

WAC 296-24-92005 Inspection of low-pressure cylinders exempt from the hydrostatic test including acetylene cylinders. (1) **Application.** This section covers cylinders of the type that are exempt from the hydrostatic retest requirements of the DOT by virtue of their exclusive use in certain noncorrosive gas service. They are not subject to internal corrosion and do not require internal shell inspection.

(2) **Preparation for inspection.** You must remove rust, scale, caked paint, etc., from the exterior surface so that the surface can be adequately observed. You must provide facilities for inverting the cylinder to facilitate inspection of the bottom. This is important because experience has shown this area to be the most susceptible to corrosion.

(3) **Exterior inspection.** You must check cylinders as outlined below for corrosion, general distortion, or any other defect that might indicate a weakness which would render it unfit for service.

(a) To fix corrosion limits for all types, designs, and sizes of cylinders, and include them in this section is not practicable. Cylinders categorized by this section and subsection (1) of this section must meet the following requirements. Failure to meet any of these requirements is of itself cause for rejection of a cylinder. You must remove rejected cylinders from the work place. Rejected cylinders may be returned to the manufacturer for reinspection.

(i) You must reject a cylinder when the tare weight is less than 95% of the original tare weight marked on the cylinder. When determining tare weight, be sure that the cylinder is empty.

(ii) You must reject a cylinder when the remaining wall in an area having isolated pitting only is less than 1/3 of the minimum allowable wall thickness as determined under (b) and (d) of this subsection.

(iii) You must reject a cylinder when line corrosion on the cylinder is 3 inches in length or over and the remaining wall is less than 3/4 of the minimum allowable wall thickness or when line corrosion is less than 3 inches in length and the remaining wall thickness is less than 1/2 the minimum allowable wall thickness as determined under (b) through (d) of this subsection.

(iv) You must reject a cylinder when the remaining wall in an area of general corrosion is less than 1/2 of the minimum allowable wall thickness as determined under (b) through (d) of this subsection.

(b) To use the criteria in (a) of this subsection, it is necessary to know the original wall thickness of the cylinder or the minimum allowable wall thickness. Table M-1 lists the minimum allowable wall thickness under DOT specifications (49 C.F.R. Ch. 1) for a number of common size low-pressure cylinders.

TABLE M - 1

Cylinder size O.D. x length (inches)	DOT Specification marking	Nominal water capacity (pounds)	Minimum allowable wall thickness (inches)
15 x 46	4B240 ¹	239	0.128
14 13/16 x 47	4E240	239	.140
14 15/16 x 46	4BA240	239	.086
14 11/16 x 28 3/8	4BA240	143	.086
11 29/32 x 32 11/16	4BA240	95	.078
11 29/32 x 18 11/32	4BA240	48	.078

¹Without longitudinal seam.

(c) When the wall thickness of the cylinder at manufacture is not known, and the actual wall thickness cannot be measured, you must reject this cylinder when the inspection reveals that the deepest pit in a general corrosion area exceeds 3/64 inch. This is arrived at by considering that in no case must the pitting exceed 1/2 the minimum allowable wall thickness which is 0.064 inch. When a pit measures 0.043 inch (approximately 3/64 inch) in a corrosion area, general corrosion will already have removed 0.021 inch of the original wall and the total pit depth as compared to the initial wall will be 0.064 inch.

(d) When the original wall thickness at manufacture is known, or the actual wall thickness is measured, this thickness less 1 1/2 times the maximum measured pit depth must be 0.064 inch or greater. If it is less, you must reject the cylinder.

(e) Dents are of concern where the metal deformation is sharp and confined, or where they are near a weld. Where metal deformation is not sharp, dents of larger magnitude can be tolerated.

(f) Where denting occurs so that any part of the deformation includes a weld, the maximum allowable dent depth must be 1/4 inch.

(g) When denting occurs so that no part of the deformation includes a weld, you must reject the cylinder if the depth of the dent is greater than 1/10 of the mean diameter of the dent.

(h) Cuts, gouges, or digs reduce the wall thickness of the cylinder and in addition are considered to be stress raisers. Depth limits are set in these standards; however, you must reject cylinders at 1/2 of the limit set whenever the length of the defect is 3 inches or more.

(i) When the original wall thickness at manufacture is not known, and the actual wall thickness cannot be measured you must reject a cylinder if the cut, gouge, or dig exceeds 1/2 of the minimum allowable wall thickness as determined under (b) through (d) of this subsection.

(ii) When the original wall thickness at manufacture is known, or the actual wall thickness is measured, you must reject a cylinder if the original wall thickness minus the depth of the defect is less than 1/2 of the minimum allowable wall thickness as determined under (b) through (d) of this subsection.

(i) Leaks can originate from a number of sources, such as defects in a welded or brazed seam, defects at the threaded opening, or from sharp dents, digs, gouges, or pits.

(i) To check for leaks, the cylinder must be charged and carefully examined. You must coat all seams and pressure openings with a soap or other suitable solution to detect the escape of gas. Any leakage is cause for rejection.

(ii) You must test safety relief devices as defined in WAC 296-24-93001(1) for leaks before a charged cylinder is shipped from the cylinder filling plant.

(j) After fire damage, you must carefully inspect cylinders for evidence of exposure to fire.

(i) Common evidences of exposure to fire are:

(A) Charring or burning of the paint or other protective coat.

(B) Burning or sintering of the metal.

(C) Distortion of the cylinder.

(D) Melted out fuse plugs.

(E) Burning or melting of valve.

(ii) The evaluation of fire damage by DOT regulations state that, "a cylinder which has been subjected to the action of fire must not again be placed in service until it has been properly reconditioned,"

in accordance with 49 C.F.R. 173.34(f). The general intent of this requirement is to remove from service cylinders which have been subject to the action of fire which has changed the metallurgical structure or the strength properties of the steel, or in the case of acetylene cylinders caused breakdown of porous filler. This is normally determined by visual examination as covered above with particular emphasis to the condition of the protective coating. If the protective coating has been burnt off or if the cylinder body is burnt, warped, or distorted, it is assumed that the cylinder has been overheated and you must comply with 49 C.F.R. 173.34(f). If, however, the protective coating is only dirtied from smoke or other debris, and is found by examination to be intact underneath, you must not consider the cylinder affected within the scope of this requirement.

(k) Cylinders are manufactured with a reasonably symmetrical shape. You must remove cylinders which have definite visible bulges from service and evaluate them. You must reject cylinders when a variation of 1% or more is found in the measured circumferences or in peripheral distances measured from the valve spud to the center seam (of equivalent fixed point).

(l) You must examine cylinder necks for serious cracks, folds, and flaws. Neck cracks are normally detected by testing the neck during charging operations with a soap solution.

(m) You must examine cylinder neck threads whenever the valve is removed from the cylinder. You must reject cylinders if the required number of effective threads are materially reduced, or if a gas tight seal cannot be obtained by reasonable valving methods. You must use gauges to measure the number of effective threads.

(n) If the valve is noticeably tilted you must reject the cylinder.

(o) The footing and heading of cylinders may become so distorted through service abuse that they no longer perform their functions:

(i) To cause the cylinder to remain stable and upright.

(ii) To protect the valve. You must examine rings for distortion; for looseness, and for failure of welds. Appearances may often warrant rejection of the cylinder.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, and 49.17.060. WSR 15-24-100, § 296-24-92005, filed 12/1/15, effective 1/5/16. Statutory Authority: Chapter 49.17 RCW. WSR 89-11-035 (Order 89-03), § 296-24-92005, filed 5/15/89, effective 6/30/89; Order 73-5, § 296-24-92005, filed 5/9/73 and Order 73-4, § 296-24-92005, filed 5/7/73.]