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CONFINED SPACES

By SeaBright Insurance Loss Control

Confined spaces kill. And yet, accident investigations and studies have shown that virtually every fatality could have been avoided if proper procedures were followed. In the past, confined space entry standards have been primarily concerned with atmospheric hazards. In fact, most confined space incidents occur as a result of unacceptable atmospheric hazards such as oxygen deficiency, oxygen enrichment, or from toxic, flammable or explosive atmospheres. Other hazards are now recognized as well. These include the dangers of engulfment, mechanical hazards, and often of untrained rescuers. *Sixty percent of all confined space fatalities involve would-be rescuers.*¹

This *Supervisors' Safety Update* covers General industries (OSHA 1910), with the exception of shipyards (1915), construction (1926) and agriculture (1928). If you operate in these specific industries, you will still need to develop and follow a written confined space entry program in order to prevent employee injury, illness and fatalities.

What Is A Confined Space?

Confined space means a space that (1) is large enough so that an employee can bodily enter and perform assigned work; (2) has a limited or restricted means for entry or exit; and (3) is not designed for continuous employee occupancy. Examples of confined spaces include tanks, silos, storage bins, hoppers, boilers, and pits.

What Is "Entry"

A frequently asked question is, "How much of the body needs to enter the space before it is considered entry?" The answer is, when **any** part of the body breaks the plane of the opening, entry has been made. And, before entry is made, you must comply with the specified confined space requirements.

Two Types of Confined Spaces

The confined space entry standard creates two categories of confined spaces. A *Non-Permit Confined Space* is "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 serious physical harm."

A *Permit Required Confined Space* has one or more of the following characteristics:

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

Every employer must evaluate the work place to determine if any spaces, which workers enter, are Permit Required Confined Spaces or Non-Permit spaces. Most spaces will be Permit Required. This is because most confined spaces have the *potential* for containing a hazard. If Permit Required spaces exist, you must inform your employees of the existence and location of the space and the danger it presents by posting danger signs, or by any equally effective means of communication. If you decide that your employees need not enter a space, you must take effective measures to prevent them from entering. Usually this means providing some sort of barrier, in addition to a sign stating that the space is not to be entered.

¹ Confined Space Rescue in Roseville; <http://www.calrescue.com/4.html>



Permit Required Confined Spaces

If it is decided that employees will enter a Permit Required space, you must have a written, customized program to guide you and your employees when working in these areas. A number of key decisions must be made to determine what steps should be taken to perform the job safely and how to be in compliance with regulatory standards.

If there are hazards other than atmospheric, these should be eliminated or controlled in accordance with the Standard. This may entail removing all materials that could engulf the entrant, isolating the space by blanking lines, lock out/tag out of machinery, etc. In addition, the Standard requires competent attendants, a communication system, and rescue provisions. The flow chart appendix is an excellent tool for working through the confined spaces decision-making process. However, you will need a copy of the Standard as a reference. Find both these on-line at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9798

1. The Permit

Permit Required confined spaces cannot be entered until a *Confined Space Entry Permit* has been completed by the designated Entry Supervisor. This primary document indicates that all necessary tests have been performed, lists the conditions under which entry can be made, and explains precautions to be taken. The entry permit is to be posted near the entry. Not just anyone can be an Authorized Entrant or Entry Supervisor since specific training and knowledge requirements exist for these roles.

2. The Entry Team

There are three distinct team positions that must be filled to make a proper, safe, and legal confined space entry. These are the entry supervisor, the authorized entrant, and the attendant. Each has specific duties that are fully covered in the Standard. Key duties and responsibilities are:

Entry Supervisor:

- Knows and understands the hazards to be faced during the entry;
- Assures that initial and periodic atmospheric tests of the space are conducted;
- Verifies information on the permit and that all requirements are met before entry is made;
- Verifies that rescue services are available;
- Terminates the entry and cancels the permit upon completion of the job;
- Removes unauthorized individuals who enter or attempt to enter the confined space.

Authorized Entrant:

- Knows and understands the hazards faced during the entry;
- Properly uses all personal protective or other equipment which is required;
- Maintains communication with attendants and notifies them if a dangerous situation is noted;
- Evacuates the space when ordered.

Attendant:

- Knows and understands the hazards faced during the entry;
- Maintains a count of those inside the space;
- Remains outside the space;
- Maintains communication with entrants, and notifies them if a dangerous situation is noted;
- Monitors activities inside and outside the space and orders evacuation as needed;
- Warns others away from the area;
- Performs no other duties that might interfere with the primary duty of monitoring and protecting the authorized entrants.

Non-Permit Confined Spaces

Although the Standard is written to address *all* confined space hazards, certain steps can be omitted if the *only* hazard presented by the space is an actual or potentially hazardous atmosphere. You must be able to demonstrate that continuous forced air ventilation will maintain these spaces safe for entry by developing monitoring and inspection data to support this. Verifying atmospheric conditions will require that you test for:

- *Oxygen content* (must be above 19.5% and below 23.5%);
- *The presence of flammable/combustible vapors* (must be below 10% of the Lower Explosive Limit (LEL));
- *Toxins* (must be below the Permissible Exposure Level (PEL)).

Tests must be done in the above order. If the oxygen content is below 19.5%, this could cause the flammable/combustible vapor readings to be erroneous.

Other Standards

Entry into a confined space is usually done to accomplish a specific task, such as cleaning or repairs. Another standard may apply to the specific work to be performed. For example, if you are going to make a welded repair, the welding standard would apply in addition to the confined space standard. When working with any standard, always check for other potential code requirements.

Do It Right!

Hundreds of confined space entries are made every day. Some are done safely; some are not. The only safe entries are those that are made with recognition of the dangers, and where action is taken to control or eliminate the hazards. Never become complacent just because a confined space fatality has not occurred at your workplace. If entry is done improperly, it may be just a matter of time before someone dies.



CONFINED SPACE ENTRY PERMIT

Permit expires	Date & Time	Confined space #	Duration of entry	Date & time finished
Location		Description		
Purpose of entry				
Entrants/attendants				
Entry supervisor	Work crew sup.	Area sup.	Atmos. mon.	
Hot work permit #		Type of hot work		
Safety approval		Industrial hygiene approval		
Alarm device	Nearest phone	In-plant rescue	Off-site rescue	
Training qual.	Pre-entry briefing	Return permit to safety department when work is completed		
ATMOSPHERIC MONITORING				
PRIOR TO ENTRY			RETEST	
Oxygen 19.5 - 23.5%	Flammable 10% LEL or less		Oxygen 19.5 - 23.5%	Flammable 10% LEL or less
Toxic			Toxic	
Chemical Name	MSDS	PEL	Detected	Chemical Name
Instrument	Calibration		Instrument	Calibration
ISOLATION OF SPACE				
Electrical Lockout <input type="checkbox"/> Tagout <input type="checkbox"/>	Mechanical Block linkage <input type="checkbox"/> Disconnect <input type="checkbox"/>		Other	
Piping Lockout <input type="checkbox"/> Tagout <input type="checkbox"/> Blank <input type="checkbox"/> Block & Bleed <input type="checkbox"/>	Hydraulic Lockout <input type="checkbox"/> Tagout <input type="checkbox"/> Disc. Lines <input type="checkbox"/> Lock Pump & Bleed <input type="checkbox"/>		Pneumatic Lockout <input type="checkbox"/> Tagout <input type="checkbox"/> Disc. Lines <input type="checkbox"/> Lock Comp. & Bleed <input type="checkbox"/>	
HAZARDS IN SPACE				
Previous contents		Other		
Contents: Flammable Irritant Corrosive Toxic Dust Asbestos Solid Liquid Gas	Configuration: Slippery surfaces Vertical drop Sharp surfaces Temp. - high or low Low overhead Slope of interior		Nature of work: Welding Cutting Grinding Scraping cleaning	
EQUIPMENT REQUIRED				
Respiratory Protection	SCBA <input type="checkbox"/> Sup. Air <input type="checkbox"/> Cart. Resp. <input type="checkbox"/> Cartridge Organic Vapor <input type="checkbox"/> Acid Gas <input type="checkbox"/> Organic vapor/Acid gas <input type="checkbox"/> ABA <input type="checkbox"/> Power Air <input type="checkbox"/> Full <input type="checkbox"/> Half <input type="checkbox"/> Ammonia <input type="checkbox"/> HEPA Dust/Mist <input type="checkbox"/>			
PPE:	Coveralls <input type="checkbox"/> Hardhat <input type="checkbox"/> Safety glasses <input type="checkbox"/> Safety shoes <input type="checkbox"/> Leather gloves <input type="checkbox"/> Ear plugs/muffs <input type="checkbox"/> Goggles <input type="checkbox"/> Welding hood <input type="checkbox"/> Welding jacket <input type="checkbox"/> Splash suit <input type="checkbox"/> Chemical gloves <input type="checkbox"/> Chemical boots <input type="checkbox"/> Faceshield <input type="checkbox"/>			
Lighting	Flashlights <input type="checkbox"/> Handlights <input type="checkbox"/> Cord lights <input type="checkbox"/> Cords <input type="checkbox"/> Portable lights <input type="checkbox"/> Generator <input type="checkbox"/> <i>*All equipment should be explosion-proof & equipped with GFCI</i>			
Ventilation	Ventilator <input type="checkbox"/> 10' sections of duct <input type="checkbox"/> 20' sections of duct <input type="checkbox"/> Saddlevent <input type="checkbox"/> CFM Required <input type="checkbox"/> <i>*All equipment should be explosion-proof & equipped with GFCI</i>			
Entry Equipment	Body harness <input type="checkbox"/> Retrieval device <input type="checkbox"/> Tripod <input type="checkbox"/> Anchor point <input type="checkbox"/> Access ladder <input type="checkbox"/> Personal alert device <input type="checkbox"/> Emergency signal <input type="checkbox"/> Communications <input type="checkbox"/>			
Rescue Equipment	Body harness <input type="checkbox"/> Retrieval device <input type="checkbox"/> Tripod <input type="checkbox"/> Anchor point <input type="checkbox"/> Access ladder <input type="checkbox"/> Personal alert device <input type="checkbox"/> Emergency signal <input type="checkbox"/> Communications <input type="checkbox"/> SCBA <input type="checkbox"/> ABA <input type="checkbox"/> Escape mask <input type="checkbox"/> Rescue harness <input type="checkbox"/> Wristlets <input type="checkbox"/>			
Other:				
Entry Supervisor (signature)				