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Replacing GB 13075-1999

Periodic Inspection and Evaluation of Welded Steel Gas Cylinders

钢质焊接气瓶定期检验与评定

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Standardization Administration of PRC.

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard replaced GB 13075-1999 *Periodic Inspection and Evaluation of Welded Steel Gas Cylinders*. Compared with GB 13075-1999, this Standard has the major changes as follows:

--- Applicable scope of the standard:

a) Change the pressure of hydraulic test no greater than 7.5MPa into nominal working pressure no greater than 10MPa (gauge pressure);

b) Change the nominal capacity from the original 10L~1000L into 1L~1000L;

c) Add the containing gases of applicable compressed gases or mixed gases;

d) Change the applicable gas cylinder types into inapplicable internal filled gas cylinders, fire extinguishing cylinders, and liquefied petroleum gas steel cylinders designed and manufactured as per GB 5842;

--- Add the following standards in the normative references: NB/T 47013.2, NB/T 47013.4, NB/T 47013.5, TSG Z7001;

--- Add requirements for inspection agency: the inspection agency performing the inspection against the gas cylinders shall meet the requirements of GB 12135; and shall be approved by national special equipment safety supervision and management department as per TSG Z7001;

--- Modify the requirements for residual wall-thickness after the treatment of knock injuries, scratches and corrosion defects; confirm the residual wall-thickness shall be less than design wall-thickness of cylinder body;

--- Modify the requirements for capacity determination;

--- Confirm the repairmen against the cylinder valve is not allowed;

--- Add inspection against the fusible alloy plugs;

--- Add the requirements for periodic inspection report of gas cylinders;

--- Add the requirements for treatment mode of rejected gas cylinders;

--- Add contents encouraging to use advanced information technology to manage the gas cylinders.

Please note some contents of this document may involve patents. The issuer of this

Periodic Inspection and Evaluation of Welded Steel Gas Cylinders

1 Scope

This Standard specifies the basic method sand technical requirements for periodic inspection and evaluation of welded steel gas cylinders (hereinafter refers to as “gas cylinder”).

This Standard is applicable to the periodic inspection and evaluation of welded steel gas cylinders that can contain compressed gases, low-pressure liquefied gases or mixed gases, and can be re-filled with nominal working pressure no greater than 10MPa (gauge pressure), nominal capacity 1L~1000L.

This Standard is not applicable to the internal filled gas cylinders, fire extinguishing gas cylinders, and liquefied petroleum gas cylindered designed and manufactured as per GB 5842.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB 5100 Welded Steel Gas Cylinders

GB 7144 Coloured Cylinder Mark for Gases

GB 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 Thread for Gas Cylinders

GB 12135 Technological Specifications for Periodic Inspection Station of Gas Cylinders

GB/T 12137 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 Particle Testing

NB/T 47013.5 Nondestructive Testing of Pressure Equipment – Part 5: Penetrant Testing

TSG R0006 Gas Cylinder Safety Specification

TSG Z7001 Accreditation Criteria on Special Equipment Inspection Agencies

3 Inspection Agency, Inspection Cycle and Inspection Items

3.1 Inspection agency

The inspection agency performing the periodic inspection of gas cylinder shall meet the requirements of GB 12135; and shall be approved by national special equipment safety supervision and management department as per TSG Z7001.

3.2 Inspection cycle

The gas cylinder containing non-corrosive high-purity gases with purity greater than or equal to 99.999% shall be inspected once every 5 years; the gas cylinder containing the gas generated corrosive role against the cylinder materials, submerge gas cylinder, as well as gas cylinder in constant contact with seawater shall be inspected once every 2 years; while the gas cylinder containing other gases shall be inspected once every 3 years. The inspection cycle of gas cylinder containing mixed gas shall be subject to the gas with shortest inspection cycle.

In the course of use, if the cylinder is found to have serious corrosion, damage or dubious safety and reliability problems, the inspected shall be performed in advance.

The gas cylinder that has been stored in the warehouse or shutdowns for more than one inspection cycle, it shall be re-inspected before starting to use.

3.3 Inspection items

The periodic inspection items of gas cylinders include appearance inspection, cylinder-mouth thread inspection, internal inspection, wall-thickness determination, valve seat and plug seat inspection, capacity determination, hydrostatic test, inspection of cylinder valve, safe pressure-relief device and blind plug, as well as air tightness test.

5.5.1 For the gas cylinders with residual wall-thickness on the positions where there is independent spot corrosion, linear corrosion, local corrosion, and general corrosion is less than design wall-thickness, they shall be rejected.

5.5.2 For the gas cylinders with corrosion depth and range can't be confirmed due to the severe corrosion, they shall be rejected.

5.6 Inspection and evaluation of welded joints

5.6.1 The gas cylinders with welding seam having undercut or both welding seam and heat affected zone having cracks, air holes, craters, and irregular mutations shall be rejected.

5.6.2 The gas cylinders with welding seam lower than the base metal, after the scratches, knock injuries, and pits on the longitudinal and circumferential welding seams is ground shall be rejected.

5.6.3 The gas cylinders with residual wall-thickness less than design wall-thickness, after the scratches and knock injuries on the longitudinal and circumferential welding seam heat affected zone is ground shall be rejected.

5.6.4 The gas cylinders with depth of depression on longitudinal and circumferential welding seams and their heat affected zone greater than or equal to 6mm shall be rejected.

5.6.5 When the type and severity of welded joints are dubious, the inspector shall confirm the non-destructive testing position, method, and detection ratio; and perform the magnetic particle, penetrant, and radiographic non-destructive test as per NB/T 47013.2, NB/T 47013.4, NB/T 47013.5. The qualified levels of magnetic particle and penetrant testing shall be no less than Level-I; while the radiographic testing shall be no less than Level-II.

6 Inspection and Evaluation of Valve Seat and Plug Seat

6.1 Inspection contents and evaluation methods

6.1.1 Visually observe or use low-power magnifier to check valve seat or plug seat one by one, as well as thread to see whether they have cracks, deformation, corrosion or other mechanical damages.

6.1.2 The gas cylinders with valve seat or plug seat having cracks, slopes, collapses shall be rejected.

6.1.3 The valve seat or plug seat threads aren't allowed to have cracks, or crack

The gas cylinders with residual wall-thickness less than the design wall-thickness shall be rejected.

9 Capacity Determination

9.1 General requirements

When performing the fist-time inspection, the capacity of gas cylinders shall be measured one by one. When inspecting thereafter, if the inspector is dubious about the capacity value of gas cylinders, then measure the capacity of such gas cylinders.

9.2 Rounding off of numeric values

The capacity shall be expressed by three significant digits; the fourth digits shall be rounded down.

9.3 Requirements for Weighing apparatus

The weighing apparatus for determination of capacity shall be maintained accurate; its maximum weighing value shall be 1.5 times ~ 3.0 times of the common weighing value. The inspection period of weighing apparatus shall not exceed 3 months.

9.4 Inspection and result evaluation

Capacity shall be measured through the water capacity method, see Appendix B in details. The gas cylinders with actually-measured capacity less than capacity marked on the steel seal shall be rejected.

10 Hydrostatic Test

10.1 Test requirements

10.1.1 Perform the hydrostatic test against the gas cylinders one by one according to the provisions of GB/T 9251.

10.1.2 The pressure in hydrostatic test shall be determined as 1.5 times of nominal working pressure; the retention time under test pressure shall be no less than 3min.

10.2 Result evaluation

For gas cylinders, when performing hydrostatic test, the cylinder body occurs leakage, obvious deformation, or the pressure is declined during the pressure keeping period (not due to test equipment), they shall be rejected.

The fusible alloy plug device can be inspected without removing; if one of the following conditions is found, replace the same size of fusible alloy plug device:

a) When performing the air tightness test, the device has leakage;

b) Fusible alloy plug has obvious creep deformation phenomenon;

c) The hexagon outside the plug body is severe worn.

13 Air Tightness Test

13.1 Test requirements

13.1.1 After the hydrostatic test of gas cylinders is qualified, perform air tightness test one by one. The test device and method shall meet the requirements of GB/T 12137; the test pressure shall be nominal working pressure of gas cylinders.

13.1.2 The gas cylinders containing combustible gases or toxic gases, and high-purity gases or mixed gases shall perform air tightness test by using immersion method. The cylinder immersion holding time shall be no less than 2min; during the pressure maintaining period, there shall be no leakage or pressure decline phenomena.

The gas cylinders containing other gases are allowed to perform air tightness test by using liquid coating method. The pressure maintaining time of gas cylinders with liquid shall be no less than 1min, the bubbles are allowed to escape.

13.1.3 During the test period, if gas-charging device occurs failures or cylinder valve leaks, test shall be stopped immediately; re-test after repairing or re-assembly.

13.2 Result evaluation

Under the test pressure, if cylinder body leaks, the gas cylinders shall be rejected.

14 Other Work

14.1 Inspection marks

The gas cylinders that are periodically inspected qualified shall be marked or imprinted inspection marks, coated inspection color marks according to the provisions of TSG R0006.

14.2 Coating

The gas cylinders that are inspected qualified shall be re-coated. Before coating, clean the surface oil stains, rust and other impurities, and the coating shall be performed

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