



SLOVENSKI STANDARD

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Transportable gas cylinders - Periodic inspection and testing of welded carbon steel gas cylinders

Ortsbewegliche Gasflaschen - Wiederkehrende Prüfung von geschweißten Gasflaschen aus Kohlenstoffstahl

Bouteilles a gaz transportables - Contrôles et essais périodiques des bouteilles a gaz soudées en acier au carbone

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English version

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This European Standard was approved by CEN on 8 November 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document EN 1803:2002 has been prepared by Technical Committee CEN/TC 23 "Transportable gas cylinders", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2002, and conflicting national standards shall be withdrawn at the latest by August 2002.

In this standard the annexes B, C, D and E are normative and the annexes A, F and G informative.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports the objectives of the framework Directives on Transport of Dangerous Goods.

This European Standard has been submitted for reference into the RID and/or the technical annexes of the ADR. Therefore in this context the standards listed in the normative references and covering basic requirements of the RID/ADR not addressed within the present standard are normative only when the standards themselves are referred to in the RID and/or the technical annexes of the ADR.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

The principal aim of a periodic inspection and testing procedure is that at the completion of the test the cylinders may be reintroduced into service for a further period of time.

Experience of the inspection and testing of cylinders which is specified in this European Standard is an important factor when determining whether a cylinder should be returned into service.

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1 Scope

This European Standard specifies the requirements for periodic inspection and testing of welded, carbon steel transportable gas cylinders intended for compressed and liquefied gases under pressure, of water capacity from 0,5 l up to 150 l.

NOTE As far as practicable, this standard may also be applied to cylinders of less than 0,5 l water capacity.

This Standard specifies the requirements for periodic inspection and testing to verify the integrity of such gas cylinders to be reintroduced into service for a further period of time. It also defines a procedure to qualify existing gas cylinders for free movement between member states of the European Union (see annex A).

This standard does not apply to periodic inspection and testing of acetylene cylinders or composite (fully wrapped or hoop-wrapped) steel cylinders.

This standard is primarily for industrial gases other than LPG but may also be applied for LPG. However for dedicated LPG cylinders, see EN 1440, *Transportable refillable welded steel cylinders for liquefied petroleum gas (LPG) – Periodic requalification* prepared by CEN/TC 286 – *Liquefied petroleum gas equipment and accessories*.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate place in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 629-2, *Transportable gas cylinders — 25E taper thread for connection of valves to gas cylinders — Part 2: Gauge inspection*.

EN 837-1, *Pressure gauges — Part 1: Bourdon tube pressure gauges — Dimensions, metrology, requirements and testing*.

EN 837-3, *Pressure gauges — Part 3: Diaphragm and capsule pressure gauges — Dimension, metrology, requirements and testing*.

EN 1089-1, *Transportable gas cylinders — Gas cylinder identification (excluding LPG) — Part 1: Stampmarking*.

EN 1795, *Transportable gas cylinders (excluding LPG) — Procedures for change of gas service*.

EN ISO 11114-1, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials (ISO 11114-1:1997)*.

EN ISO 11114-2, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials (ISO 11114-2:2000)*.

prEN 13322-1, *Transportable gas cylinders — Refillable welded steel gas cylinders — Design and construction — Part 1: Welded steel*.

prEN 13322-2, *Transportable gas cylinders — Refillable welded steel gas cylinders — Design and construction — Part 2: Welded stainless steel*.

EN ISO 13341, *Transportable gas cylinders — Fitting of valves to gas cylinders (ISO 13341:1997)*.

3 Intervals between periodic inspection and test

In order to ensure continued safe operation, cylinders shall be periodically submitted to inspection and test in accordance with annex B. A cylinder shall fall due for a periodic inspection and test on its first receipt by a filler after the expiry of the interval in annex B.

NOTE Table B.1 gives a list of the intervals between periodic inspections for some gases which complies with the current RID/ADR regulations and also gives recommendations which could be subsequently adopted by the RID/ADR regulations.

Provided the cylinder has been subjected to normal conditions of use and has not been subjected to abusive and abnormal conditions rendering the cylinder unsafe, there is no general requirement for the user to return a gas cylinder before the contents have been used even though the test interval may have lapsed. However it is suggested that cylinders are retested within a period not exceeding twice the time interval.

In the case of cylinders used for emergency purposes (e.g. fire extinguishers, breathing apparatus), it is the responsibility of the person in possession (owner or user) to submit it for a periodic inspection within the interval specified in annex B or as specified in the relevant cylinder design standard/regulation, if this is shorter.

4 List of procedures for periodic inspection and test

The inspection and test shall be carried out only by competent persons who shall ensure that the cylinders are fit for continued safe use.

NOTE A competent person is a person who has the necessary technical knowledge, experience and authority to assess and approve materials for use with gases and to define any special conditions of use that are necessary. Such a person will also normally be formally qualified in an appropriate technical discipline.

Each cylinder shall be submitted to periodic inspection and test. The following procedures form the requirements for such inspection and test, and are explained more fully in later clauses:

- identification of cylinder and preparation for inspection and test (clause 5);
- external visual inspection (clause 6);
- inspection of welds (6.2);
- internal visual inspection (clause 7);
- supplementary tests (clause 8);
- inspection of cylinder neck (clause 9);
- pressure test, proof test only (clause 10);
- repair of cylinders (clause 11);
- inspection of valve (clause 12);
- final operations (clause 13);
- rejection and rendering cylinders unserviceable (clause 14).

Where cylinders are manufactured according to National Regulations and are intended to be qualified under the Transportable pressure equipment directive (TPED) for free movement and use between member states of the European Union, additional requirements are specified in annex A.

It is recommended that the above listed tests are performed in the suggested sequence. In particular the internal visual examination (clause 7) should be carried out before the pressure test (clause 10).

Cylinders which fail the inspection or tests shall be rejected (see clause 13). When, after the above tests, doubts still exist as to the extent of a defect or the condition of a cylinder, then additional tests may be performed in accordance with clause 8, until such doubts are positively resolved or the cylinder shall be rendered unserviceable.

Some cylinders rejected during periodic inspection and test may be recovered in accordance with annex C.

5 Identification of cylinder and preparation for inspection and test

Before any work is carried out, the relevant cylinder data (e.g. see EN 1089-1) and its contents and ownership shall be identified.

If contents are identified as hydrogen or other embrittling gases only those cylinders manufactured or qualified as a hydrogen cylinder shall be used for that service. Such cylinders shall be checked that they are compatible with hydrogen service i.e. with respect to the maximum tensile strength and internal surface condition (e.g. cylinders stampmarked according to EN 1089-1 are stamped "H"). All other cylinders shall be withdrawn from hydrogen service and their suitability checked for their new intended service.

The cylinders shall be depressurized and emptied in a safe, controlled manner before proceeding. Particular attention shall be given to cylinders containing flammable, oxidizing and toxic gases to eliminate risks at the internal inspection stage.

Cylinders with incorrect markings, unknown gas contents, or those which cannot be safely emptied of gas, shall be set aside for special handling.

Cylinders with inoperative or blocked valves may be treated as outlined in annex D. Provided the requirements above have been complied with, and the cylinder has been depressurized safely, the valve shall be removed.

6 External visual inspection

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6.1 Preparation for external visual inspection

Each cylinder shall be cleaned and have all loose coatings, corrosion products, tar, oil or other foreign matter removed from its external surface by a suitable method, e.g. by brushing, shot blasting (under closely controlled conditions), water jet abrasive cleaning, chemical cleaning or other suitable methods. Care shall be taken at all times to avoid damaging the cylinder, or removing excess amounts of cylinder wall.

If fused nylon, polyethylene or a similar coating has been applied and is seen to be damaged, or prevents a proper inspection, then the coating shall be removed. If the coating is removed by the application of heat, the temperature of the cylinder shall not exceed 300 °C.

6.2 Inspection procedure

The external surface of each cylinder shall then be inspected for:

- a) dents, cuts, gouges, bulges, cracks, laminations or excessive base wear;
- b) heat damage, torch or electric arc burns (as defined in Table C.1);
- c) corrosion (as defined in Table C.2). Special attention shall be given to areas where water may be trapped. These include the entire base area, the junction between the body and the foot ring and the junction between the body and the shroud;
- d) weldings. All welds and the areas adjacent to them shall be checked for defects;
- e) other defects such as illegible or unauthorized stamp markings, unauthorized additions or modifications;
- f) integrity of all permanent attachments;

g) vertical stability (if relevant) (as defined in Table C.1);

For rejection criteria, see annex C. Cylinders no longer suitable for future service shall be rendered unserviceable (as defined in clause 14).

7 Internal visual inspection

Each cylinder shall be inspected internally, using illumination to identify any defects such as those listed in 6.2 a) and 6.2 c). Precautions shall be taken to ensure that the method of illumination presents no hazards to the tester whilst performing the operation. Any internal liner or coating which can obstruct optimum internal visual inspection, shall be removed. Any cylinder showing presence of foreign matter or signs of more than light surface corrosion shall be cleaned internally under closely controlled conditions by shot blasting, water jet abrasive cleaning, flailing, steam jet, hot water jet, rumbling, chemical cleaning, or other suitable method. Care shall be taken to avoid damage to the cylinder. If cleaning is required, the cylinder shall be re-inspected after the cleaning operation.

8 Supplementary tests

Where there is doubt concerning the type and/or severity of a defect found on visual inspection (see clauses 6 and 7), additional tests or methods of examination may be applied, e.g. ultrasonic techniques, check weighing or other non-destructive tests. Only when all doubts are eliminated may the cylinder be further processed (see annex C).

9 Inspection of cylinder neck

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9.1 Internal neck thread

The internal neck thread of the cylinder shall be examined to ensure that it is:

- clean and of full form;
- free of damage;
- free of burrs;
- free of cracks;
- free of other imperfections.

9.2 Other neck surfaces

Other surfaces of the neck shall also be examined to ensure they are free of cracks or other defects (see annex C).

9.3 Damaged internal neck threads

Where necessary, and where the manufacturer or the competent person confirms that the design of the neck permits, threads may be re-tapped to provide the appropriate number of effective threads. After re-tapping, the threads shall be checked by the appropriate thread gauge, (e.g. for 25E threads, in accordance with EN 629-2).

9.4 Neck ring and collar attachment

When a neck ring/collar is attached, an examination to ensure that it is secure and free from thread damage shall be carried out. Neck rings shall only be changed using an approved procedure. If it is found that any significant damage to cylinder material has occurred by replacement of the neck ring/collar, the cylinder shall be rendered unserviceable (see clause 14).

10 Pressure test

10.1 General

Each cylinder shall be subjected to a hydraulic or pneumatic pressure test (see 10.2).

10.2 Proof pressure test

10.2.1 General requirements

When carrying out a pressure test, a suitable fluid, normally water shall be used as the test medium. The test shall be a proof pressure test (see 10.2.2), as appropriate to the design of the cylinder. The test pressure shall be in accordance with the stamping on the cylinder.

The pressure in the cylinder shall be increased gradually until the test pressure is reached. The cylinder test pressure shall be held for at least 30 s with the cylinder isolated from the pressure source, during which time there shall be no decrease in the recorded pressure or any evidence of any leakage. Safety precautions shall be taken during the test.

10.2.2 Procedure and acceptance criteria

Annex E describes a typical method for carrying out the test.

NOTE A pneumatic pressure test may be substituted, provided approval from the relevant authority has been obtained. Take appropriate measures to ensure safe operation and to contain any energy, which is considerably more than that in the hydraulic test, which can be released.

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During the 30 s hold period the pressure as registered on the test gauge shall remain constant.

There shall be no visible leakage or visible permanent deformation on the entire surface of the cylinder. This check may be made either during the 30 s hold or immediately after the pressure has been released.

Any cylinder failing conforming to with the requirements of this test shall be rendered unserviceable.

11 Repair of cylinders

11.1 Repair of pinholes

If during the pressure test or external visual inspection pinhole leaks are detected in a weld, the cylinder shall be made unserviceable or repaired by welding. No other repair to pressure containing welds shall be undertaken.

11.2 Other repairs

Any other repairs including dedenting, replacement of foot rings and shrouds may be carried out, provided this will not impair the integrity of the cylinder. All corrosion products shall be removed prior to repair.