522 CMR 7.00: AIR TANKS

Section

7.01: Scope

In accordance with the provisions of M.G.L. c. 146, § 2, the Board adopts by reference the 2019 *ASME Boiler and Pressure Vessel Code* Section VIII, *Rules for Construction of Pressure Vessels*.

(1) 522 CMR 7.00 shall apply to all Air Tanks enumerated in M.G.L. c. 146, § 34, including: Air Tanks that meet the following criteria:

(a) design MAWP greater than 50 PSI;
(b) greater than six inches internal diameter; and
(c) internal volume greater than one cubic foot.

Note: The exemption of Air Tanks containing less than one cubic foot of air applies to each single vessel and not to an assembly of vessels.

(2) 522 CMR 7.00 shall not apply to the exceptions enumerated in M.G.L. c. 146, § 34, including the following:

(a) Air Tanks subject to Federal control.
(b) Air Tanks attached to locomotives, street cars, railway cars, trackless trolley vehicles, or to motor vehicles for use in operating such vehicles or their brakes or body lifting apparatus.
(c) Air Tanks in which air is used solely for cushioning systems containing water or other liquids.
(d) Air Tanks containing air and liquids in which the pressure is maintained by pumps; for example, hydraulic elevator tanks.
(e) An Air Tank or other receptacle used by divers if such Air Tank or other receptacle is inspected by the refilling agency.
(f) Portable tanks and bottles containing compressed air as used for breathing purposes while combating fires or used in rescue operations in contaminated areas; and storage tanks and mechanical filling systems used to fill such portable tanks and bottles.
(g) Air Tanks used in and as part of electrical substations owned and operated by an electric company, as defined M.G.L. c. 164, § 1.

7.02: Construction

All Air Tanks under the scope of 522 CMR 7.00 shall be initially constructed in accordance with the 2019 *ASME Boiler and Pressure Vessel Code* Section VIII, *Rules for Construction of Pressure Vessels*.

7.03: Installation

(1) All Air Tanks shall be available for complete External Inspection, and shall be so installed that there will be not less than 12 inches between the Air Tank and any floor, wall, ceiling or other obstruction, except where an Air Tank is attached to a portable compressor by means of straps and is removable for complete inspection. The 12-inch clearance may be waived by the District Engineering Inspector who shall document in their report that there was not a clearance of 12 inches, but that a complete External and Internal Inspection was made. The name plate, safety valve, drain, pressure gauge, tank bottom, and inspection openings shall be readily visible and accessible if the clearance requirement is to be waived.

7.03: continued

(2) In case of vertical Air Tanks, the bottom head if dished shall have the pressure on the concave side to ensure complete drainage.

(3) Vertical Air Tanks with a base ring shall have unobstructed access to the Air Tank bottom for inspection.

(4) Air Tanks in a fixed installation shall be secured to prevent movement.

(5) Steel or another metallic piping and fittings shall be used from the Air Tank outlet to the first block valve and on all vessel penetrations and nozzles.

(6) Air Tanks that can be isolated with block valves shall have a pressure relief valve attached to the Pressure Vessel.

(7) Air Tanks that can be isolated with block valves shall have a pressure gage attached to the Pressure Vessel per 522 CMR 7.00.

(8) The connection to the pressure relief valve shall be as short as possible and not reduced.

(9) The pressure relief valve shall discharge to a safe location.

(10) The pressure relief valve shall be sized to relieve the capacity of all compressors which may operate at one time.

(11) In systems with multiple Air Tanks, all Air Tanks shall have a safety relief valve which lifts at the pressure of that Air Tank with the lowest MAWP or other means shall be provided to prevent pressurizing any Air Tank to a pressure greater than that Air Tank's MAWP.

(12) Air Tanks shall be protected from external corrosion.

(13) Automatic drains may be used in addition to the drain required by 522 CMR 7.00, provided that there is a manual by-pass valve around the automatic drain so that verification of the automatic drain's operation can be made.

(14) All Air Tanks shall be protected by such safety valves and indicating and controlling devices as will ensure their safe operation. These devices shall be so constructed, located, and installed that they cannot readily be rendered inoperative.

7.04: Inspections and Certificates

(1) Application. Whoever owns or uses or causes to be used an Air Tank that comes within the scope of M.G.L. c. 146, § 34, shall make application for inspection prior to installation and operation to the Chief in a format approved by the Department.

(2) Field Inspection.

(a) All First Inspections shall be performed by a District Engineering Inspector before the Air Tank is put into service. All Air Tanks, except those listed on 522 CMR 7.01(2), shall be inspected internally biennially thereafter either by a District Engineering Inspector or an Authorized Inspector.

If the installation is found to comply with 522 CMR 7.00, the Department shall issue a Certificate stating the pressure at which the Air Tank will be permitted to operate.

(b) Every Air Tank which has been inspected by a District Engineering Inspector shall be given a noncorrosive metal tag not less than one inch in height attached to the Air Tank with a noncorrosive metal wire secured with a lead seal. Only a District Engineering Inspector may remove the Mass Tag.

(3) An Air Tank which has been relocated shall require a first inspection by a District Engineering Inspector.

7.04: continued

(4) Ultrasonic Inspections. Pursuant to M.G.L. c. 146, § 39, an ultrasonic thickness determination shall be permitted in *lieu* of, or in conjunction with, an Internal Inspection for Air Tanks or other receptacles of 36 inches diameter or less. Thickness measurements shall be made in at least eight areas: two on each head and two on both the top and bottom portions of the shell. Thickness determinations indicating significant reduction in material thickness over a general area shall be shown on the inspection report, as well as calculations for the reduction in allowable working pressure. The Authorized Inspector's employer or the Chief, as applicable, shall be responsible for the inspector's or the ultrasonic examiner's competency in the use of the ultrasonic thickness gauge, and the examiner's signed report shall be attached to the Authorized Inspector's or District Engineering Inspector's inspection report. A hydrostatic test shall be applied if required by the Authorized Inspector or District Engineering Inspector. The pressure applied during the test shall be equal to 1½ times the pressure allowed on the Air Tank or other receptacle. A hammer test may also be applied if there is no pressure on the Air Tank or receptacle.

A significant reduction in material is a reduction in material to less than the minimum allowable thickness. If the thickness is reduced below the minimum allowable thickness, the Air Tank shall be repaired to bring the Air Tank to at least the minimum thickness, or a fitness for service evaluation shall be performed to determine the maximum allowable pressure in accordance with the NBIC.

The examiner's signed report and the Authorized Inspector's inspection report shall be submitted in a format approved by the Department.

(5) Certificate to Be Posted.

(a) The Department shall issue to the Owner/User of an Air Tank compliant with 522 CMR a Certificate, on the condition that the appropriate fees have been paid. The Certificate shall be protected from dirt, moisture, and contamination and shall be posted in a conspicuous place near where the Air Tank specified therein is located and shall be kept with said Air Tank and shall be always accessible to the District Engineering Inspector or Authorized Inspector.

(b) The Certificate shall include the name of the insurance company, the National Board number, the Mass Tag number, the name of the manufacturer, the name of the owner or user, the location, size and number of the Air Tank, the date of inspection and the maximum pressure at which it may be operated, with the signature of the inspector, and shall contain such extracts from the statutes as shall be deemed necessary by the board.

(c) The Certificate shall remain posted while the Certificate is in force, unless a District Engineering Inspector or an Authorized Inspector deems the Air Tank or its Appurtenances unsafe or dangerous. If an Air Tank is determined to be unsafe or dangerous, the District Engineering Inspector or Authorized Inspector shall remove the Certificate, and submit such certificate to the Chief, and the Air Tank shall not be operated until such time that a valid Certificate is reissued.

(6) Inspection Reporting. Pursuant to M.G.L. c. 146, §§ 37 and 38, whoever owns, or uses or causes to be used, any Air Tank, shall report in writing to the Chief the location of such Boiler, before the work of installation of such Boiler, and annually thereafter; provided that the Owner/User of an insured Boiler shall report immediately in writing to the Chief whenever the insurance company ceases for any cause to inspect the Boiler.

(7) Reporting by Insurance Companies.

(a) Pursuant to M.G.L. c. 146, § 38, every insurance company shall forward to the Chief, within 14 days after each inspection, reports of all Air Tanks inspected by the Authorized Inspectors. Such reports shall be made on a form, and submitted in a format approved by the Chief and shall contain all orders made by the company regarding such Air Tanks.

(b) All insurance companies shall notify the Chief, within 14 days, on a form and submitted in a format approved by the Chief, of all new business or discontinuation of business regarding coverage of registered Air Tanks. All insurance companies shall report immediately to the Chief in writing the name of the Owner/User and the location of every Air Tank required to be inspected by M.G.L. c. 146, § 34, upon which they have cancelled or refused insurance, giving the reasons therefor.

(c) The Authorized Inspector shall notify the Chief or his or her designee immediately in writing if the Authorized Inspector finds that an unsafe and dangerous condition exists resulting in the removal of the Certificate.

7.04: continued

(8) Riveted Air Tanks. In determining the maximum allowable working pressure on the shell of lap-riveted Air Tanks over ten years old, the lowest factor of safety to be used shall be as follows:

(a) 5.5 for Air Tanks over ten and not over 15 years old;
(b) 5.75 for Air Tanks over 15 and not over 20 years old; and
(c) 6.0 for Air Tanks over 20 years old.

Stamping shall comply with the 2019 *ASME Boiler and Pressure Vessel Code* Section VIII, *Rules for Construction of Pressure Vessels*.

No piping, drains, safety valves, pressure gauges or other Appurtenances shall be connected to threaded openings required for inspection and cleanout purposes. Flanged and/or threaded connections from which piping, instruments or similar attachments can be removed may be used in place of the required inspection openings in accordance with the 2019 *ASME Boiler and Pressure Vessel Code* Section VIII, *Rules for Construction of Pressure Vessels*.

7.05: Pressure Relief Valves

(1) All pressure relief valves on Air Tanks shall conform to the ASME and National Board Codes as adopted by 522 CMR 7.00.

(2) All tanks, the contents of which are likely to cause interference with the operation of a pressure relief valve if attached directly to the Air Tank, shall have the pressure relief valve connected in such a manner as to avoid such interference. Intercoolers and aftercoolers shall not be classed as primary vessels, but shall be protected by adequate pressure relief valves.

(3) When the pressure relief valve covered by 522 CMR 7.00 is exposed to the elements and freezing temperatures, they shall be located on the discharge pipe from the compressor as near to the Air Tank as practical.

7.06: Gauges and Drains

(1) Pressure Gauge.

(a) Every Air Tank shall have a pressure gauge connected in a manner that the pressure gauge cannot be shut off from the Air Tank except by a cock with T or lever handle, which shall be placed on the pipe near the pressure gauge. Gauge connections shall be of brass pipe and fitting or copper tubing so connected to the system that they will not be exposed to high temperatures due to compression. The minimum copper tubing size used shall be ⅛ inch.

(b) The dial of the pressure gauge shall be graduated to not less than 1½ times the maximum pressure allowed on the Air Tank.

(2) Test Gauge Connection. The Owner/User of the Air Tank shall install a test gauge connection at the request of the District Engineering Inspector or Authorized Inspector.

(3) Bottom Drain Pipe. Each Air Tank shall have a bottom drain pipe fitted with a valve or cock, of the straightway type, in direct connection with lowest water space practicable, or a pipe may be used extending inward from any other location to within ¼ inch (6 mm) of the lowest point. The minimum size of pipe and fittings shall be ½ inch except for tanks 20 inches in diameter or less, in which the minimum size of such pipe and fitting shall be ¼ inch iron pipe size. If a plug cock is used, the plug shall be held in place with a guard or gland.

7.07: Welded Repairs, Major Repairs, Alterations

No Repairs or Alterations shall be done by the welding process without the prior approval of an Authorized Inspector. All reconstruction, including Repairs and Alterations performed to bring the Air Tank to the original code of construction, shall be done in accordance with the NBIC.

7.07: continued

In no case shall heat be used to bring the metal to a dull red color around an inspection port or other opening for removing threaded attachments. Evidence of bringing the metal to a dull red color may require the immediate removal from service of the Air Tank until supporting documentation is submitted to the Board by a Massachusetts registered Professional Engineer.

REGULATORY AUTHORITY

522 CMR 7.00: M.G.L. c. 146, §§ 1 through 51, 56 through 64 and 66 through 80.