

**WAC 296-24-92009 High-pressure cylinders. (1) Application.**

High-pressure cylinders are those with a marked service pressure of 900 p.s.i. or higher. They are seamless; no welding is permitted. The great bulk of such cylinders are of the 3A or 3AA types under DOT specifications (49 C.F.R. Ch. 1).

**(2) Preparation for inspection.**

(a) You must clean cylinders for inspection so that the inside and outside surfaces and all conditions can be observed. This must include removal of scale and caked paint from the exterior and the thorough removal of internal scale. You must examine cylinders with interior coating for defects in the coating. If the coating is defective, you must remove it.

(b) A good inspection light of sufficient intensity to clearly illuminate the interior wall is mandatory for internal inspection. You must purge flammable gas cylinders before being examined with a light. Lamps for flammable gas cylinder inspection must be explosion proof.

**(3) Exterior inspection.**

(a) To fix corrosion limits for all types, designs, and sizes of cylinders, and include them in this section, is not practicable. Considerable judgment is required in evaluating cylinders fit for service. Experience is a major factor, aside from strength considerations for high pressure cylinders.

(b) When the original wall thickness of the cylinder is not known, and the actual wall thickness cannot be measured, you must reject the cylinder if corrosion exceeds one thirty-second inch in depth. This is arrived at by subtracting from the minimum allowable wall at manufacture (0.221 inch), the limiting wall in service (0.195 inch), to give the maximum allowable corrosion limit of 0.026 inch, the equivalent of 1/32 inch.

(c) When the wall thickness is known, or the actual wall thickness is measured, the difference between this known wall and the limiting value establishes the maximum corrosion figure. The normal hot forged cylinder of this size will have a measured wall of about 0.250 inch. Comparison of this with the limiting wall thickness shows that defects up to about 1/16 inch are allowable provided, of course, that the actual wall is measured or is known.

(d) Cylinders with general corrosion are evaluated by subjecting them to a hydrostatic test. Thus, you must reject a cylinder with an elastic expansion of 227 cc. or greater. If areas of pronounced pitting are included within the general corrosion, the depth of such pitting should also be measured (with the high spots of the actual surface as a reference plane) and the criteria established in the first example apply. Thus, the maximum corrosion limit would be 1/32 inch when the wall was not known.

(e) Any defect of appreciable depth having a sharp bottom is a stress raiser and even though a cylinder may be acceptable from a stress standpoint, it is common practice to remove such defects. After any such repair operation, you must verify the cylinder strength and structure by a hydrostatic test of other suitable means.

(f) Dents can be tolerated when the cylinder wall is not deformed excessively or abruptly. Generally speaking, dents are accepted up to a depth of about 1/16 inch when the major diameter of the dent is equal to or greater than 32 times the depth of the dent. Sharper dents than this are considered too abrupt and must require rejection of the cylinder. On small diameter cylinders these general rules may have to be adjusted. Considerations of appearance play a major factor in the evaluation of dents.

(g) You must remove cylinders with arc or torch burns from service. Defects of this nature may be recognized by one of the following conditions:

(i) Removal of metal by scarfing or cratering.

(ii) A sentering or burning of the base metal.

(iii) A hardened heat affected zone. A simple method for verifying the presence of small arc burns is to file the suspected area. The hardened zone will resist filing as compared to the softer base metal.

(h) Cylinders are normally produced with a symmetrical shape. You must remove cylinders with distinct visual bulges from service until the nature of the defect is determined. Some cylinders may have small discontinuities related to the manufacturing process - Mushroomed bottoms, offset shoulders, etc. These usually can be identified and are not normally cause for concern.

(i) You must carefully inspect cylinders for evidences of exposure to fire. (See WAC 296-24-92005 (3)(j).)

(j) You must examine cylinder necks for serious cracks, folds, and flaws. (See WAC 296-24-92005 (3)(l) and (m).)

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, and 49.17.060. WSR 15-24-100, § 296-24-92009, filed 12/1/15, effective 1/5/16; Order 73-5, § 296-24-92009, filed 5/9/73 and Order 73-4, § 296-24-92009, filed 5/7/73.]