carbon monoxide to enter the space?

Appendix

Sample Confined Space Entry Permit #1

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Sample Confined Space Entry Permit

Page 1 of 2

Date and Time Issued: _____ Date and Time Expires: _____

Job site/Space I.D.: _____ Job Supervisor: _____

Equipment to be worked on: _____ Work to be performed: _____

Stand-by personnel: _____

1. Atmospheric Checks: Time _____
- Oxygen _____%
- Explosive _____% L.F.L.
- Toxic _____PPM

2. Tester's signature: _____

3. Source isolation (No Entry):
- | | | |
|-----|-----|-----|
| N/A | Yes | No |
| () | () | () |
| () | () | () |
- Pumps or lines blinded,
disconnected, or blocked
4. Ventilation Modification:
- | | | |
|-----|-----|-----|
| N/A | Yes | No |
| () | () | () |
| () | () | () |
- Mechanical
- Natural Ventilation only

5. Atmospheric check after isolation and Ventilation:

- Time _____
- Oxygen _____%
- Explosive _____% L.F.L.
- Toxic _____PPM

Tester's signature _____

6. Communication procedures: _____

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7. Rescue procedures: _____

8. Entry, standby, and back up persons:	Yes	No
Successfully completed required training?	()	()
Is it current?	()	()

9. Equipment:	N/A	Yes	No
Direct reading gas monitor tested	()	()	()
Safety harnesses and lifelines	()	()	()
Hoisting equipment	()	()	()
Powered communications	()	()	()
SCBA's for entry and standby persons	()	()	()
Protective Clothing	()	()	()
All electric equipment listed			
Class I, Division I, Group D			
and Non-sparking tools	()	()	()

10. Periodic atmospheric tests:

Oxygen _____ % Time _____	Oxygen _____ % Time _____
Oxygen _____ % Time _____	Oxygen _____ % Time _____
Explosive _____ % Time _____	Explosive _____ % Time _____
Explosive _____ % Time _____	Explosive _____ % Time _____
Toxic _____ % Time _____	Toxic _____ % Time _____
Toxic _____ % Time _____	Toxic _____ % Time _____

We have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: (Supervisor) _____

Approved By: (Unit Supervisor) _____

Reviewed By (Operations Personnel) : _____