

**Subchapter 7. General Industry Safety Orders**  
**Group 16. Control of Hazardous Substances**  
**Article 108. Confined Spaces**

[New query](#)

---

**§5158. Other Confined Space Operations.**

---

(a) Scope. For industries and operations specified in section 5156(b)(2) this section prescribes minimum standards for preventing employee exposure to dangerous air contamination, oxygen enrichment and/or oxygen deficiency in confined spaces, as defined in subsection (b).

Note: Implementing a permit-required confined space program in accordance with section 5157 shall meet the requirements of this section.

(b) Definitions.

(1) Confined Space. A space defined by the concurrent existence of the following conditions:

(A) Existing ventilation is insufficient to remove dangerous air contamination, oxygen enrichment and/or oxygen deficiency which may exist or develop.

(B) Ready access or egress for the removal of a suddenly disabled employee is difficult due to the location and/or size of the opening(s).

(2) Dangerous Air Contamination. An atmosphere presenting a threat of causing death, injury, acute illness, or disablement due to the presence of flammable and/or explosive, toxic, or otherwise injurious or incapacitating substances.

(A) Dangerous air contamination due to the flammability of a gas or vapor is defined as an atmosphere containing the gas or vapor at a concentration greater than 20 percent of its lower explosive (lower flammable) limit.

(B) Dangerous air contamination due to a combustible particulate is defined as a concentration greater than 20 percent of the minimum explosive concentration of the particulate.

(C) Dangerous air contamination due to the toxicity of a substance is defined as the atmospheric concentration immediately hazardous to life or health.

Note: This definition of dangerous air contamination due to the toxicity of a substance does not preclude the requirement to control harmful exposures, under the provisions of Article 107, to toxic substances at concentrations less than those immediately hazardous to life or health.

(3) Oxygen Deficiency. An atmosphere containing oxygen at a concentration of less than 19.5 percent by volume.

(4) Oxygen Enrichment. An atmosphere containing more than 23.5 percent oxygen by volume.

(c) Operation Procedures and Employee Training. The employer shall implement the provisions of this subsection before any employee is permitted to enter a confined space.

(1) Operating Procedures.

(A) Written, understandable operating and rescue procedures shall be developed and shall be provided to affected employees.

(B) Operating procedures shall conform to the applicable requirements of this section and shall include provision for the surveillance of the surrounding area to avoid hazards such as drifting vapors from tanks, piping and sewers.

(C) For multi-employer worksites, the procedures shall address how all the affected employers will coordinate their work activities, so that operations of one employer will not endanger the employees of any other employer. If the permit-required confined space requirements of section 5157 or the requirements of section 8355 apply to one or more of the other employers, then the procedures shall also include coordination with those employers;

(2) Employee Training. Employees, including standby persons required by subsection (e)(1)(D), shall be trained in the operating and rescue procedures, including instructions as to the hazards they may encounter.

(d) Pre-entry. The applicable provisions of this subsection shall be implemented before entry into a confined space.

(1) Lines which may convey flammable, injurious, or incapacitating substances into the space shall be disconnected, blinded, or blocked off by other positive means to prevent the development of dangerous air contamination, oxygen enrichment and/or oxygen deficiency within the space. The disconnection or blind shall be so located or done in such a manner that inadvertent reconnection of the line or removal of the blind are effectively prevented.

Exception: This subsection does not apply to public utility gas distribution systems.

NOTE: This subsection does not require blocking of all laterals to sewers or storm drains. Where experience or knowledge of industrial use indicates materials resulting in dangerous air contamination may be dumped into an occupied sewer, all such laterals shall be blocked.

(2) The space shall be emptied, flushed, or otherwise purged of flammable, injurious or incapacitating substances to the extent feasible.

(3) The air shall be tested with an appropriate device or method to determine whether dangerous air contamination, oxygen enrichment and/or an oxygen deficiency exists. A written record of such testing results shall be made and kept at the work site for the duration of the work. Affected employees and/or their representative shall be afforded an opportunity to review and record the testing results. If an electronic or thermal device is used to test a confined space that contains or is likely to develop a dangerous air contamination due to flammable and/or explosive substances, then the device must be approved for use in such explosive or flammable conditions as required by section 2540.2.

(4) Where interconnected spaces are blinded off as a unit, each space shall be tested and the results recorded, in accordance with subsection (d)(3), and the most hazardous condition so found shall govern procedures to be followed.

(5) If dangerous air contamination, oxygen enrichment and/or oxygen deficiency does not exist within the space, as demonstrated by tests performed in accordance with subsection (d)(3), entry into and work within the space may proceed subject to the following provisions:

(A) Testing, in accordance with subsection (d)(3), shall be conducted with sufficient frequency to ensure that the development of dangerous air contamination, oxygen enrichment and/or oxygen deficiency does not occur

during the performance of any operation.

(B) If the development of dangerous air contamination, oxygen enrichment and/or an oxygen deficiency is imminent, the requirements prescribed by subsection (e) shall also apply.

(6) Where the existence of dangerous air contamination, oxygen enrichment and/or oxygen deficiency is demonstrated by tests performed in accordance with subsection (d)(3), existing ventilation shall be augmented by appropriate means.

(7) When additional ventilation provided in accordance with subsection (d)(6) has removed dangerous air contamination, oxygen enrichment and/or oxygen deficiency as demonstrated by additional testing conducted (and recorded) in accordance with subsection (d)(3), entry into and work within the space may proceed subject to the provisions of subsection (d)(5).

(8) No source of ignition shall be introduced until the implementation of appropriate provisions of this section have ensured that dangerous air contamination due to oxygen enrichment, flammable and/or explosive substances does not exist.

(9) Whenever oxygen-consuming equipment such as salamanders, plumbers' torches or furnaces, and the like, are to be used, measures shall be taken to ensure adequate combustion air and exhaust gas venting.

(10) To the extent feasible, provision shall be made to permit ready entry and exit.

(11) Where it is not feasible to provide for ready exit from spaces equipped with automatic fire suppression systems employing harmful design concentrations of toxic or oxygen-displacing gases, or total foam flooding, such systems shall be deactivated. Where it is not practical or safe to deactivate such systems, the provisions of subsection (e) related to the use of respiratory protective equipment shall apply during entry into and work within such spaces.

#### (e) Confined Space Operations.

(1) Entry Into and Work Within Confined Spaces. The requirements of this subsection apply to entry into and work within a confined space whenever an atmosphere free of dangerous air contamination, oxygen enrichment and/or oxygen deficiency cannot be ensured through the implementation of the applicable provisions of subsection (d), or whenever, due to the existence of an emergency, it is not feasible to ensure the removal of dangerous air contamination, oxygen enrichment and/or an oxygen deficiency through the implementation of the applicable provisions of subsection (d).

(A) Tanks, vessels, or other confined spaces with side and top openings shall be entered from side openings when practicable.

Note: For the purposes of this Order, side openings are those within 3 1/2 feet of the bottom.

(B) Appropriate, approved respiratory protective equipment, in accordance with Section 5144, shall be provided and worn.

(C) An approved safety belt with an attached line shall be used. The free end of the line shall be secured outside the entry opening. The line shall be at least 1/2-inch diameter and 2,000-pounds test.

Exception: Where it can be shown that a safety belt and attached line would further endanger the life of the employee.

(D) At least one employee shall stand by on the outside of the confined space ready to give assistance in case of emergency. At least one additional employee who may have other duties shall be within sight or call of the

standby employee(s).

1. The standby employee shall have appropriate, approved, respiratory protective equipment, including an independent source of breathing air which conforms with Section 5144(e), available for immediate use.

2. A standby employee (or employees) protected as prescribed by subsection (e)(1)(D) 1. may enter the confined space but only in case of emergency and only after alerting at least one additional employee outside of the confined space of the existence of an emergency and of the standby employee's intent to enter the confined space.

(E) When entry must be made through a top opening, the following requirements shall also apply.

1. The safety belt shall be of the harness type that suspends a person in an upright position.

2. A hoisting device or other effective means shall be provided for lifting employees out of the space.

(F) Work involving the use of flame, arc, spark, or other source of ignition is prohibited within a confined space (or any adjacent space having common walls, floor, or ceiling with the confined space) which contains, or is likely to develop, oxygen enrichment or dangerous air contamination due to flammable and/or explosive substances.

(G) Whenever gases such as nitrogen are used to provide an inert atmosphere for preventing the ignition of flammable gases or vapors, no flame, arc, spark, or other source of ignition shall be permitted unless the oxygen concentration is maintained at less than 20 percent of the concentration which will support combustion.

1. Testing of the oxygen content shall be conducted with sufficient frequency to ensure conformance with this paragraph.

2. A written record of the results of such testing shall be made and kept at the work site for the duration of the work.

3. Affected employees and/or their representative shall be provided an opportunity to review and record the testing results.

(H) Only approved lighting and electrical equipment, in accordance with the Low-Voltage Electrical Safety Orders, shall be used in confined spaces subject to oxygen enrichment or dangerous air contamination by flammable and/or explosive substances.

(I) Employees working in confined spaces which have last contained substances corrosive to the skin or substances which can be absorbed through the skin shall be provided with, and shall be required to wear, appropriate personal protective clothing or devices in accordance with Article 10.

(J) When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves a confined space entry covered by this standard or by sections 5157 or 8355, the host employer shall:

1. Inform the contractor that the workplace contains a confined space and that confined space entry is allowed only through compliance with a confined space program meeting the requirements of this section, section 5157 or section 8355, depending on which section applies to the contractor;

2. Apprise the contractor of the elements, including the hazards identified and the host employer's experience with the confined space, that make the space in question a confined space;

3. Apprise the contractor of any precautions or procedures that the host employer has implemented for the

protection of employees in or near the confined space where the contractor's personnel will be working;

4. Coordinate entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near the confined space, as required by subsection (c)(1)(C); and

5. Debrief the contractor at the conclusion of the confined space operation regarding the confined space program followed and any hazards confronted or created in the confined space during entry operations.

(K) In addition to complying with the confined space requirements that apply to all employers, each contractor who is retained to perform confined space entry operations shall:

1. Obtain any available information regarding confined space hazards and entry operations from the host employer;

2. Coordinate entry operations with the host employer, when both host employer personnel and contractor personnel will be working in or near a confined space, as required by subsection (c)(1)(C); and

3. Inform the host employer of the confined space program that the contractor will follow and of any hazards confronted or created in the confined space, either through a debriefing or during the entry operation.

(2) Precautions for Emergencies Involving Work in Confined Spaces.

(A) At least one person trained in first aid and cardiopulmonary resuscitation (CPR) shall be immediately available whenever the use of respiratory protective equipment is required subsection (e)(1). Standards for CPR training shall follow the principles of the American Heart Association or the American Red Cross.

(B) An effective means of communication between employees inside a confined space and a standby employee shall be provided and used whenever the provisions of subsection (e)(1) require the use of respiratory protective equipment or whenever employees inside a confined space are out of sight of the standby employee(s). All affected employees shall be trained in the use of such communication system and the system shall be tested before each use to confirm its effective operation.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

## HISTORY

1. New section filed 9-14-78; effective thirtieth day thereafter (Register 78, No. 37).

2. Change without regulatory effect of subsection (k) pursuant to section 100, Title 1, California Code of Regulations filed 5-1-90 (Register 90, No. 23).

3. Amendment filed 11-24-93; operative 12-24-93 (Register 93, No. 48).

4. Amendment of subsections (d)(3) and (e)(1)(F) filed 3-23-2000; operative 4-22-2000 (Register 2000, No. 12).

5. Amendment filed 4-25-2001; operative 5-25-2001 (Register 2001, No. 17).

 [Go Back to Article 108 Table of Contents](#)

<p>The above information is provided free of charge by the Department of Industrial Relations from its web site at <a href="http://www.dir.ca.gov">www.dir.ca.gov</a>.</p>
--