Confined Space Entry

Scope

This section contains requirements for practices and procedures to protect employees in General industry and the Maritime industry from the hazards of entry into permit-required confined spaces. This section does not apply to agriculture or construction (Parts 1928, and 1926 of this chapter, respectively).

Background

A confined area or space is one which by design, has limited openings for entry and exit, unfavorable natural ventilation that can produce dangerous air contaminants, and is not intended for continuous employee occupancy. Confined spaces with different types of associated hazards are located throughout the state. For employees who perform work activities within them, confined spaces can present dangerous hazards.

This document applies to any operation that requires state employees or contractors to enter, construct, or work inside any boiler, cupola, degreaser, furnace, pipe line, pumping station, existing tank, tank car, tower, sewer, manhole, vault, vat, reaction, or process vessel pit, tunnel, septic tank, ships hold, utility vault, or similar type of enclosure or confined spaces.

Requirements

This safety requirement and procedure, established in accordance with Occupational Safety and Health Standards for General Industry (29 CFR 1910.146) and for the Maritime Industry (29 CFR 1915), provides guidelines for entry into confined spaces. It defines confined space and presents details on identifying and evaluating confined spaces. Additionally, it lists the hazards of confined spaces. It includes provisions for training, identifies the general and specific responsibilities of personnel, and presents discussions on the requirements for permit-required confined space entry, recordkeeping, and rescue.

It is the requirement of the state to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm, to employees or the public. Therefore, confined spaces will be identified at each state facility and/or jobsite, and where applicable, permitted and posted with warning signs.

When confined space hazards exist that cannot be eliminated, then engineering practices, administrative practices, safe work practices, Personal Protective Equipment (PPE), and proper training regarding Confined Space Entry will be implemented. These measures will be implemented to minimize hazards to ensure the safety of employees and the public.

The provisions of this safety requirement and procedure are as follows:

- **Identifying and Evaluating Confined Spaces**
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- **Hazard Recognition**
- **Training**
- **General Responsibilities**
- **Specific Responsibilities**
- **Permit-Required Confined Space Entry**
- **Recordkeeping**
- **Rescue**

Please refer to the subsection for each provision for detailed information, in addition to definitions, which are provided in Confined Space Entry - Definitions.

## Identifying and Evaluating Confined Spaces

A confined area or space is one which by design, has limited openings for entry and exit, unfavorable natural ventilation that can contain or produce dangerous air contaminants and is not intended for continuous employee occupancy. A confined space is large enough, however for an employee to enter and perform assigned work. Confined spaces can include, for example, any exiting tank, tank car, tower, sewer, manhole, sump, vault, vat, grease pit, tunnel, or any other area that exhibits these space design characteristics.

All confined spaces at a worksite or facility must be located and identified, so that a Confined Space Permit Program may be established. A worksite or facility must be visually surveyed in order to identify areas that need to be included in the confined space inventory. In addition to the areas that meet the criteria for inclusion into the confined space inventory, any suspected confined spaces must also be listed.

Once all the confined spaces have been identified, then those confined spaces must be further evaluated to determine the hazards that may be present. Hazardous atmospheres and general safety hazards must be evaluated for all the confined spaces.

- A hazardous atmospheric evaluation must be performed by conducting atmospheric testing to assess the conditions in the confined space. The results of atmospheric testing should be documented for later use (See Confined Space Evaluation Form).

- General safety hazards should be assessed by physical observation that includes a visual assessment of engulfment potential, the internal configuration of the confined space and other serious safety or health hazards. Additionally, assessment should be based on knowing the existing conditions and use of the confined space along with the actual and potential hazards posed by materials and substance in the confined space.
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If any of these hazards are present, then the confined space is a permit-required confined space (See Confined Space Decision Tree Flowchart).

If a change in the use or configuration of a non-permit-required confined space increases hazards to the entrant, then the space must be reevaluated for possible reclassification to a permit-required confined space.

A permit-required confined space may be reclassified to a non-permit-required confined space under the following conditions:

- The permit-required confined space poses no actual or potential atmospheric hazards and all non-atmospheric hazards are eliminated without entry.
- Entry is necessary to eliminate hazards and such entry is performed in accordance with the confined space entry program, and testing and inspection during entry, indicates that the hazards have been eliminated.
- The basis for determining that all hazards are eliminated is documented and certified.
- Reclassification is effective as long as the hazards remain eliminated.

**Hazard Recognition**

Confined spaces present many hazards to employees due to the nature of the space’s shape, size, lack of ventilation, proximity to toxic gases, and other contributing substances. Potential confined space hazards include hazardous atmosphere, and general safety hazards.

Hazardous atmospheres expose employees to risks of death, incapacitation, injury, or acute illness. These hazardous atmospheres include:

- A flammable gas, vapor, or mist in excess of ten percent of its lower flammable limit (LFL).
- An airborne combustible dust at a concentration that obscures vision at a distance of five feet or less.
- An atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
- An atmospheric concentration of any substance for which a permissible exposure limit is published in Subpart Z of 29 CFR 1910 and could result in employee exposure in excess of its permissible limit(s).
- Any atmospheric condition recognized as immediately dangerous to life or health.

General safety hazards include, but are not limited to the following:
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- Physical hazards (non-chemical physiologic stressors, noise, vibration, slick/wet surfaces, falling objects, temperature extremes, employee fatigue and engulfment).

- Structural hazards (structural obstructions and hazards such as inwardly converging walls etc.).

- Electrical hazards (shock, burns, and/or electrocution due to exposed or ungrounded electrical energy sources).

- Mechanical hazards (inadvertent mechanical movement of (or within) a confined space that threatens the safety of the employee working in the confined space).

- Biological hazards (bacterial action that can consume oxygen to produce carbon monoxide or emit hydrogen sulfide or methane).

- Radiation hazards (sources that can inadvertently expose employees to dangerous levels of radiation).

Training

The formal written confined space training program is to provide employees with the necessary understanding, skills, and knowledge to safely perform their jobs. The components of this formal written training program, includes instruction on the following:

- Types of confined spaces
- Confined space hazards
- Atmospheric testing of confined spaces
- Cleaning and ventilation
- Lockout of confined spaces
- Personal Protective Equipment (PPE)
- Respirator use and care
- Buddy systems and emergency procedures
- Communication procedures
- Emergency rescue and procedures
- Hot work

Initial and refresher training is to be provided to employees. Refresher training must be conducted when an employee’s duties change, the hazards in the confined space
change, or an evaluation of the confined space entry program identifies inadequacies in the employee’s knowledge.

Employees designated to enter confined space work areas, including the entrant, attendant, and rescue team, are to be trained in the following areas:

- Emergency entry and exit procedures
- Applicable respirators
- First Aid and CPR
- Lockout barriers at worksites
- Safety equipment use
- Rescue equipment
- Permit system
- Work practices

Qualified employees shall receive initial and refresher training in the following areas:

- Atmospheric testing methods
- Meter calibration
- Atmospheric behaviors of oxygen, combustibles, and toxic gases.

**General Responsibilities**

It is the responsibility of each manager/unit head, supervisor, and employee to ensure implementation of the state’s safety requirement and procedure on Confined Space Entry.

<table>
<thead>
<tr>
<th>Manager</th>
<th>To ensure that adequate funds are available and budgeted for the purchase of confined space equipment in their areas.</th>
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<tbody>
<tr>
<td></td>
<td>To identify the employees affected by this safety requirement and procedure.</td>
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<td>To identify confined spaces at their worksite or facility.</td>
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<td>To evaluate and determine if a permit is required prior to entry into a confined space.</td>
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<td>To designate entry supervisors and qualified persons.</td>
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<td>To obtain and coordinate the required training for affected employees.</td>
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</tbody>
</table>
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<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
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<tbody>
<tr>
<td></td>
<td>To provide prompt assistance to managers, supervisors, or others as applicable on any matter concerning this safety requirement and procedure.</td>
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<tr>
<td></td>
<td>To assist in developing and securing the required training.</td>
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<td></td>
<td>To train qualified persons to perform atmospheric testing.</td>
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<td></td>
<td>To provide guidelines for using air monitoring and gas detection equipment.</td>
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</tbody>
</table>

| Supervisor                    | To prevent any employee that has not received the required training from performing any of the tasks or activities associated with this safety requirement and procedure.                                             |
|                               | To communicate the appropriate needs to managers and/or supervisors.                                                                                                                                              |
|                               | To know where confined and permit-required confined spaces are located at their worksite or facility.                                                                                                              |
|                               | To ensure warning signs are posted at permit-required confined spaces.                                                                                                                                             |
|                               | To ensure that PPE that is appropriate for the job is provided to employees.                                                                                                                                     |
|                               | To ensure that only trained and qualified employees operate material handling equipment.                                                                                                                          |

| Employee                      | To comply with applicable guidelines contained in this safety requirement and procedure.                                                                                                                           |
|                               | To follow all instructions pertaining to confined spaces.                                                                                                                                                         |
|                               | To refrain from entering any confined space unless authorized by training and job duties.                                                                                                                            |

### Confined Space Entry Team (Specific Responsibilities)

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
</tr>
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</table>
| Entrant (Person Entering Confined Space) | Performs the assigned task.  
Reviews the permit before entry.  
Uses appropriate PPE as required. |
| Attendant (Observer) | Uses and attends to the area and personal monitoring equipment.  
| Pays attention to physical reactions that could signal an unsafe condition.  
| Maintains contact with the attendant and responds to evacuation orders.  
| Signals for help from the attendant and vacates the space immediately when sensing any reaction to the environment.  
| Remains outside while the work is being performed.  
| Reviews the permit before the Entrant enters the confined space.  
| Keeps track of who is in the space at all times.  
| Keeps unauthorized people out of the area.  
| Maintains continuous visual (or voice) communication with the entrant during the entry.  
| Makes sure the ventilation equipment (if used) is working.  
| Monitors the atmospheric testing equipment.  
| Attends to the lifeline, if worn by the entrant.  
| Attends to the air line, if used, to prevent tangles and kinks.  
| Remains alert for early symptoms of danger within the space.  
| Watches for hazards outside and inside the space.  
| Maintains clear access to and from the space.  
<p>| Notifies the entrant and orders |</p>
<table>
<thead>
<tr>
<th>Role</th>
<th>Requirements</th>
</tr>
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</table>
| Entry Supervisor (Authorizes Permits)    | - Plans each entry into a confined space including a description of the work to be performed, identification of the workers to be involved, evaluation of the hazards that exist, arrangements for atmospheric testing and monitoring, and development of a rescue plan.  
- Ensures that the permit is complete, signed and dated.  
- Determines specific equipment needs.  
- Ensures atmospheric testing.  
- Ensures that all necessary procedures and equipment are in effect.  
- At appropriate intervals, determines that operations remain acceptable.  
- Cancels the permit and terminates the work if the conditions are not acceptable.  
- Trains (or provides training) for all workers on the Confined Space Entry Team.  
- Keeps records on training, safety drills, test results, equipment inspections, and equipment maintenance.  
- Cancels the permit and secures the space when the work is finished.  
- Determines if a written rescue plan is necessary for a particular confined space entry. |
|                                          | evacuation if conditions warrant or if the permit limit expires.  
- If needed, is prepared to call for emergency help.  
- Remains at the entry point, unless relieved by another trained attendant.  
- Performs no other duties, not related to the confined space work, such as, texting, talking on cell phone, directing traffic, etc.) |
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<tr>
<td>Rescue Team</td>
<td>To perform rescue using established emergency procedures and use appropriate equipment and techniques.</td>
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<tr>
<td>Verifies that emergency help is available and that the method of summoning help is operable.</td>
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</tbody>
</table>

**Permit-Required Confined Space Entry**

Once all permit-required confined spaces have been identified, no employee can enter that space until:

*A permit system is established.*

- Each worksite or facility shall maintain a **Confined Spaces Inventory** or list of all permit-required confined spaces.

- A warning sign or label (or other effective means of marking) shall be displayed at each permit-required confined space to advise agency personnel and the general public of the potential danger.

- Where practical, entry into all permit-required confined spaces should be locked or blocked.

- Entry into a permit-required confined space must be authorized by a qualified supervisor or safety professional and a written **Confined Space Entry Permit** issued. (See **Confined Space Entry Flowchart**)

- A written permit for permit-confined space entry must include authorization of the entry, an order for corrective measures (if necessary), a termination date/time and the signature of the qualified individual issuing the permit.

- The permit must be posted in a conspicuous location near the confined space entry, available to the entrants from the time of entry and for the duration of the task only.

- The permit must be cancelled when the work has been completed but, retained for one year to facilitate any review of the Confined Space Program.

- The individual charged with administering the Confined Space Permit Program shall retain the forms for a Confined Space Entry Permit and the **Confined Space Entry Program Element Contact List** at each facility or operation.

- If welding is to be performed in any confined space (permit-required or non-permit required), a hot work permit must be obtained (See **Welding 29 CFR 1910.252**).
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Pre-entry atmospheric testing is conducted. Pre-entry atmospheric testing for the confined space shall be performed prior to employee entrance (See Atmospheric Testing Procedures).

Energy sources are isolated. Energy sources will be completely isolated by physical disconnection, double blocking, bleeding, or by lockout/tagout procedures (See Lockout/Tagout 29 CFR 1910.147).

Warning signs are posted for permit-required confined spaces.

The confined space is ventilated and cleaned.

- Where feasible, ventilation and cleaning to empty flush, or purge spaces, shall be performed from the outside.
- During pre-entry ventilation, the blowing duct outlet should be positioned for uniform dilution and elimination of any hazardous pockets in the atmosphere.
- When a hazardous atmosphere is detected, ventilation will continue until the job is completed, or the space has no harmful concentration of toxic gases or vapors, and acceptable oxygen concentrations.
- The atmosphere will be tested three times or until safe levels are maintained.

The appropriate Personal Protective Equipment (PPE) is worn. The appropriate PPE should be worn based on the hazard(s) and include eye and face protection, head protection, foot and leg protection, body protection, hearing protection, respiratory protection, hand and arm protection, harness, safety belt, and lifeline (See Personal Protective Equipment (General Requirements 29 CFR 1910.132), (Eye, Face Protection 29 CFR 1910.133), (Foot Protection 29 CFR 1910.136), (Electrical Workers 29 CFR 1910.335), (Electrical Protective Equipment 29 CFR 1910.137), (Electrical Safety-Related Work Practices, Use of PPE 29 CFR 1910.333(c)(2)), (Head Protection 29 CFR 1910.135).

The appropriate tools are in place. The appropriate equipment and tools must be in place and in good condition (See Hand and Portable Power Tools 29 CFR 1910.241).

The attendant(s) is/are in place. This individual will be responsible for alerting others that a rescue is in progress and for taking the appropriate measures to ensure the safety of all co-workers in the area. No employee is to enter a confined space if another employee is overcome.

- The attendant shall be stationed immediately outside permit-required confined space(s).
- The attendant shall be trained in rescue.
- The attendant shall not enter the permit-confined space.
- The attendant shall maintain visual or voice contact with the entrant or other appropriate communications should be established such as the use of radios or walkie-talkies.
The attendant shall have the means to summon assistance.

The attendant shall have safety and rescue equipment on hand.

_The rescue team(s) is/are in place._ Rescue equipment and self-contained breathing apparatus must be available.

_Any contractor that performs work for a state agency must comply with the OSHA confined space entry requirement._ The contractor is to provide their own confined space entry program and training.

**Recordkeeping**

This section establishes general provisions and identifies responsibilities for Confined Space Entry ([29 CFR 1910.146](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=5648)). Recordkeeping requirements for Confined Space Entry include the following:

- Retaining each cancelled permit for at least one year to facilitate review of the Permit-Required Confined Space Program.
- Noting problems encountered during entry on the permit to facilitate revisions to Permit-Required Confined Space Program.
- Certification of training to include the employee name, identity of the trainer(s) and the training dates.
- Reclassification from permit to non-permit space certification, with the date, location, and signature, of the person making the determination.

**Definitions**

This section provides applicable definitions for Confined Space Entry ([29 CFR 1910.146](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=5648)).

_Attendant:_ Person who remains outside the permitted space while the work is being done.

_Confined Space:_ A confined space by design is large enough and so configured that an employee can bodily enter and perform assigned work; and has limited or restricted openings for entry and exit; and is not designed for continuous employee occupancy.

_Entrant:_ An employee who is authorized by the employer to enter a permitted space.

_Entry Permit:_ A written document that is provided by the employer to allow and control entry into a permit required 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.
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*Hot Work Permits*: A permit allowing employees to perform work involving welding, cutting, or any task that would deplete oxygen, create toxic fumes and vapors, or create the potential for fire or explosion.

*Lower Explosive Limit (LEL)*: The minimum concentration of a combustible/flammable gas or vapor in air which will ignite if an ignition source is present.

*Oxygen Deficiency*: An atmosphere containing oxygen at a concentration of less than 19.5 percent by volume as measured by an oxygen measuring device.

*Oxygen Maximum*: An atmosphere containing oxygen at a concentration of more than 23.5 percent by volume as measured by an oxygen measuring device.

*Permit Required Confined Space*: One that meets the definition of a confined space and has one or more of these characteristics: 1) contains or has the potential to contain a hazardous atmosphere, 2) contains material that has the potential for engulfing an entrant, 3) has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section, and /or 4) contains any other recognized serious safety or health hazards.

*Qualified Person*: A person who has been trained and authorized to perform atmospheric testing.

*Upper Explosive Limit (UEL)*: The maximum concentration of a combustible/flammable gas or vapor in air before its saturation point which will ignite if an ignition source is present.

**Pictures**

Examples of Confined Spaces

**Resources**


**Confined Space Entry Permit**

**Confined Space Entry Flowchart**

**Confined Space Decision Tree Flowchart**

**Confined Space Evaluation Form**

Confined Space Pre-entry atmospheric testing is conducted. (See Atmospheric Testing Procedures).

Energy sources are isolated. (See Lockout/Tagout 29 CFR 1910.147).

Personal Protective Equipment (PPE).

General Requirements 29 CFR 1910.132
Eye, Face Protection 29 CFR 1910.133
Foot Protection 29 CFR 1910.136
Electrical Workers 29 CFR 1910.335
Electrical Protective Equipment 29 CFR 1910.137
Electrical Safety-Related Work Practices, Use of PPE 29 CFR 1910.333(c)(2)
Head Protection 29 CFR 1910.135