

REQUALIFYING STEEL LP-GAS CYLINDERS USING THE EXTERNAL VISUAL INSPECTION METHOD

PROPANE SAFETY MEETING OUTLINE

Summary

This module covers the steps to be followed when using the external visual inspection method to determine if a steel LP-gas cylinder can be requalified.

Only persons who have been issued a current U.S. Dept. of Transportation (DOT) requalifier identification number (RIN) may inspect cylinders for requalification purposes. The inspection must be made and the results recorded and maintained in accordance with 49 CFR §180.215.

A separate module, *Requalifying Aluminum LP-Gas Cylinders Using the External Visual Inspection Method*, covers the procedures for requalifying aluminum cylinders.

Who should attend

- Cylinder plant employees (filling)

NOTE: Employees in this category who do not attend this meeting should be trained on this subject as soon as possible.

Additional material

Compressed Gas Association (CGA) Pamphlet C-6, 1999 edition (Reaffirmed 2005), *Guidelines for Visual Inspection and Requalification of Low-Pressure Steel Compressed Gas Cylinders*.

Key information for this topic

49 CFR §180.205, General requirements for requalification of specification cylinders.

49 CFR §180.209, Requirements for requalification of specification cylinders.

49 CFR §180.213, Requalification markings.

49 CFR §180.215, Reporting and record-retention requirements.

Company Standard Operating Procedures (SOP)

Note any additional materials used on the attached documentation form, or indicate not applicable.

The attached inspection steps should be posted in a conspicuous location where the steps are readily visible to necessary personnel during requalification activities.

Documentation

Complete the attached documentation form listing the date, time and location of the safety meeting and the printed names and signatures of attendees, names of person who need to attend but did not, and copies of any materials distributed, video shown, or visual aids used in a demonstration. These materials should be properly filed in a safe location.

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Inspection Equipment

Depth gauges, scales

Exterior corrosion, bulging, gouges, dents and digs are normally measured by taking direct measurements with a scale or depth gauge.

Exterior inspection

Cylinders must be inspected for corrosion, dents, gouges, leaks, cuts, digs, fire damage, general distortion, and any other defect that could indicate a weakness that would render a cylinder unfit for service.

Corrosion limits

Failing any of these tests is cause for condemning a cylinder.

- (1) When the tare weight is less than 90 percent of the original stamped tare weight.
- (2) When the line or crevice line corrosion on a cylinder is 3 inches long or longer, and the remaining wall thickness is less than three-fourths of the minimum allowable design thickness, OR when the line or crevice line corrosion is less than 3 inches long, and the remaining wall thickness is less than one-half the minimum allowable design thickness.
- (3) If the remaining wall thickness in an area has isolated pitting less than one-third of the minimum allowable design thickness.
- (4) When the remaining wall thickness in an area of general corrosion is less than one-half of the minimum allowable design thickness.

General corrosion accompanied by pitting

When the actual wall thickness can be measured, the cylinder must be condemned when the remaining wall thickness is less than 0.063 inches.

If the wall thickness cannot be measured and the original wall thickness is unknown, the cylinder must be condemned when the deepest pit in the general corrosion area is greater than 0.042 inches.

When the wall thickness cannot be measured and the original wall thickness is known, the cylinder must be condemned when the original wall thickness, less one and one-half times the maximum pit depth, is less than 0.063 inches.

Table 1 shows the original wall thickness (referred to as the "minimum allowable design thickness") for certain types of cylinders:

Table 1 Minimum Allowable Design Thicknesses for Steel Cylinders

Nominal Cylinder Diameter In Inches	DOT Specification Marking	Minimum Allowable Design Thickness In Inches
5, 6, 8 and 9	4B-240	0.090
9 and 10	4BA-240 and 4BW-240	0.078
12	4B-240	0.105
12	4B-240 and 4BW-240	0.078
14.5	4B-240	0.125
14.5	4B-240 and 4BW-240	0.087
22	4B-240	0.191
22	4BA-240 and 4BW-240	0.130
24	4B-240	0.208
24	4BA-240 and 4BW-240	0.142
30	4B-240	0.251
30	4BA-240 and 4BW-240	0.172

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Leaks

Leaks can be caused by defects at the threaded opening, defects in a welded or brazed seam, or by sharp dents, pits, gouges or digs. To check for leaks, the cylinder must be pressurized and carefully examined. All seams, pressure openings, gouges, pits and digs must be coated with a soap or suitable solution so any escaping gas can be detected. Any amount of leakage is cause for condemning a cylinder.

Dents

Pay special attention to dents where the metal deformation is sharp and confined or where the dent is located at or near a weld.

When a dent includes a weld, the maximum allowable depth is 0.25 inches. The depth must be measured on a longitudinal plane. Place a straightedge lengthwise across the dent and measure to the deepest point.

When a dent does not include a weld, the cylinder must be rejected if the dent is more than 10 percent deeper than it is wide. For instance, a dent that measures 2.5 inches wide at its widest point may not be more than 0.25 inches deep.

Fire Damage

Cylinders must be inspected very carefully for evidence of fire exposure. Common indications of fire exposure are cylinder distortion, a melted or burned valve, burned or scarfing of metal, charred or burned paint or other protective coating, a melted fuse plug, or extruded fusible metal.

If the protective coating is burned off any portion of the cylinder, or if the body of the cylinder is warped, distorted, or burned, it is reasonable to assume the cylinder was overheated.

If the protective coating is only discolored, blistered or smudged and is determined to be intact underneath, the cylinder may be considered for requalification.

Inspection Report

49 CFR Subpart C requires the results of cylinder inspections to be recorded and a record retained by the owner or his authorized agent until either the retest period expires or the cylinder is reinspected or retested, whichever occurs first. Any cylinder passing a visual inspection must be marked as required by 49 CFR §180.213. The "E" following a requalification date indicates the cylinder was requalified by the visual external inspection method.

Refer To CGA C-6 (Steel Cylinders) for specific information regarding the inspection criteria described in this document.

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