GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 23.020.30

CCS J 74

GB/T 8334-2022

Replace GB/T 8334-2011

Periodic inspection and evaluation of liquefied petroleum steel gas cylinders

液化石油气钢瓶定期检验与评定

Issued on: March 9, 2022 **Implemented on: October 1, 2022**

Issued by: State Administration for Market Regulation;
Standardization Administration of PRC.

Table of Contents

Periodic inspection and evaluation of liquefied petroleum steel gas cylinders

1 Scope

This document specifies the basic methods and technical requirements for periodic inspection and evaluation of liquefied petroleum gas cylinders (hereinafter referred to as cylinders) designed and manufactured in accordance with GB/T 5842.

This document is applicable to steel cylinders that can be used at normal ambient temperatures of -40 °C to 60 °C, with a nominal working pressure of 2.1 MPa and a nominal volume not greater than 150 L, which can contain liquefied petroleum gas repeatedly.

2 Normative references

The following documents contain the provisions which, through normative reference in this document, constitute the essential provisions of this document. For the dated referenced documents, only the versions with the indicated dates are applicable to this document; for the undated referenced documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 3864 Industrial Nitrogen

GB/T 5842 Liquefied petroleum steel gas cylinders

GB/T 7512 Valves for liquefied petroleum gas cylinders

GB/T 8335 Special threads for gas cylinders

GB/T 8336 Special thread gauges for gas cylinders

GB/T 9251 Methods for hydrostatic test of gas cylinders

GB/T 10878 Special taps of taper threads for gas cylinders

GB/T12137 Methods for leakage test of gas cylinders

NB/T 47013.2 Nondestructive testing of pressure equipment - Part 2: Radiographic testing

NB/T 47013.4 Nondestructive testing of pressure equipment - Part 4: Magnetic

5.2 Treatment of residual liquid and residual gas in the bottle

5.2.1 Before the steel cylinder inspection, under the premise of ensuring no leakage, no pollution to the environment, and no impact on the health of the operators, use appropriate methods to recover the residual liquid and residual gas in the cylinders one by one. For steel cylinders whose cylinder valves cannot be opened and it is impossible to prove whether there is residual pressure, they shall be stored separately from the cylinders to be inspected, and marked for proper disposal. For the steel cylinders that are judged to be waste by visual inspection, the residual liquid and residual gas in the cylinders shall also be recovered one by one.

5.2.2 The residual liquid and residual gas in the cylinder shall be disposed of by purging the cylinder with steam or by a method that does not affect the safety performance of the steel cylinder after the safety assessment.

5.2.3 When using steam to purge the cylinder, the steel cylinder shall be placed upside down on the steam purging device. Generally, the steam pressure shall be greater than or equal to 0.2 MPa, and the purging time shall not be less than 3 min.

5.2.4 Use a combustible gas detector to measure the concentration of residual gas after purging in the cylinder. For steel cylinders with a concentration higher than 0.4% (volume fraction), the residual liquid and residual gas in the cylinder shall be treated again.

5.3 Cylinder valve disassembly and surface cleaning

5.3.1 When confirming that the pressure inside the bottle is consistent with the atmospheric pressure, remove the cylinder valve with an instrument that does not damage the metal of the bottle body.

5.3.2 For steel cylinders whose cylinder valves cannot be opened, a reliable valve-removal device shall be used to remove the cylinder valves. The valve-removal device shall have the functions of being safety explosion-proof and preventing the medium in the bottle from leaking into the atmosphere.

5.3.3 Use a surface treatment device that does not damage the cylinder body, and remove the rust and coating on the outer surface of the cylinder one by one.

6 Appearance inspection and evaluation

6.1 Initial inspection and evaluation of appearance

Visually inspect the outer surface defects that are easy to find one by one, and any steel cylinder that falls under one of the following conditions shall be rejected:

a) Steel cylinders whose shields are screwed to the cylinder body;

b) Steel cylinders where the shield falls off or its welded joints are broken, and the butt joint of the cylinder body is cracked;

c) Steel cylinders whose upright standing is affected due to base detachment, deformation, corrosion, cracks, wear, and other defects;

d) Steel cylinders that have undergone welding, repairing, patching, dismantling, and refurbishment.

6.2 Appearance re-inspection and evaluation

6.2.1 Visual inspection of appearance

Visually inspect the steel cylinders one by one to check whether there are cracks, bulges, wrinkles, interlayers, pits, gouges, scratches, dents, corrosion, heat damage, and other defects on the outer surface of the cylinders, and check the shape of the base and the cylinder body. For parts with pits, gouges, scratches, and corrosion defects found in the appearance inspection, the minimum wall thickness of the bottle wall at the defect shall be measured with an ultrasonic thickness measuring instrument.

6.2.2 Inspection and evaluation of mechanical damage

6.2.2.1 Steel cylinders with defects such as cracks, bulges, wrinkles, interlayers, and volume deformation visible to the naked eye shall be rejected.

6.2.2.2 Steel cylinders with gouges, scratches and pits, at which the remaining wall thickness is less than the design wall thickness, shall be rejected (see Appendix A for the measurement method).

6.2.2.3 Steel cylinders with a depth of dent not less than 6 mm or greater than 1/10 of the short diameter of the dent shall be rejected (see Appendix A for the measurement method).

6.2.2.4 If the depth of the dent is less than 6 mm, there are scratches or gouges in the dent, and the remaining wall thickness at the defect is less than the design wall thickness, then the steel cylinder shall be rejected.

6.2.2.5 The surface of the defective steel cylinder that does not meet the criteria for rejection shall be ground to make the edges transition smoothly, but the remaining wall thickness after grinding shall not be less than the design wall thickness.

6.2.3 Inspection and evaluation of heat damage

Steel cylinders with arc scars, weld marks, or obvious signs of flame burns that may damage the metal shall be rejected.

The qualified level for magnetic particle and penetrant testing shall not be lower than level-I, the technical level for X-ray testing shall not be lower than level AB, and the qualified level for weld quality shall not be lower than level-III.

7 Valve seat inspection and evaluation

7.1 Inspection content and evaluation method

7.1.1 Visually or with a low-magnification magnifying glass, check the valve seat and thread one by one for cracks, deformation, corrosion, or other mechanical damage.

7.1.2 Steel cylinders with cracked, inclined, or collapsed valve seats shall be rejected.

7.1.3 The thread of the valve seat shall not have cracks or crack defects, but slight damage that does not affect the use is allowed.

7.2 Thread repair

If there is slight corrosion, wear, or other damage to the thread, it can be repaired with a tap that meets the requirements of GB/T 10878. After the repair, it shall be inspected with a gauge in accordance with the provisions of GB/T 8336, and the inspection results shall meet the requirements of GB/T 8335, and the steel cylinders that still fail to pass the inspection after thread repair shall be rejected.

8 Determination of wall thickness

8.1 Measurement requirements

8.1.1 In addition to local thickness measurement for defective parts of steel cylinders, fixed-point thickness measurements shall also be carried out one by one.

8.1.2 The thickness measurement point shall be selected respectively at the arc transition area of the upper and lower heads; for the cylinder part, the points shall be selected at positions 50 mm away from both sides or one side (for steel cylinders composed of three parts) of the girth weld. For severely corroded steel cylinders, the corrosion area shall be measured to find the minimum value point of the remaining wall thickness. For cylinders consisting of three parts, two additional points shall be measured in the lower part of the cylinder and the arc transition zone of the lower head.

8.2 Evaluation of results

Steel cylinders whose remaining wall thickness is smaller than the design wall thickness shall be rejected.

9 Volume measurement (supplementary testing)

9.1 General provisions

After visual inspection, if there is any doubt about the volume of the steel cylinder, the volume shall be measured.

9.2 Weighing instrument requirements

For weighing instruments used to weigh steel cylinders, the maximum weighing capacity shall be 1.5 to 3.0 times the commonly used weighing value, and the allowable error shall meet the requirements of "medium accuracy level" in JJG 539. The verification or calibration cycle of weighing instruments shall not exceed three months.

9.3 Numerical processing

The volume shall be expressed with three significant figures, and the fourth figure shall be discarded.

9.4 Measurement and result evaluation

The volume measurement shall be carried out according to the water volume measurement method given in Appendix B, and the steel cylinder whose actual measured volume is smaller than the nominal volume shall be rejected.

10 Hydrostatic test

10.1 Test requirements

10.1.1 Steel cylinders shall be subjected to hydrostatic test one by one according to the provisions of GB/T 9251, and the test method is a pressure test.

10.1.2 The test pressure is 3.2 MPa, and the pressure holding time shall not be less than 1 min.

10.1.3 For steel cylinders that have passed the test, use appropriate methods to drain the residual water in the cylinder.

10.2 Evaluation of results

During the test, cylinders with leakage, visible deformation, or pressure drop during the holding period (not due to leakage from the test device or the bottle mouth) shall be rejected.

with nitrogen.

12.1.4 The compressed air used in the test shall not contain oil or water; if nitrogen is used, its purity shall not be lower than the provisions of GB/T 3864.

12.1.5 If the inflating device fails during the test or the cylinder valve leaks due to improper assembly or other reasons during the test, the test should be stopped immediately, and the test should be performed after repair or reassembly.

12.2 Evaluation of results

Steel cylinders that leak under the test pressure shall be rejected.

13 Work after inspection

13.1 All steel cylinders that have passed the inspection shall be marked for regular inspection in accordance with the provisions of TSG 23.

13.2 Steel cylinders shall be coated according to the provisions of GB/T 5842. Special color steel cylinders shall be coated with the specified color.

13.3 After the steel cylinder is recoated, a safety reminder shall be pasted, and its content shall comply with the provisions of GB/T 5842.

13.4 For the steel cylinders that are judged to be scrapped, the “Scrap” mark shall be marked on the eye-catching position of the steel cylinder. Scrap steel cylinders shall be processed to eliminate the use function.

13.5 After the inspection, the inspectors shall issue inspection reports in accordance with the provisions of TSG 23 for the qualified and scrapped steel cylinders in a timely manner. At the same time, they shall upload relevant inspection information to the gas cylinder quality and safety traceability information platform in a timely manner in accordance with the requirements of the relevant special equipment safety technical specifications.

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------