

PRESSURE VESSELS

Permits Are Required for Air Tanks, LPG Propane Storage Tanks Over 125 Gallons, and High Pressure Boilers Over 15 PSIG Steam. Permit Exceptions Depend On Vessel Capacity and Operating Pressures.

Applicable standards

Title 8, California Code of Regulations, Chapter 4, [Subchapter 1 and Subchapter 2](#).

What's needed

- DOSH Pressure Vessel Unit is responsible for issuing these permits. Permit inspections may be done by certified insurance inspectors or the DOSH unit
- Schedule an inspection with the nearest [pressure vessel office](#)
- An inspector from the DOSH unit will perform on-site inspection, follow-up and renewals.

Fees

The pressure vessel unit is responsible under [Labor Code sections 7620](#) et seq. for the inspection of boilers (any fired or unfired pressure vessel used to generate steam pressure by the application of heat) and tanks (any fired or unfired pressure vessel used for the storage of air pressure or liquefied petroleum gases). The pressure vessel unit has two district offices as follows:

Oakland PV district office
Suite 1302
1515 Clay Street
Oakland, CA 94612
(510) 622-3066

Santa Ana PV district office
Suite 215
2000 E. McFadden Ave
Santa Ana, CA 92705
(714) 567-7208

For Your Convenience a Copy of the Applicable California Standards Are Included;
It Is Strongly Suggested You Review the Current Version of the Regulations
<http://www.dir.ca.gov/dosh/pressure.html>

If You Have Any Questions or Need Assistance Contact Your CompWest Loss Control Consultant or Request Assistance on the CompWest Web Page

Unfired Pressure Vessel Safety Orders

§451. Unfired Pressure Vessels Not Subject to These Safety Orders.

- (a) Pressure vessels that are under the jurisdiction and inspection of the United States Government or are specifically exempted by the Labor Code.
- (b) Pressure vessels subject to an internal or external pressure of not more than 15 psig except for those listed in Section 450(a)(5), with no limitation on size, and vessels having an inside diameter not exceeding 6 inches with no limitation on pressure. However, vessels excluded in this section shall be designed and constructed in accordance with recognized standards when applicable, or in accordance with good engineering practices for pressure vessel design using a factor of safety of at least 4, and shall be fitted with necessary controls and safety devices to permit safe operation.
- (c) Natural gas vessels and installations and air brake tanks subject to the jurisdiction and inspection of the Public Utilities Commission, the Department of Transportation, or the Department of the California Highway Patrol, except as provided in Article 7 of these Orders.

Subchapter 1. Unfired Pressure Vessel Safety Orders

Article 3. Air Tanks

§461. Permits to Operate.

- (a) Except during the time that a request for a permit remains unacted upon or as permitted in Section 461(f), no air tank shall be operated unless a permit to operate has been issued.
- (b) Except during the time that a request for a permit remains unacted upon, every person owning or having the custody, management, or operation of an air tank which requires a permit to operate who operates it without a permit is guilty of a misdemeanor. Operating an air tank without a permit constitutes a separate offense for each day that it is so operated.
- (c) The permit shall be posted under glass in a conspicuous place on or near the air tank or in a weatherproof container secured to the unit, and shall be available at all times to any qualified inspector.
- (d) Except as provided in Subsection 461(h), the permit for portable air tanks shall expire not more than three years from the date of inspection and for all other air tanks not more than 5 years from the date of inspection or upon the alteration of, or damage to, the air tank or installation, or upon change of ownership and location, whichever occurs first.

NOTE: The permit shall not expire upon change of ownership and location for portable tanks.

- (e) A temporary permit to operate may be issued for not more than 30 days to allow a reasonable time for required changes to be made.
- (f) Air tanks having a volume of 1 1/2 cubic feet or less which have safety valves set to open at not more than 150 psi do not require permits to operate, but shall comply with all other provisions of these Orders, including construction. Air tanks used for self-contained breathing apparatus and having a volumetric capacity of 1 cubic foot or less and constructed, inspected, and maintained in accordance with DOT regulations do not require permits to operate.
- (g) No person, firm, or company shall rent or offer for rent for use in a place of employment any air tank requiring a permit to operate unless the required permit has been issued by or in behalf of the Division.

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(h) Air tanks subject to a maximum allowable working pressure not exceeding 150 psi., as shown by the required code marking, and having a volume of 25 cubic feet or less shall be inspected when placed into service. An indefinite permit shall be issued provided that the tank has been constructed, inspected and stamped in compliance with the ASME Code, or the design, material, and construction of the tank is accepted by the Division as equivalent to the ASME Code and the tank is in compliance with the applicable provisions of these orders. A new inspection and permit for operation shall be required whenever there is a change of ownership and permanent location of the tank or there is an alteration or change in the tank which affects the tank's safety.

Subchapter 1. Unfired Pressure Vessel Safety Orders

Article 3. Air Tanks

§462. Field Inspections and Reports.

(a) All air tanks requiring a permit to operate shall be inspected internally and externally at least once every 3 years for portable tanks and once every 5 years for all other tanks by a qualified inspector.

This subsection shall not be applicable for air tanks which fulfill the requirements for an indefinite permit as provided in Section 461(h).

EXCEPTION: The internal inspection of tanks less than 2 years old may be waived at the discretion of the inspector, provided all other requirements of Section 462(c) are met.

(1) Ultrasonic thickness determination shall be permitted in lieu of, or in conjunction with, internal inspection for air tanks of 36" diameter or less. Thickness determinations shall be made in at least eight areas: two on each bead and two on both the top (upper) and bottom (lower) portions of the shell.

Thickness determinations indicating significant reduction in the material thickness over a general area (National Board Inspection Code Par. U-107 may be used as a guide) shall be shown on the inspection report as well as the calculations for the reduction in the allowable working pressure.

The qualified inspector's employer shall be responsible for the inspector's or ultrasonic examiner's competency in the use of the ultrasonic thickness gage, and the examiner's signed report shall be attached to the qualified inspector's inspection report.

(2) Air tanks shall be installed so that all drains, handholes, inspection plugs and manholes therein are easily accessible. Air tanks shall be supported with sufficient clearance to permit a complete external inspection and to avoid corrosion of external surfaces. Under no circumstances shall an air tank be buried underground or located in an inaccessible place.

(b) The owner or user of any air tank shall prepare it for inspection and make provisions to permit the required inspections to be made safely when requested to do so by the Division or a qualified inspector.

(1) Preparation for an internal inspection shall include the removal of such inspection plugs or plates as are deemed necessary by the qualified inspector.

(2) The qualified inspector shall decide whether a hydrostatic pressure test is necessary and if it is ordered, the owner or user shall make the necessary preparations for such tests by blanking off connections and filling the tanks with water and pressurizing the tank.

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(3) If the owner or user finds the date set for inspection not convenient, the owner or user shall immediately ask the Division for a postponement and give good cause, in which case the inspection shall be permitted to be postponed for a period of not more than 30 days from the date first set for inspection.

(c) All air tanks subject to inspection under these Orders and regularly inspected by qualified inspectors not employed by the Division shall be exempt from periodic inspection by the Division if the tanks and systems conform to these Safety Orders and:

(1) Reports of all air tank inspections are submitted to the Division within 21 days of inspection;

(2) Reports indicate whether internal inspection or external inspection under pressure, or both, have been made.

(3) Reports give the reasons for any refusal to issue a permit and for any change in the allowable working pressure;

(4) Reports specify in detail the condition of the air tank and any changes or repairs ordered. If changes or repairs are ordered, a written report shall be furnished to the owner or user of the tank by the inspecting agency.

(d) Permits shall be issued only if tanks and systems comply in all respects with these orders and all inspection fees are paid.

(e) Qualified inspectors employed by insurance companies shall immediately notify the Division of the name of the owner or user, as shown on the permit to operate, the location and state serial number of every air tank on which insurance has been refused, canceled or discontinued, and shall give the reasons why.

(f) Qualified inspectors employed by other than insurance companies shall immediately notify the Division of the name of the owner or user and the location and state serial number of every tank inspected by them which is removed from active service or which is considered unsafe for further service as an air tank, and shall give the reasons why.

NOTE: Nothing in these order shall prevent a qualified safety engineer employed by the Division from inspecting any tank. However, no inspection fee shall be charged by the Division where the required inspection has been made and the provisions of subsection (c) above have been met.

(g) Qualified inspectors making the first field inspection of air tanks required by these Orders to have a permit to operate shall stamp on the tank a State serial number (unless a State serial number has previously been stamped thereon) which shall become a permanent means of identification. This assigned number shall be made either by steel die figures not less than 5/8 inch in height, or outlined by means of center punch dots with figures not less than 3/4 inch in height, and shall be stamped adjacent to the manufacturer's ASME Code stamping or above an inspection opening if the ASME Code stamping is not accessible.

(h) No state serial number or ASME Code stamping shall be permanently covered by insulating or other material unless such number and stamping is transferred to a fixed plate readily visible outside of all insulating material.

(i) Whenever the condition of an air tank is such as to make it unfit for air pressure service, a qualified safety engineer employed by the Division may affix a rejection mark (X) consisting of an "X" at least 1 inch in height with a circle at least 1/2 inch in diameter located between the upper arms of the "X". The rejection mark shall be outlined in center punch marks and located immediately above or adjacent to the state serial number.

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(j) All air tanks shall have inspection openings in compliance with the ASME Code. When inspection openings are not provided, the owner or user shall provide such openings, one (1) in each head or in the shell near each head and approximately opposite the longitudinal seam, as follows:

(1) Tanks 12 inches or less in inside diameter shall have at least two threaded openings not less than 3/4 inch pipe size.

(2) Tanks less than 18 inches and more than 12 inches in inside diameter shall have at least two handholes or two plugged, threaded openings not less than 1 1/2 inch pipe size.

(3) Tanks 18 inches to and including 36 inches in inside diameter shall have a manhole or at least two handholes or two plugged, threaded inspection openings not less than

2-inch pipe size.

(4) Tanks exceeding 36 inches in inside diameter shall have a manhole, except those whose shape or use makes a manhole impractical; in which case two handholes 4 inches by 6 inches or two openings of equivalent area may be substituted for the manhole opening.

(5)(A) An elliptical manhole shall be not less than 11 inches by 15 inches or 10 inches by 16 inches in size. The inside diameter of a circular manhole shall be not less than 15 inches.

(B) A handhole shall be at least 2 inches by 3 inches in size. It may be larger, depending upon the size of the tank and the location of the opening.

(C) All access and inspection openings shall be designed in accordance with the rules of the ASME Code for openings.

(k) Air tanks used in systems which have had moisture removed to the degree that the air has an atmospheric dew point of -50° F or less, shall not be required to have inspection openings.

(l) Air tanks shall meet and be installed in accordance with the following requirements:

(1) Air tank supports and appurtenances shall be in accordance with Paragraph UG-22 and recommended design practices of Appendix G of Section VIII, Division 1 of the ASME Code with sufficient clearance provided under the tank to allow for operation of the drain valve.

(2)(A) Air compressor units which have a reciprocating compressor and a driving unit over two horsepower mounted on the tank shall be in accordance with the requirements of paragraphs (B) and (C) as follows:

(B) The tank manufacturer's data report shall show the tank and machinery supports provided by the tank manufacturer. When reinforcing pads are used as a means of stress distribution at the legs and/or base plate attachment they shall be designed to minimize regions of high stress concentration and be sealed in such a manner as to inhibit corrosion.

(C) Based on written certification from the vessel manufacturer stating compatibility of the vessel and compressor driving system, the assembler shall permanently affix a label or apply stamping with letters and figures not less than 5/32 inch in height to the side of the vessel machinery platform showing 462(l)(2) compliance. In those cases where the tank manufacturer is the assembler, this data shall be permitted to be stamped on the ASME Code nameplate, separated from the ASME Code stamping. Upon request of the Qualified Inspector or the Division, design calculations incorporating system dynamics or experimentally obtained test data shall be furnished by the tank manufacturer to verify compliance with this Order.

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(D) New air tanks not complying with this subsection shall not have a reciprocating compressor and driving unit mounted on the tank unless the supports are modified to the satisfaction of the Qualified Inspector, and the Division.

(3) All visible undercuts at butt, groove, or fillet welds must be repaired prior to issuance of the permit to operate.

(4) The employer shall notify the Division and the inspection agency before further use in the event of cracking or leaking of the air tank.

(5) If an air tank has cracked because of the compressor mounting or supports, the compressor and driving unit shall be reinstalled separately from the air tank in accordance with the requirements of the applicable Safety Orders, unless the supports are modified to the satisfaction of the Qualified Inspector and the Division. Whenever possible, the reinstallation of the compressor and driving unit shall be in accordance with the recommendations of the original assembler. The reinstallation must be acceptable to the Qualified Inspector.

(m)(1) Air piping shall be in accordance with ANSI B31.1 or B31.3.

(2) All piping from the tank to the first shut-off valve shall be Schedule 80 metallic pipe.

(3) Plastic piping systems may be used for compressed air conveyance above and below ground, when meeting all of the following requirements:

EXCEPTION: Pipe or tubing under 3/8-inch diameter need not meet these requirements.

(A) Only ductile plastic materials shall be used.

(B) Only plastic pipe, valves and fittings recommended for use by the manufacturer to convey compressed air shall be used.

(C) Plastic pipe, valves and fittings shall not be used for compressed air systems over 150 psi or temperatures over 140°F.

(D) Plastic piping systems shall be designed, installed, maintained, and operated in full accordance with the manufacturer's specifications and instructions.

(E) All plastic pipe shall be permanently marked continuously, but not to exceed 5-foot intervals, with the following information:

1. Size;
2. Manufacturer's name;
3. Pressure rating at 73°F and 140°F;
4. Material name, specification, ASTM cell classification, batch number, and the date of manufacture;
5. The words "For Compressed Air"; and
6. Either Schedule, "Sch Number:", or Standard Dimension Ratio, "SDR Number".

(F) All plastic valves and fittings shall be permanently marked with the following:

1. Size;
2. Manufacturer's name or logo;

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3. Pressure rating at 73°F; and

4. Material name.

(G) Plastic valves and fitting shall be of the same manufacturer and materials as the pipe.

(H) Only joining compounds meeting or exceeding manufacturer's specifications shall be used when assembling the plastic pipe.

(I) The employer shall use pipe that meets or exceeds the test requirements listed in Appendix C, and upon request, supply the Division written laboratory certification from the manufacturer that the pipe meets or exceeds all test requirements listed in Appendix C of these orders.

(J) The pipe system components, pipe, valves, fittings, and joining compounds shall be designed for the full working pressure of the system for its design life.

(4) Plastic pipe and fittings that do not meet the requirements of subsection (m)(3) may be used in compressed air service, provided that all of the following conditions are satisfied:

(A) Pressure shall be limited to 150 psi, temperature to 120°F, size up to 2-inch diameter pipe size, and wall thickness to Schedule 40 or heavier;

(B) The piping system shall be protected from mechanical damage along its entire length by either location or actual guarding. The guarding shall be of sufficient strength to withstand any anticipated impact. It shall also be capable of containing exploding fragments; and

(C) The piping system shall be supported and secured by U bolts, conduit supports, rigid hangers or similar methods at intervals not to exceed five (5) feet.

(n) Any air tank having dished heads or conical heads the skirt (flange) and/or the knuckle radius of which does not meet the minimum ASME Code requirements shall have such heads stayed as flat surfaces in accordance with the ASME Code rules for braced and stayed flat plates. Any head dished to a radius greater than the diameter of the tank to which it is attached shall be stayed as a flat surface in accordance with the ASME Code rules for braced and stayed flat plates. No allowance shall be taken in such calculations for the curved portion of the head.

(o) All air tanks, including existing installations, having unstayed dished heads without a transition knuckle for attachment to the shell shall be permanently removed from service with the rejection mark affixed by the qualified inspector, as required in Section 462(i).

(p) The bottom dished head of an air tank operated in the vertical position shall not be dished inward but must be concave to pressure.