



SLOVENSKI STANDARD SIST EN 14876:2007

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Transportable gas cylinders - Periodic inspection and testing of welded steel pressure drums

Ortsbewegliche Gasflaschen - Wiederkehrende Prüfung von geschweißten Fässern aus Stahl

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Bouteilles a gaz transportables - Contrôles et essais périodiques des futs a pression soudés en acier

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ICS:

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English Version

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This European Standard was approved by CEN on 11 November 2006.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, 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 14876:2007) 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of an identical text or by endorsement, at the latest by July 2007, and conflicting national standards shall be withdrawn at the latest by July 2007.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and 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 pressure drums may be reintroduced into service for a further period of time.

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

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1 Scope

This European Standard deals with welded steel transportable pressure drums intended for compressed and liquefied gases under pressure of water capacity from 150 litres up to 1 000 litres.

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

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.

EN 14208, *Transportable gas cylinders — Specification for welded pressure drums up to 1 000 litre capacity for the transport of gases — Design and construction*

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)*

EN ISO 11621, *Gas cylinders — Procedures for change of gas service (ISO 11621:1997)*

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

EN ISO 13769, *Gas cylinders — Stamp marking (ISO 13769:2002)*

3 Intervals between periodic inspection and test

In order to ensure continued safe operation, pressure drums shall be subjected periodically to inspection and test in accordance with Annex B. A pressure drum shall fall due for periodic inspection and test on its first receipt by filler after expiry of the interval in Annex B.

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

Provided that the pressure drum has been subjected to normal conditions of use and has not been subjected to abusive and abnormal conditions making the pressure drum unsafe, there is no requirement for the user to return a pressure drum before the contents have been used even though the test interval may have been exceeded. However, it is suggested that pressure drums are re-tested at a period not exceeding twice the normative time interval specified in Table B.1.

NOTE 2 Certain products such as hydrogen fluoride require an intermediate check of wall thickness as well as the contents to be checked for pressure rise due to the generation of gases such as hydrogen. Other products such as hydrogen bromide should not be allowed to exceed one and a half times the time interval for the normative test interval in Table B.1.

4 List of procedures for periodic inspection and test

Each pressure drum shall be submitted to a 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 pressure drum and preparation for inspection and test;
- depressurization and de-valving operation;
- external visual inspection;
- visual inspection of welds;
- internal visual inspection;
- supplementary tests;
- inspection of valve connections;
- repair of pressure drums;
- inspection of openings;
- inspection of valves;
- proof pressure test;
- final operations, including drying;
- rejection and rendering pressure drums unserviceable.

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Where pressure drums 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. For most gases, the internal visual examination (Clause 8) should be carried out before the pressure test (Clause 11). In some cases, e.g. HCl, performing the hydraulic test first can dissolve residual product thus making the internal inspection less hazardous.

Pressure drums which fail the inspection or tests shall be rejected. When after the above tests, doubts still exist as to the extent of a defect or the condition of a pressure drum, additional tests may be performed in accordance with Clause 9, until such doubts are positively resolved, or the pressure drum shall be rendered unserviceable.

5 Identification of pressure drum and preparation for inspection and test

Before any work is carried out, details of the design, contents and ownership shall be identified. If it is intended to change the service of the drum, procedures in EN ISO 11621 shall be followed.

6 Depressurization and de-valving procedures

The pressure drum shall be depressurised and emptied in a safe and controlled manner before proceeding. Particular attention shall be paid to pressure drums that have contained flammable, oxidising or toxic gases to eliminate risks at the internal visual inspection. Additionally, as some liquefied products may not be removed from the pressure drum by venting, an additional check such as check weighing or check of the atmosphere of the pressure drum may be required. It is recommended that pressure drums containing a hazardous product are purged in a safe manner.

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

Before removing any pressure retaining accessory e.g. valve, flange, a positive check shall be performed to ensure that the pressure drum does not contain any gas under pressure. This can be performed as described in Annex D using the device such as shown in Figure D.1.

NOTE If the above procedure is not performed, a violent reaction can occur e.g. projection of the valve, release of toxic gas, fire etc.

Pressure drums with inoperative or blocked valves shall be treated as outlined in Annex D. Provided the requirements above have been complied with, and the pressure drum has been safely depressurised, the valves and/or flanges, as applicable, may be removed.

7 External visual inspection

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7.1 Preparation for external visual inspection

Each pressure drum shall be cleaned and have all labels, loose coatings, corrosion products, tar, oil or other foreign matter removed from its external surface, e.g. by brushing, shot-blasting, (under controlled conditions), water jet abrasive cleaning, chemical cleaning or other methods. Care shall be taken at all times to ensure that the pressure drum is not damaged or excess amounts of the wall of the pressure drum are not removed by the cleaning application.

If a fused nylon, polythene 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 pressure drum shall not exceed 300 °C.

7.2 Inspection procedure

The external surface of each pressure drum shall undergo a thorough visual inspection for:

- dents, cuts, gouges, bulges, cracks, laminations or excessive wear;
- heat damage, torch or electric arc burns, (as identified in Table C.1);
- corrosion (as defined in Table C.2). Special attention shall be given to areas where water may be trapped;
- all welds and welded attachments and the areas adjacent to them shall be checked for defects;
- other defects such as illegible or unauthorized stamp markings, unauthorized additions or modifications;
- integrity of all permanent attachments e.g. shrouds, lifting points, lifting pockets, rolling bands;
- damage to rolling bands.

Occasionally, it may be necessary to use non destructive techniques (NDT) such as dye-penetrant, to investigate potential cracks.

For rejection criteria see Annex C. Pressure drums no longer suitable for continued service shall be rendered unserviceable (as defined in Clause 15).

8 Internal visual inspection

Once the requirements of Clause 6 have been met, each pressure drum shall be inspected internally to identify any defects such as those listed in 7.2. Precautions shall be taken to ensure that the method of illumination presents no hazard to the person carrying out the inspection. Any internal lining or coating which may prevent a thorough examination shall be removed. Any pressure drum showing presence of foreign matter or signs of more than light surface corrosion shall be cleaned under closely controlled conditions by shot blasting, water jet abrasive cleaning, flailing, steam jet, hot water jet, rumbling, chemical cleaning or other method. Care shall be taken to avoid damage to the pressure drum. If cleaning is required the pressure drum shall be re-inspected after the cleaning operation.

9 Supplementary tests

Where there is doubt concerning the type/severity of a defect found on visual inspection (see Clauses 7 and 8), or when the cleaning processes might have reduced the wall thickness, 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 drum be further processed (see Annex C).

10 Inspection of openings

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10.1 Internal neck threads

The internal threaded openings shall be visually examined, and using gauges relevant to the threads in the drum, to ensure they are:

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

Where there is any doubt as to the thread condition, the thread shall be checked using a threaded gauge by a person trained in gauging threads.

10.2 Damaged internal neck threads

Where necessary and where the manufacturer or the competent person confirms that the design of the neck thread permits, threads may be re-tapped or re-machined to provide the required number of effective threads. After re-making, the threads shall be checked by a thread gauge. Damaged retaining assemblies shall be replaced ensuring compatibility with the intended gas service (see EN ISO 11114-1 or EN ISO 11114-2 as relevant).

10.3 Flanged openings and retaining assemblies

Where the pressure drum is fitted with flanged openings, these shall be inspected to ensure that they are:

- clean faced;
- free of damage to the mating surfaces;
- free of cuts or gouges.

For retaining assemblies e.g. bolts/studs etc. it shall be ensured that:

- the profile conforms to the required specification;
- is free from all surface defects;
- the materials are compatible with the intended gas service even though they might not be in the gas stream (see EN ISO 11114-1).

10.4 Damaged flanged openings and/or retaining assemblies

Where necessary, and where the manufacturer or a competent person confirms that the design permits, damaged flange faces, both on the drum and the flange, may be re-machined to enable a pressure seal to be made on re-assembly.

Damaged retaining assemblies shall be replaced ensuring compatibility with the intended gas service (see EN ISO 11114-1 or EN ISO 11114-2 as relevant).

11 Pressure test

11.1 General

Each pressure drum shall be subjected to a hydraulic or pneumatic pressure test (see 11.2).

11.2 Proof pressure test

When carrying out a pressure test, a fluid, normally water, shall be used as the test medium. The test shall be a proof pressure test (see 11.3) as appropriate to the design of the drum. The test pressure shall be in accordance with the stamping on the pressure drum.

NOTE A pneumatic pressure test may be substituted provided that a risk assessment has been carried out. Those using pneumatic testing need to ensure, that precautions are taken to contain any energy released if a pressure drum fails. The energy required to conduct a pneumatic pressure test is considerably more than required for a hydraulic pressure test and can cause extensive damage in the event of failure if adequate precautions have not been taken.

11.3 Procedure and acceptance criteria

11.3.1 Hydraulic test

11.3.1.1 General

The pressure in the pressure drum shall be increased gradually until the test pressure is reached. The pressure shall be held for a minimum of 10 min with the pressure drum isolated from the pressure source. During the test period there shall be no decrease in the recorded pressure or evidence of any leakage. Safety precautions shall be taken, even for a hydraulic test in view of the considerable stored energy in a pressure drum.

11.3.1.2 Test equipment

11.3.1.2.1 All rigid pipe work, flexible tubing, valve, fittings and components forming the pressure system of the test equipment shall be designed to withstand a pressure 1,5 times the maximum test pressure of any pressure drum that may be tested. Flexible tubing shall have sufficient wall thickness to prevent kinking.

11.3.1.2.2 There shall be two pressure gauges to at least an accuracy of Class 2,5 as defined in EN 837-1 or EN 837-3, with a scale appropriate to the test pressure. They shall be checked for accuracy against a calibrated gauge at regular intervals, and in any case not less than once a month. The pressure gauges shall be chosen such that the test pressure is approximately between 1/3 and 2/3 of the value capable of being measured on the pressure gauge and the readings are clearly visible to the test personnel.