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Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods

AMENDMENT 1

Bouteilles à gaz — Bouteilles à gaz métalliques non rechargeables — Spécifications et méthodes d'essai

AMENDEMENT 1

Reference number
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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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This document was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 3, *Cylinder design*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods

AMENDMENT 1

Normative references

Add the following new reference:

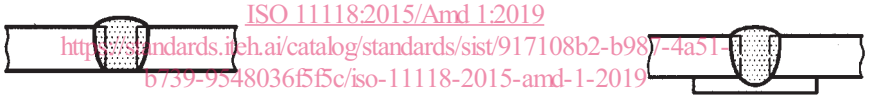
ISO 14732, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*

8.1.1.2.1

Replace the third paragraph with the following:

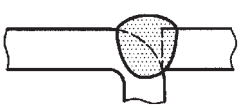
The circumferential seam(s), if any, shall be as illustrated in Figure 1 a), b), c) or d).

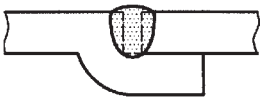
Replace Figure 1 with the following:



a) Butt weld joint

c) Butt weld joint with backing ring





b) Offset weld

d) Joggle weld

Figure 1 — Weld joints

8.1.1.2.2.1

Replace the text of this subclause with the following:

a) All welders, welding operators and welding procedures shall be approved by meeting the requirements of 8.1.1.2.2 through 8.1.1.2.2.9 or those given in ISO 9606-1, ISO 14732, ISO 15613, and ISO 15614-1 as appropriate.

b) Records of welders and welding operator qualifications and welding procedure qualifications shall be kept on file by the manufacturer.

c) Welding procedure specification approval tests shall be carried out such that the welds shall be representative of those made in production.

d) Welders, welding operators and welding procedures shall pass the approval tests for the specific type of work and procedure specification concerned.

8.1.1.2.2.7

Replace the first paragraph with the following:

The welding procedure specification and welder qualification shall be tested and approved when any of the following changes are made, if not already covered:

9.2.2

Replace the first paragraph with the following:

For carbon steel, a check analysis shall be performed by the cylinder manufacturer on material representative of the cylinders.

Insert the following new paragraphs after the second paragraph:

For austenitic stainless steels the cylinder manufacturer shall obtain certificates of the analysis of the cast. If check analysis is required, it shall be carried out either on test specimens taken from material in the form supplied by the producer of the austenitic stainless steel or from finished gas cylinders.

For aluminium alloys, the cylinder manufacturer shall obtain certificates of the analysis of the cast. If check analysis is required, it shall be carried out either on test specimens taken from material in the form supplied by the producer of the aluminium alloys or from finished gas cylinders.

9.2.4.1

Replace the second paragraph with the following:

Burst testing successfully passing the requirements of 9.2.4.5 fulfils the requirement of this Clause.

9.2.4.5

Replace the first paragraph of a) with the following:

a) for cylinder designs with p_b of <70 bar, pressurize the cylinder to the test pressure (p_h) at a rate not exceeding 14 bar/min and hold the test pressure for 30 s. There shall be no decrease in the pressure during the 30 s holding period. Once the holding period has passed, increase the pressure in the cylinder at any convenient rate until the cylinder bursts. As an alternative, once the 30 s holding period has ended, the pressure may be decreased below the test pressure before repressurizing until the cylinder bursts.

Replace the first paragraph of b) with the following:

b) for cylinder designs with $p_b \geq 70$ bar, pressurize the cylinder to the test pressure (p_h) at a rate not exceeding 5 bar/s to test pressure (p_h) and hold for 30 s. There shall be no decrease in the pressure during the holding period. Once the holding period has passed, increase the pressure in the cylinder at any convenient rate until the cylinder bursts. As an alternative, once the 30 s holding period has ended, the pressure may be decreased below the test pressure before repressurizing until the cylinder bursts.

Clause 11

Replace the text with the following:

11.1 Visual inspection

Each cylinder shall be inspected for the following:

a) being free of cracks, seams, laminations, or other defects;

b) weld quality;

c) proper markings.

11.2 Proof pressure test

Each non-refillable cylinder, except those used for burst tests, shall be proof pressure tested at a pressure of at least the test pressure (p_h). As an alternative, the cylinder shell shall be pressure tested at a pressure of at least the test pressure (p_h) and the non-refillable cylinder shall be leak tested at time of filling (see 11.3).

The cylinder/cylinder shell shall remain at the proof test pressure long enough, at least 10 s for testing with gaseous media and 30 s for liquid media, to make it possible to validate the integrity of the cylinder and welds.

WARNING — It should be noted that pneumatic pressure tests are considerably more dangerous than water pressure tests since, regardless of the size of the cylinder, any error in carrying out this test is highly likely to lead to a rupture under gas pressure. Therefore, these tests should only be carried out after ensuring that the safety measures satisfy the safety requirements.

11.3 Leak testing

Leak testing shall be conducted with the cylinder submerged under water or by any other method giving equal sensitivity of leak detection.

11.4 Rejection criteria

Cylinders shall not exhibit leaks (or pressure reduction), visible distortion, or any other defects during the test.

Cylinders exhibiting any of these defects shall be rejected.

11.5 Repairs

Cylinder weld repairs are permitted. The weld operator and process shall be as defined in Clause 8. Repairs shall be followed by pressure testing as defined in 11.2.

Cylinders that cannot be repaired shall be rendered unserviceable.

12.1

Delete the NOTE.

12.2.1

Delete list item h).

12.2.4

Delete the entire subclause.

A.1

Replace the text of this Clause with the following:

This Annex specifies requirements of non-refillable sealing devices (valves, or pierceable metal membranes) to be used with non-refillable cylinders and the method of testing for prototype approval.

A.2.2.2.1

Replace the second and third paragraph with the following:

A threaded valve shall not be able to be removed without destruction of the original cylinder thread. This shall be demonstrated by removing the threaded valve from the cylinder and then attempt reinstalling a new threaded valve. A new threaded valve shall not be able to be installed.

The valve body shall be capable of withstanding a hydraulic pressure test in accordance with A.3.2.2.

A.3.2.1

Replace the text of this subclause with the following:

A minimum of eight sample valves shall be selected from the batch of 50 valves presented to the inspector.

a) One sample (n°1) for the hydraulic pressure test (see A.3.2.2).

b) Five samples (n°2 through n°6) for the tightness test (see A.3.2.3).

c) One sample (n°7) for the non-refillability test (see A.3.2.4).

d) One sample (n°8) for any additional test which may be required.

e) For oxygen service three additional samples (n°9 through n°11) shall be subjected to the oxygen pressure surge valve test (see A.3.2.5).

A.3.2.2

Replace the title and text of this subclause with the following:

A.3.2.2 Hydraulic pressure test

For safety reasons, this test shall be carried out prior to all other tests. The hydraulic pressure test shall be carried out with the following:

a) the valve seat in open position;

b) the valve outlet connection sealed;

c) any safety relief devices (where fitted) removed and the opening sealed;

d) the test medium is water or any other suitable fluid;

e) the hydraulic test pressure minimum is 1,6 times the test pressure of the cylinder shell;

f) the test temperature is the ambient temperature;

g) the pressure holding time is 2 min minimum.

The pressure shall be raised continuously and gradually. The prototype valve shall withstand the test pressure without permanent deformation or rupture.

A.3.2.4

Replace list item 2) of a) with the following:

2) attach the valve stem to a suitable empty container of the same water capacity as the cylinder intended to be used. Apply a continuous positive pressure of 10 % of p_{vt}, but not less than 2 bar to the valve outlet. Ensure that the valve is open. After 1 h, check the pressure in the container. The pressure in the container shall not exceed 5 % of the applied pressure.

A.3.2.6

Delete the entire subclause.

A.4.2

Replace the first paragraph with the following:

A minimum of 50 non-refillable cylinders guaranteed by the manufacturer to be representative of the new design shall be made available for prototype testing. Out of these cylinders, the following samples shall be taken as a minimum: