



Best Practices for Confined Space Entry

Scope

Confined Space Entry procedures are regulated by OSHA under 29 CFR 1910.146 and the reader must be thoroughly familiar with this regulation. Although this best practice provides commentary on certain aspects of the regulation, it is not intended to be used in lieu of the regulation. Entry into a confined space should always be undertaken based on clearly defined procedures and with all personnel trained in their job responsibilities. Assumptions should never be made. Accidents associated with confined space entry continue to occur in the chemical industry each year, and an effective program is required to protect employees from possible death or injury.

Key Points

- For facilities that successfully perform many confined space entries, complacency can be a problem. EHS professionals must audit confined space entries and the completed permits to prevent against complacency and backsliding.
- The “buck stops” with the Entry Supervisor. The Entry Supervisor is responsible for all aspects of the entry. Individuals in this role shall take this job seriously and be thoroughly familiar with their responsibilities per Exhibit 1. In addition to standard confined space entry training, best practice is to provide Entry Supervisors initial and recurring training specific to their role.
- On large turnarounds, be careful to assure a single Entry Supervisor is not overloaded with responsibility for multiple, and perhaps too many, confined space entries.
- There is often a temptation to use an individual with the least experience to serve as the attendant for the confined space. Do not underestimate the critical importance of this role. Ensure that the attendant is well trained in their duties per Exhibit 1 and can demonstrate competency.
- Ensure the isolation procedure used for the space to be entered is appropriate for confined space entry versus non-entry maintenance activities. Typically, additional blanking or isolation is needed for entry. See the section below, “Effective Isolation/Lockout of Confined Spaces” for additional commentary.
- Per the Lockout Standard, isolation procedures are often prepared in advance. Since physical changes can occur that may not be reflected in the isolation procedure, best practice is to have two qualified individuals independently verify that the isolation procedure is accurate before its use for confined space entry isolation. This independent verification should occur shortly before use, typically a few days or a week, as defined by the facility.
- Although periodic testing is required by the regulation, monitoring of the confined space atmosphere with continuous monitors is highly recommended. Additional safety is provided when these continuous monitors are worn by the entrants near their breathing zone (e.g. clipped to neck or collar).



- Pre-entry conferences are essential to a safe confined space entry. Entry Supervisors shall ensure that pre-entry conferences occur not only at the beginning of the job, but at shift change, such as transitioning from day shift to night shift, and when personnel are added or changed during the entry procedure.
- Many injuries and fatalities have occurred when unauthorized personnel enter a confined space to attempt a rescue, and then they become another victim. Ensure your training program strongly addresses the emergency procedures to rescue someone in distress in a confined space.
- If rescue personnel are summoned for another emergency, the attendant must evacuate the confined space until rescue personnel are again available.
- Do not allow compressed gas cylinders (e.g. for hot work) to be located inside a confined space. Also, ensure compressed gas hoses are removed at breaks and when no longer needed.
- Performing hot work inside a confined space presents an array of unique hazards. Best practice is to issue the hot work permit with enhanced review and approvals. For example, if the hot work permit is normally issued by a single individual, consider having a team of two or more supervisors review and approve the hot work permit. Clearly, the Entry Supervisor must be involved as well.

What Constitutes “Entry” Into a Confined Space?

OSHA defines “entry” as “the action by which a person passes through an opening into a Permit Required Confined Space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space, regardless of whether there is intent to fully enter the space.” Letters of interpretation have clarified that incidentally breaking the plane of a permit required confined space with one’s arm (only) for limited, specific tasks and without the intent of entering the space, or the risk of falling into the space and/or risk of exposure to any safety and health hazard within the space is not considered entry.

Permit-Required Confined Space Entry Program

A documented Permit-Required Confined Space Entry Program is required if employees are going to enter confined spaces. This is typically in the form of a documented safe work practice specific to this subject. OSHA has many requirements described in 29 CFR 1910.146(d). The regulation is quite comprehensive and if strictly followed, the facility will have a very good confined space entry program. Key points are:

- In addition to making sure your safe work practice/program meets the required elements, make sure the program is a living and useful document for the workforce. The required annual review of the program with employees participating is critical to success.
- Have clear roles and responsibilities defined.
- Ensure contractors follow your program requirements.
- Ensure your program has integrated the best practices described in this document.



Entry Permit

The entry permit requirements are described in 29 CFR 1910.146(f). Key points are:

- Audit completed permits to ensure that they were completely and correctly filled out. Due to the size of the permit, there are many opportunities to make errors.
- Ensure contractors use your confined space entry permit. If they have a policy of using their own permit, require the use of both confined space entry permits.
- For contractors entering a confined space, it is permissible for a contractor supervisor to be the Entry Supervisor if properly trained. However, best practice is that the entry permit to be opened by a facility Entry Supervisor and for a facility Entry Supervisor to close the entry permit at the conclusion of the entry.

Effective Isolation/Lockout of a Confined Space

Isolation/lockout for entering confined spaces involves additional measures compared to isolation for non-entry work. Consider the following.

If an isolation procedure for the purpose of confined space entry was prepared well in advance of the planned entry, best practice is to have two qualified individuals independently verify the correctness of the isolation procedure a few days prior to its use. This practice would catch any changes to the confined space, such as additional pipelines entering/exiting the confined space not updated by a Management of Change procedure.

Isolation of pipelines connected to the confined space need to have measures beyond simply closing and locking a valve. Best practice is to:

- Install a blind/blank flange on the end of a disconnected line, or
- Install a “slip blank,” suitable for pipeline pressure, in between a pair of flanges in the line, or
- Provide an “air gap” such as removing a short section of pipeline, or
- If your facility allows it, use a “double block and bleed” isolation. (See Hazardous Energy Isolation for diagrams of double block and bleed isolations.)

Rescue Services and What Constitutes Timely Rescue?

What is considered timely rescue? The regulation in 1910.146(k)(1)(i) only states “timely rescue,” but they did provide a note to indicate that the response time will vary according to the specific hazards involved for each entry. Also note that the Respiratory Protection standard requires that employers provide a standby person or persons capable of immediate action to rescue employee(s) wearing respiratory protection while in work areas defined as IDLH (immediately dangerous to life and health) atmospheres.

An employer who designates rescue and emergency services shall meet the requirements described in 29 CFR 1910.146(k). Rescue personnel can be part of an employer’s work force, be a contracted service, or the local municipal emergency responder. The guidance provided by



the regulation is very good, but the following advice is offered:

- The evaluation and selection of a third-party rescue service requires considerable effort to do it right. Don't rush through this process.
- Best practice is to have a rescue plan developed in advance for each specific confined space to be entered.

Training

The regulation states that the employer is responsible for providing initial training and recurring training as changes or deviations occur to the program. Best practice for recurring training is annual. Also, best practice is to have additional, more detailed, training for Entry Supervisors to ensure that they clearly understand their duties. Note that training shall be documented and be available for inspection by employees, their authorized representatives and regulators.

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Exhibit 1

Roles and Responsibilities as Defined in the Confined Space Entry Regulation

Duties of Entry Supervisors

The employer shall ensure that each entry supervisor:

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
- Terminates the entry and cancels the permit;
- Verifies that rescue services are available and that the means for summoning them are operable;
- Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and
- Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

Duties of Authorized Entrants

The employer shall ensure that all authorized entrants:

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Properly use equipment, e.g. communications, ventilation, PPE, continuous monitors (if provided), etc.;
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space;
- Alert the attendant whenever:
 - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or
 - The entrant detects a prohibited condition; and
- Exit from the permit space as quickly as possible whenever:
 - An order to evacuate is given by the attendant or the entry supervisor,
 - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
 - The entrant detects a prohibited condition, or
 - An evacuation alarm is activated.

Duties of Attendants

The employer shall ensure that each attendant:

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Is aware of possible behavioral effects of hazard exposure in authorized entrants;
- Continuously maintains an accurate count of authorized entrants in the permit space;
- Remains outside the permit space during entry operations until relieved by another attendant; *NOTE:* When the employer's permit entry program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations and if they have been relieved.
- Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space;
- Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions;
 - If the attendant detects a prohibited condition;
 - If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
 - If the attendant detects a situation outside the space that could endanger the authorized entrants; or
 - If the attendant cannot effectively and safely perform all the duties required.
- Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - Warn the unauthorized persons that they must stay away from the permit space;
 - Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
 - Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;
- Performs non-entry rescues as specified by the employer's rescue procedure; and
- Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrant.

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