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Gas cylinders — Cylinder valves — Manufacturing tests and examinations

Bouteilles à gaz — Robinets de bouteilles — Essais de fabrication et contrôles

[Revision of first edition (ISO 14246:2001)]

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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Foreword

ISO 14246 is intended to be used under a variety of national regulatory regimes but has been written so that it is suitable for use with the conformity assessment system of the UN Model Regulations for the Transportation of Dangerous Goods. Attention is drawn to requirements in specified relevant national regulations of the country (countries) where the cylinders are intended to be used that might override the requirements given in this International Standard.

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 14246 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinder fittings*.

This second/third/... edition cancels and replaces the first/second/... edition (ISO 14246:2001), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

The main changes from ISO 14246:2001 are:

- scope refers to cylinder valves according to ISO 10297 only;
- the definitions were brought in line with the revision of ISO 10297;
- addition of a separate clause for the determination of the valve test pressure;
- modification/addition/deletion of manufacturing related definitions (batch/sample/shift);
- modification of tests to be performed on every valve;
- modification of tests to be performed on a sample of a batch;
- addition of procedures to validate materials of construction;
- deletion of revalidation tests;
- modification of example of production test protocol on every valve.

Introduction

Gas cylinders are usually fitted with a cylinder valve to contain the gas and to allow its filling and controlled discharge. Requirements for the specification and type testing of cylinder valves are given in ISO 10297.

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Gas cylinders — Cylinder valves — Manufacturing tests and examinations

1 Scope

This International Standard describes the procedures and acceptance criteria (sometimes called initial inspection and tests) for manufacturing testing and examination that cylinder valves have been manufactured to match those that achieved type approval.

This International Standard is applicable to valves according to ISO 10297.

The principles of these tests and examinations may be beneficially applied to cylinder valves type tested to national or international standards other than ISO 10297.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10297, *Transportable gas cylinders — Cylinder valves — Specification and type testing*

3 Terms and definitions

For the purposes of this International standard, the following terms and definitions apply.

3.1

valve working pressure

settled pressure of a compressed gas at a uniform reference temperature of 15 °C in a full gas cylinder for which the valve is intended

[ISO 10297]

NOTE This definition does not apply to liquefied, e.g. carbon dioxide, or dissolved gases, e.g. acetylene.

3.2

valve test pressure

pressure applied to a valve through a gas during testing

[ISO 10297]

3.3

external leak tightness

leak tightness to atmosphere (leakage in and/or leakage out) when the valve is open and the outlet connection is sealed

[ISO 10297]

NOTE The external leak tightness of cylinder valves fitted with accessories e.g. pressure relief devices and pressure gauges is included within this definition.

3.4 internal leak tightness

leak tightness across the valve seat (leakage in and/or leakage out) when the valve is closed and pressurized from the inlet passage and the outlet connection is open

[ISO 10297]

3.5 batch

quantity of valves of the same type tested design produced as a controlled number in a time period not exceeding that marked on the valve i.e. year and month, or year and week

NOTE Marking of valves is specified in ISO 10297.

3.6 sample

quantity of valves selected from a batch according to a recognized sampling procedure, e.g. the standard series ISO 2859, chosen and validated by the manufacturer

4 Valve test pressure

For compressed gases:

$$p_{vt} = 1,2 \times p_w$$

For liquefied gases, e.g. carbon dioxide, and dissolved gases under pressure, e.g. acetylene:

p_{vt} is at least equal to the minimum test pressure of the cylinder quoted in the relevant transportation regulation for that gas or gas group.

5 Manufacturing tests and examinations

5.1 General

Manufacturing tests and examinations shall include:

- tests to be performed on every valve,
- examinations to be performed on a sample of a batch and
- procedures to validate materials of construction.

Test results and examinations shall be recorded.

5.2 Tests to be performed on every valve

All valves shall be subjected to both internal leak tightness and external leak tightness (leakage out only) testing via the inlet connection prior to dispatch. In addition, the presence of a through passage shall be varified.

Testing shall be conducted at p_{vt} or for valves equipped with pressure activated pressure relief devices at 0,8 times the lowest value of the range of the set pressure of the relief device or as per the applicable national regulation and/or standard.

Leak tightness tests shall be performed at ambient temperature (usually between +15 °C and +30 °C). Valves shall be closed with the sealing torque specified by the manufacturer between the minimum closing torque (T_C) and the endurance torque (T_E) as defined in ISO 10297. The internal or external leakage rate shall not exceed 6 cm³/h (at nominal conditions: 20 °C and 1 013 mbar). For high integrity valves e.g. valves for highly toxic or ultra high purity gas service, lower leakage rates for both internal and external tightness tests may be required. Additionally an extra external tightness test to measure the leakage in value may be required.

Generally, these tests are conducted with oil free dry air or nitrogen but other suitable test gases may be used.

An example of a production test protocol is given in annex A. Other qualified or accepted methods that comply with this clause may also be used.

NOTE Additional testing may be required for valves with special features, e.g. residual pressure valves.

5.3 Examinations to be performed on a sample of a batch

These examinations shall be performed on a sample of valves of a batch. The sampling procedure, the examination sequence and the detailed examination content shall be specified in the manufacturer's quality assurance programme. The corresponding examinations shall be carried out to verify the production process with regard to at least:

- compliance with production or customer order by comparison with the general assembly drawing and other documentation;
- metallic and non-metallic materials by examination of suppliers documentation, e.g. according to EN 10204:2004 certificate type 3.1 or respective national standards
- stress relieving (if required) by examination of production documentation;
- machining by visual and metrological examination;
- dimensions by metrological examination;
- cleanliness by visual examination and production documentation;
- assembling by visual examination for use of correct components, by visual examination of application and quantity of lubricants, sealants and adhesives and measurement of torques during disassembly;
- testing by examination of production documentation and
- marking by visual examination.

5.4 Procedures to validate materials of construction

Manufacturers must set up a quality management system which include their suppliers, subcontractors, third party laboratories and their own facilities (if necessary) to ensure that only metallic and non-metallic materials of the correct and proven specifications are incorporated into cylinder valves as per the original type tested design.