

Section 34

CONFINED SPACE ENTRY

34.A CONFINED SPACES – NON-MARINE FACILITIES

34.A.01 General. Confined space (CS) work performed in permanent facilities and/or performed on construction sites shall be performed in accordance with this Section, 29 CFR 1910.146 and ANSI Z117.1. This section does not regulate excavations or underground construction work (tunneling) as a confined space. For the requirements for excavations see Section 25 and for the requirements for underground work and tunneling, see Section 26.

34.A.02 For USACE-conducted CS work activities associated with ship and vessel repair and maintenance operations covered by 29 CFR 1915, see Section 34.B.

34.A.03 The following definitions apply to all CSs, during operations and maintenance and construction, except for those during ship and vessel repair and maintenance:

a. Confined Space – A space that is large enough and so configured that an employee can bodily enter and perform assigned work and, has limited or restricted means for entry or exit and, is not designed for continuous employee occupancy;

b. Non-Permit Required Confined Space (NPRCS) – a CS that does not contain or have the potential to contain an atmospheric hazard capable of causing death or physical harm. The atmosphere shall be proven by air monitoring and isolation to be free of hazard. Water tunnels or sewer pipes are considered NPRCS only when all possible openings where material may enter has been blinded or blanked out and the atmosphere is proven by air sampling to be controlled by continuous ventilation. This is applicable during both construction and normal entry or maintenance activities.

c. Permit Required Confined Space (PRCS) – Is a CS that has one or more of the following characteristics:

(1) Contains or has a potential to contain a hazardous atmosphere and is not controlled by continuous ventilation, air sampling, and blanking or blinding;

(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 by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section; AND

(4) Contains any other recognized serious safety or health hazard (physical, chemical, biological, electrical, radiological, etc.).

d. Confined Space Competent Person (CSCP) or Safety Supervisor – A person with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, documented previous experience with PRCS space entry procedures and, the authority to supervise and influence how work is performed on job sites and in facilities.

34.A.04 Confined Space Identification. Facilities and job sites shall assign a Safety Supervisor or CSCP to identify all CSs and determine entry rules and requirements (See Figure 34-1).

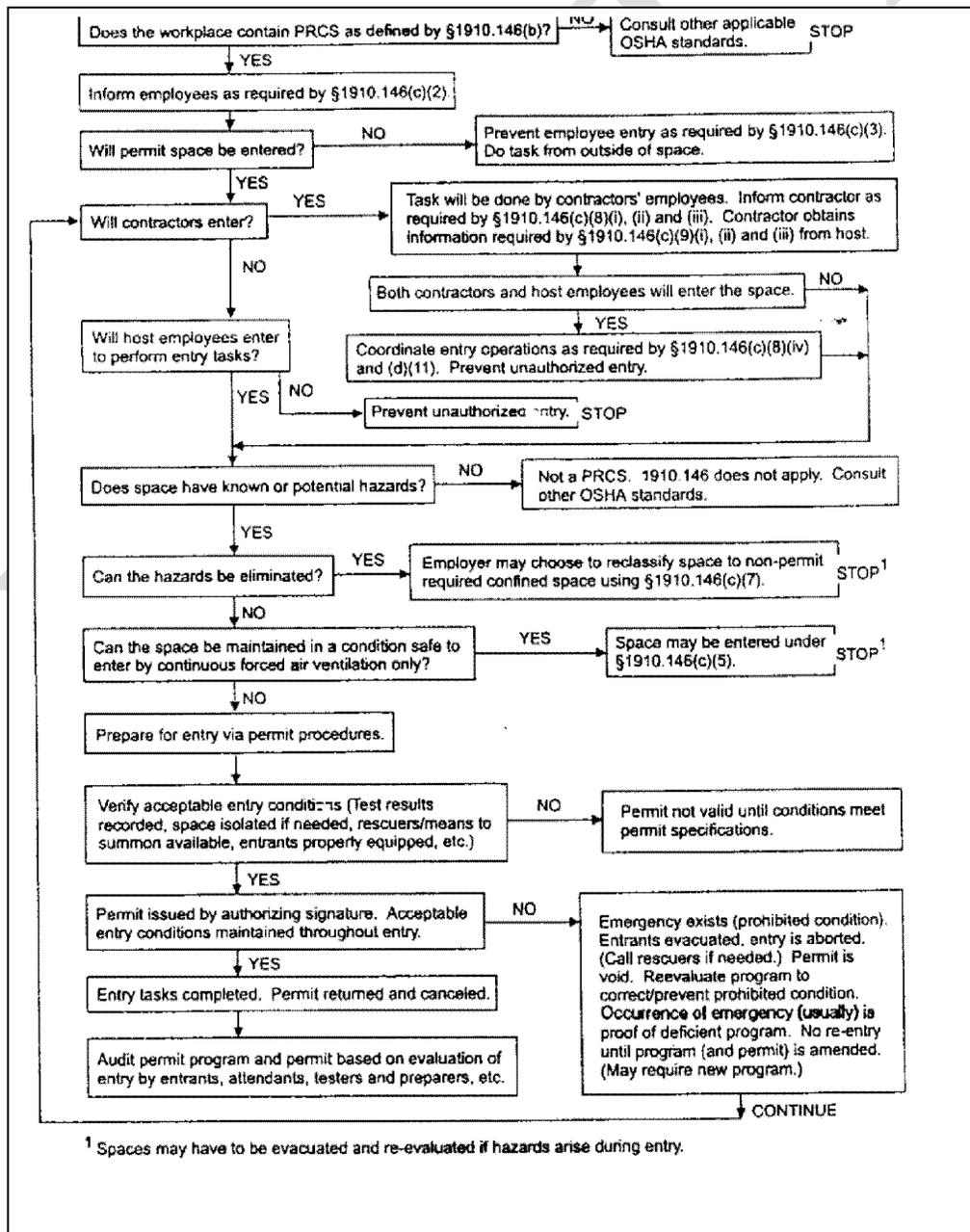
a. All CSs shall be labeled as a danger and defined as either a PRCS or a NPRCS.

b. All previously identified CSs shall be identified in writing to any contract personnel prior to the beginning of work . The contract documents shall list any known hazards in the CS and specific precautions to be taken during entry. If it is known that work to be conducted inside a CS would create a possible hazardous atmosphere, the contractor shall be notified prior to

beginning work and shall be required to follow the requirements for PRCS. All entry into an identified or contractor-created CS shall be coordinated with the GDA and site security or emergency personnel before each entry.

c. For work conducted on military installations, the CSCP or designer shall coordinate with the installation CS program manager/team to identify all CSs and determine any specific installation requirements for entry.

Figure 34-1, Confined Space Identification Flow Chart



(1) That does not contain or have the potential to contain an atmospheric hazard capable of causing death or physical harm there are no entry procedures required.

(2) With an environment being controlled by ventilation and/or isolation, continual air monitoring and the use of audible/visual alarms in the event the ventilation system or the isolation system for physical hazards fail, as well as training for the employees in the area and those working in the CS on the proper rescue procedures to be used shall be required. This shall be documented a written in the Confined Space Entry Plan.

c. It is the responsibility of the site supervisor or project manager to ensure all entries into a CS are completed in a safe and protective manner.

d. At the end of the shift where PRCS was entered, there should be an after action review by all parties on the procedures and how the procedures could be improved. This review should include not only contract personnel, but GDA and any security or emergency responders on site.

34.A.06 CSCP/Safety Supervisor Responsibilities:

a. Identification and Labeling. The CSCP shall identify and label all CSs at the facility/site. The label shall identify the space as a NPRCS or a PRCS, and provide a warning regarding the appropriate entry requirements. If a contract will require contract employees to enter an identified CS, the contractor shall be notified in the contracting documents that CS entry and a CS program will be required for the completion of the contract;

b. Program Development. The CSCP shall develop and implement an activity/site-specific CS program. The program shall contain and adequately address the CS program elements of 29 CFR 1910.146 and those defined in this section;

c. PRCS Permit. The CSCP shall complete or review the completed CS permit (example provided in Figure 34-2) and shall be responsible for enforcing the use of CS permits for entry into all PRCSs at the facility/site;

d. Coordination with local emergency responders. The CSCP shall coordinate with local emergency responders to determine if they are capable of a timely (5 minutes) rescue from the specific CS. If the local emergency responders do not have the appropriate rescue capability, the rescue capability should be developed on-site.

n. Documented multi-employer/contractor provisions.

o. Establish review procedures to review CS program and permits that have been expired and/or revoked annually.

34.A.07 Confined Space Program Elements. The CS program shall address each of the following elements with facility/site-specific detail:

a. Identification and Labeling. Describe the process for identifying a work area as a CS and rationale used for classifying the type of CSs. Describe labeling and enforcement procedures that will assure personnel do not enter confined spaces in an unauthorized fashion;

b. Confined space hazard identification. Describe the air monitoring, physical isolation identification, or ventilation monitoring conducted to identify the space as a PRCS or a NPRCS;

c. Safe confined space entry conditions. Describe the practices and procedures that will be followed to assure that CSs will be entered safely. Procedures and practices shall include but are not limited to the following:

(1) NPRCSs – Describe any monitoring and employee training that will assure non-permit conditions are maintained and that

employees entering the NPRCS understand how to maintain a safe working environment while working in the NPRCS.

Describe the potential atmospheric and/or physical hazards that are present in the confined space and the necessary controls for these hazards; necessary training requirements of entrants and workers in the vicinity.

(2) PRCSs – At a minimum, describe how each of the elements below will be enforced at each PRCS:

(a) PRCS entry permit (example in Figure 34-2) completion, review, processes, signature authority, and maintenance procedures for all PRCS. The entry supervisor or manager shall be required to sign all permits daily before entry;

(b) Acceptable entry conditions;

(c) Observation by the authorized entrant of monitoring or testing in PRCSs;

(d) Isolation and/or any alarms for physical hazards or atmospheric hazards of the PRCSs;

(e) Purging, inerting, flushing or ventilating the PRCS as necessary to eliminate or control atmospheric hazards;

(f) Installation of barriers to protect entrants from external hazards;

(g) Monitoring requirements and procedures used to verify that acceptable entry conditions are maintained for the duration of the authorized entry;

d. Equipment (and equipment maintenance procedures) to be used for confined space entry at the facility/site. All equipment shall be calibrated and functionally tested before each entry in accordance with the manufacture's instructions. Equipment shall include the following at a minimum:

- (1) Appropriate atmospheric testing and monitoring equipment necessary to assure safe entry and that safe entry conditions are maintained;
 - (2) Ventilation equipment to assure maintenance of safe entry conditions;
 - (3) Communication equipment for entry;
 - (4) Personal Protective Equipment (PPE) necessary in the event that engineering controls and work practices do not adequately protect entrants;
 - (5) Lighting equipment for entry;
 - (6) Barriers and shields to keep unauthorized entrants out of the confined spaces during entry;
 - (7) Ladders or other equipment necessary for entrant access and egress;
 - (8) Rescue and emergency equipment needed to remove entrants in the event of an emergency. Particular emphasis shall be placed on the use and implementation of appropriate self-rescue procedures and equipment;
 - (9) Any other equipment necessary for safe entry into or rescue from CSs;
- e. Procedures for evaluating PRCS conditions when entry is conducted. Address each of the following in facility/site-specific detail;
- (1) Atmosphere conditions required to be maintained during entry to ensure safe entry;
 - (2) At a minimum, test the PRCS atmosphere for the following in the order specified:

- (a) Oxygen (before and continual while entrant is in the PRCS);
- (b) Combustible gases and vapors; and
- (c) Toxic gases and vapors.

- f. Policies and procedures to assure that at least one attendant is immediately available outside the PRCS during entry operations to monitor the conditions of the space, to communicate with entrants, and to respond to emergencies;
- g. Designate by name, personnel at the facility/site with active roles in confined space entry. Specify their responsibilities for PRCS entry. All permits shall be signed by each employee entering the confined space, the CSCP, attendant and a responsible entry supervisor;
- h. Document procedures and agreements with local emergency responders for notifying emergency services of a pending entry and summoning rescue and emergency services for rescuing PRCS entrants;
- i. Document a facility/site procedure for preparing, issuing, using and canceling PRCS entry permits;
- j. Document procedures for coordinating with employees from outside organizations who will be participating in PRCS entry;
- k. Document procedures for concluding an entry after entry operations have been completed;
- l. Develop procedures for reviewing PRCS entries and documenting lessons learned from them; and
- m. Establish a policy to review cancelled permits to modify the PRCS entry procedures.

34.A.07 Employee Training – All employees entering PRCS or NPRCS, authorized attendants, supervisors and managers, and workers in close proximity of the CS shall be trained to understand the requirements of the facility/site-specific CS program, CS entry procedures, and emergency retrieval procedures.

a. All entrants, authorized attendants, and supervisor/managers shall receive an initial CS training course.

b. Initial training shall include a minimum of the following: the roles and responsibilities in conducting an entry; specialized training on the use, calibration, and maintenance of monitoring, communications, and retrieval equipment; the hazards of the entry and the control of the hazards of the entry. This shall include hands on practical exercise with all the equipment; rescue exercise; and completing the CS permit.

c. Before each activity requiring entry into a CS, the entrant, authorized attendants, supervisor/managers, and workers in close proximity, shall review the entry procedures, the use of the air monitoring, personal protective, and retrieval equipment. Emergency responders shall be invited to the training review. If it has been over a year since the initial training, a rescue exercise shall be part of the training review.

d. Training shall be documented in the activity hazard analysis with a roster of those attending and topics discussed.

34.A.08 Rescue and Emergency Services – The CSCP shall develop or establish rescue and emergency services for PRCS entry. Emergency responders shall be notified of the training and at least annually, or immediately prior to each entry, shall have participated in an emergency response drill for retrieval of an employee or dummy from the confined space(s).

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Figure 34-2

CONFINED SPACE ENTRY PERMIT

Location of Work: _____

Description of Work (Purpose): _____

Authorized Attendants: _____

Authorized Entrants: _____

Entry Date: _____ Entry Time: _____

Outside Contractors: _____

Isolation Checklist (Safe Clearance):

Blanking and/or Disconnecting _____

Electrical _____

Mechanical _____

Other _____

Hazardous Work:

Burning _____

Welding _____

Brazing _____

Open Flame _____

Other _____

Hazards Expected:

Corrosive Materials _____

Hot Equipment _____

Flammable Materials _____

Toxic Materials _____

Drains Open _____

Cleaning (Ex: chemical or water lance) _____

Spark Producing Operations _____

Spilled Liquids _____

Pressure Systems _____

Other _____

Vessel Cleaned:

Deposits _____

Method _____
Inspection _____
Neutralized with _____

Fire Safety Precautions: _____

Personal Safety:
Ventilation Requirements _____
Respirators _____
Life Lines and Harness _____
Lighting _____
Communications _____
Buddy System _____
Name of Attendant _____

Atmospheric Gas Tests:

	Tests Performed	Location	Reading
Example:	(Oxygen)	_____	(19.5%)
Example:	(Flammability)	_____	(< 10% LFL)
	_____	_____	
	_____	_____	
	_____	_____	

Remarks: _____

Test Performed By: _____
Signature

Time: _____

Authorizations:
Entry Supervisor: _____
Safety Supervisor/Qualified Person: _____

Emergency Phone Numbers:
Fire Department _____
Ambulance _____
Hospital _____
Doctor _____

Permit Expires: _____

34.B WORK PERFORMED IN CONFINED AND ENCLOSED SPACES ON SHIPS AND VESSELS. The following applies only to ship and vessel repair and maintenance, not regular ship and vessel activities. > See Section 19.

34.B.01 Definitions

- a. Adjacent spaces are spaces which border an area on a vessel or vessel section such as, cargo tanks or holds, pump or engine rooms, storage lockers, tanks containing flammable or combustible liquids, gases, or solids, and crawl spaces, in all directions, including all points of contact, corners, diagonals, decks, tank tops, and bulkheads.
- b. A Competent Person for confined spaces in ships and vessels (CPCSSV) is a person who has knowledge of the designation of spaces where the work is done; ability to understand and follow through on the air sampling, PPE and instructions of a Marine Chemist or Certified Industrial Hygienist (CIH).
- c. A confined space on a ship or vessel is a compartment of small size and limited access such as a double bottom tank, cofferdam, or other space which by its small size and confined nature can readily create or aggravate a hazardous exposure.
- d. An enclosed space means any space, other than a confined space, which is enclosed by bulkheads and overhead. It includes cargo holds, tanks, quarters, and machinery and boiler spaces.
- e. "Enter with restrictions" refers to entry into a confined space when engineering controls, PPE and time limitations are imposed by the competent person.
- f. "Safe for Workers" denotes a space that meets the following criteria:

- (1) The oxygen content of the atmosphere is at least 19.5 percent and below 23.5 percent by volume;
- (2) The concentration of flammable vapors is below 10 percent of the lower explosive limit (LEL);
- (3) Any toxic materials in the atmosphere associated with cargo, fuel, tank coatings, or inerting media are within permissible concentrations at the time of the inspection.

34.B.02 All spaces on a vessel or ship or floating plant that could be considered a "potential confined space", shall be posted as a "Potential Confined Space". An inventory of these spaces shall be maintained in the pilot house and the land based office.

34.B.03 Before and during entry into the types of spaces listed below, the CPCSSV shall test for oxygen content, flammability, and toxicity. These tests and all entries shall be recorded on a entry form or in an entry log and reviewed by the GDA:

- a. Unventilated CSs that have been closed up or freshly painted;
- b. CSs that have contained or do contain combustible or flammable liquids or gases;
- c. CSs that have contained or do contain toxic, corrosive, or irritant liquid, gases, or solids.

34.B.04 If the testing determines the oxygen is below 19.5% or above 23.5%, or the lower explosive limit (LEL) of 10% is exceeded, or other toxic substances are measured, then the space should be thoroughly ventilated, and appropriate PPE used for entry as directed by the CPCSSV.