

Environmental Health and Safety

Last Reviewed: July 18, 2013

How to enter, work, and exit Confined Spaces

Philosophy:

Many workplaces contain spaces that are considered to be "confined" because their configurations hinder the activities of any employees who must enter into, work in, and exit from them. Employees who work in confined spaces also face increased risk of exposure to serious physical injury from hazards such as entrapment, engulfment and hazardous atmospheric conditions. Confinement itself may pose entrapment hazards, and work in confined spaces may keep employees closer to hazards, such as an asphyxiating atmosphere, than they would be otherwise.

Procedure:

Definitions

Confined Space - an area which:

- Has adequate size and configuration for employee entry
- Has limited means of access or exit
- Is not designed for continuous employee occupancy

Permit Required Confined Space (Permit Space) - a confined space that has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere (toxic, flammable, asphyxiating)
- Contains a material that has the potential for engulfing an entrant
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section
- Contains any other recognized serious safety or health hazard

Non-Permit Confined Space - a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or any serious physical harm.

Permit-Required Confined Space Program - the employer's overall program for controlling and, where appropriate, for protecting employees from permit-required space hazards and for regulating employee entry into permit-required spaces.

Permit System - the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Authorized Entrant - an employee who is authorized by the employer to enter a permit-required space

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Attendant - an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendants' duties assigned in the employer's permit space program

Entry Supervisor - the person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned; authorizing entry; overseeing entry operations; and terminating entry when required.

Hazardous Atmosphere - an atmosphere that may expose employee to the risk of death, incapacitation, impairment of the ability to self-rescue, injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL)

- Airborne combustible dust at a concentration that meets or exceeds its LFL

This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less

- Atmospheric oxygen concentration below 19.5% percent or above 23.5 percent

- Atmospheric concentration of any substance which could result in employee exposure

- Any other atmospheric condition that is immediately dangerous to life or health

Hot Work Permit- the employer's written authorization to perform operations (e.g., riveting, welding, cutting, burning and heating) capable of providing a source of ignition

Retrieval System - The equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for the non-entry rescue of persons from permit spaces

Testing - the process by which the hazards that may confront entrants of a permit space are identified and evaluated

Responsibilities

The Division of Environmental Health and Safety shall appoint a Confined Space Entry Coordinator. The Coordinator, as well as the division/department heads, will be charged with the following responsibilities:

Confined Space Entry Coordinators:

- Provide technical assistance in the categorization of the confined spaces on USF property
- Provide technical assistance in determining the physical and chemical hazards and selecting gas monitoring instruments
- Coordinate supervisor and/or trainer training as needed

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- Periodically evaluate the Confined Space Entry Program

Division/Department/Area Heads:

- Evaluate their workplaces and determining if there are any permit required confined spaces that their personnel or associated contractor personnel enter
- Ensure that the necessary equipment is available to personnel entering their confined spaces. This includes, but is not limited to, ventilation equipment, gas monitoring equipment, and rescue equipment.
- Ensure that their personnel are properly trained prior to entering confined spaces
- Develop a written program to prevent unauthorized entry, to identify and evaluate confined space hazards, and to establish procedures and practices for safe entry, including testing and monitoring
- Ensure that all personnel who enter their confined spaces fully comply with the work practices and procedures specified in the Florida-adopted rule and this policy

Individual employees are responsible for fully complying with this procedure.

Authorized entrants must know the hazards they may face, be able to recognize signs or symptoms of exposure and understand the consequences of exposure to hazards.

Entrants must know how to:

- Use any needed equipment
- Communicate with the attendant as necessary
- Alert the attendant to the warning signs or the existence of a hazardous condition
- Exit as quickly as possible whenever ordered or alerted (by alarm, warning sign, or prohibited condition)

Attendants must:

- Know the hazards of confined spaces
- Be aware of the behavioral effects of potential exposures
- Maintain a continuous count and identification of authorized entrants
- Remain outside the space until relieved
- Communicate with entrants as necessary to monitor entrant status
- Monitor activities inside and outside the permit space and order exit if required, summon rescuers if necessary, prevent unauthorized entry into the confined space and perform non-entry rescues if required.

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Attendants may not perform other duties that interfere with their primary duty to monitor and protect the safety of authorized entrants.

Entry Supervisors must:

- Know the hazards of confined spaces
- Verify that all required tests have been conducted and that all procedures and equipment are in place before endorsing a permit
- Terminate entry if necessary
- Cancel permits
- Verify that rescue services are available and the means for summoning them are operable*

*Rescue services may be provided by on-site employees or an off-site service.

On-site teams must be properly equipped and must receive the same training as authorized entrants, plus training in the use of personal protective and rescue equipment and in first aid, including CPR. They must practice simulated rescues at least once every twelve months.

Outside rescue services must be made aware of the hazards of the confined spaces, must have access to comparable permit spaces to develop rescue plans, and must practice rescues.

Hospitals or treatment facilities must be provided with any Safety Data Sheets (SDS) or any other information in a permit space hazard exposure situation that may aid in the treatment of rescued employees.

Contractors must:

- Coordinate with the host employer to obtain information regarding the location of the permit-required confined spaces, the permit space program and procedures, and likely hazards that the contractor might encounter.

Joint entries must be coordinated and the contractor debriefed at their conclusion.

Confined Space Entry Procedures

Alternative Entry Procedure

This procedure may only be used if all of the following conditions are met:

- The only hazard posed by the permit space is an actual or potential hazardous atmosphere

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- Continuous forced ventilation alone is sufficient to maintain that permit space safe for entry
- The entry supervisor has developed monitoring and inspection data that supports the above conclusions.

If an initial entry is required to obtain the data referred to above, normal permit-required procedures must be followed.

Entry into the permit space is performed in accordance with the following requirements:

- Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed
- When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space
- Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for the following conditions in the order given:
 - 1) Oxygen content
 - 2) Flammable gases and vapors
 - 3) Potential toxic air contaminants

There may be no hazardous atmosphere within the space whenever any employee is inside the space.

Continuous forced air ventilation shall be used as follows:

- An employee shall not enter the space until the forced air ventilation has eliminated any hazardous atmosphere
- The forced air ventilation shall be so directed as to ventilate the immediate areas where an employee is or may be present within the space and shall continue until all employees have left the space
- The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space. The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

If a hazardous atmosphere is detected during entry:

- Each employee shall leave the space immediately
- The space shall be evaluated to determine how the hazardous atmosphere developed

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- Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry take place

The entry supervisor shall verify that the space is safe for entry and that the measures described above have been taken, through a written certification that contains the date, location of the space and the signature of the person providing the certification. The certification shall be made before entry and should be made available to each employee entering the space.

Permit-Required Entry Procedures

Entry supervisors are responsible for the following:

1) Implementing the measures necessary to prevent unauthorized entries; identifying and evaluating the hazards of permit spaces before employees enter them and documenting the completion of the following measures before any entry into a permit space is required, by preparing an entry permit which specifies:

- Acceptable entry conditions
- Procedures for isolating the permit space
- Procedures for purging, inerting, flushing or ventilating the permit space to eliminate or control atmospheric hazards
- Procedures for providing pedestrian, vehicle, or other barriers as necessary to prevent entrants from external hazards
- Procedures for verifying conditions in the permit space are acceptable for entry throughout the duration of an authorized entry

2) Providing the following equipment to employees, maintaining this equipment properly, and ensuring that employees use this equipment properly:

- Testing and monitoring equipment needed to evaluate permit space conditions
- Ventilating equipment needed to obtain acceptable entry conditions
- Communications equipment necessary for the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space
- Personal protective equipment insofar as feasible engineering and work practice controls do not adequately protect employees
- Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency
- Barriers and shields to protect entrants from external hazards, such as vehicles and pedestrians
- Equipment, such as ladders, needed for safe ingress and egress by authorized entrants
- Emergency and rescue equipment as needed for in-house rescues

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- Any other equipment needed for safe entry into and egress by authorized entrants

3) Evaluating the permit space conditions as follows when entry operations are conducted:

- Test conditions in the permit space to determine if acceptable entry conditions exist before entry to begin is authorized. If the isolation of the space is not feasible because the space is large or is part of a continuous system (such as a sewer), perform pre-entry testing to the extent that is feasible before entry is authorized.
- If entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working. Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations. When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

4) Providing at least one attendant outside the permit space into which entry is authorized for the duration of entry operations. If multiple spaces are to be monitored by a single attendant, the permit program should include the means and procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces being monitored. This is should not distract from the attendant's other responsibilities.

5) Designating authorized entrants, attendants, and personnel who will test and monitor the atmosphere in a permit space during entry operations; identifying the duties of each such employee; and providing each such employee with their required training.

6) Developing and implementing procedures for summoning rescue and emergency services; for rescuing entrants from permit spaces; for providing necessary emergency service to rescued employees; and for preventing unauthorized personnel from attempting a rescue.

7) Developing and implementing a system for the preparation, issuance, use, and cancellation of entry permits.

8) Developing and implementing procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the employees of any other employer.

9) Developing and implementing procedures necessary for concluding the entry after entry operations have been completed.

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10) Reviewing entry operations when there is reason to believe that measures taken under the permit space program may not protect employees; and revising the program to correct deficiencies found to exist before subsequent entries are authorized.

11) Reviewing the permit-required confined space program, using the canceled permits that are retained for one year after each entry. They shall then revise the program as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

Entry Permits

General Conditions

- 1) Before entry begins, the entry supervisor identified on the permit shall sign the entry permit to authorize entry.
- 2) The completed permit shall be made available at the time of entry to all authorized entrants, by posting it at the entry portal or by any other equally effective means; so that the entrants can confirm that pre-entry preparations have been completed.
- 3) The duration of the permit shall not exceed the time required to complete the assigned task or job identified on the permit.
- 4) The entry supervisor shall terminate entry and cancel the entry permit when, the entry operations covered by the entry permit have been completed; or a condition that is not allowed under the entry permit arises in or near the permit space.

Description of Entry Permit

An entry permit identifies:

- The permit space to be entered
- The acceptable entry conditions
- 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 by such other means as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space
- The personnel, by name, currently serving as attendants
- 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

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- The measures used to isolate the permit space and to eliminate or control permit space hazards before entry
- The specific procedures for purging, inerting, flushing or ventilating the permit space as necessary to eliminate or control atmospheric hazards
- The results of initial and periodic tests, including oxygen, combustible gases and vapors, and toxic gases and vapors. Include the names or initials of the testers and an indication of when the tests were performed
- The rescue and emergency services that can be summoned and the means for summoning these 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 policy
- Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety
- Any additional permits, such as for hot work, which has been issued to authorize work in the permit space

Training

Training shall be provided to each affected employee:

- Before the employee is first assigned permit space duties
- Before there is a change in assigned duties.
- Whenever there is a change in permit space operations that presents a new hazard.
- Whenever there are inadequacies in an employee's knowledge.

Division/department/area heads shall certify that the required training has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers and the dates of training. The certification shall be available for inspection by employees and their authorized representatives.

Rescue and Emergency Services

In-House Rescue Services

Each member of the rescue service shall:

- Be trained to use the personal protective equipment provided to them and the rescue equipment-necessary for making rescues from permit spaces.
- Perform the duties of authorized entrants as well as their assigned rescue duties

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- Practice making permit space rescues at least once every twelve months, by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from the actual permit spaces or from representative permit spaces.
Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescues are to be performed.
- Be trained in basic first-aid and in cardiopulmonary resuscitation (CPR.)

Outside Rescue Services

The rescue service must:

- Be informed of the hazards they may confront when called on to perform rescues.
- Be provided 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.

Non-Entry Rescue

Retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk entry or would not contribute to the rescue of the entrant.

Retrieval systems shall meet the following requirements:

- Each authorized entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, or above the entrant's head
Wristlets may be used in lieu of the chest or full body harness if it can be demonstrated 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 permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.
A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than five feet deep.