



SLOVENSKI STANDARD
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LPG equipment and accessories - Transportable refillable composite cylinders for Liquefied Petroleum Gas (LPG) - Periodic inspection

Flüssiggas-Geräte und Ausrüstungsteile - Ortsbewegliche wiederbefüllbare Flaschen aus Verbundwerkstoffen für Flüssiggas (LPG) - Wiederkehrende Prüfung

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(accessories (Bouteilles))
Équipements pour GPL et leurs accessoires (Bouteilles) en matériau composite, transportables et rechargeables pour gaz de pétrole liquéfié (GPL) - Contrôle périodique

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English Version

LPG equipment and accessories - Transportable refillable
composite cylinders for Liquefied Petroleum Gas (LPG) -
Periodic inspection

Équipements pour GPL et leurs accessoires - Bouteilles en
matériau composite, transportables et rechargeables pour
gaz de pétrole liquéfié (GPL) - Contrôle périodique

Flüssiggas-Geräte und Ausrüstungsteile - Ortsbewegliche
wiederbefüllbare Flaschen aus Verbundwerkstoffen für
Flüssiggas (LPG) - Wiederkehrende Prüfung

This European Standard was approved by CEN on 27 October 2005.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This European Standard (EN 14767:2005) has been prepared by Technical Committee CEN/TC 286 “Liquefied petroleum gas equipment and accessories”, the secretariat of which is held by NSAI.

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 June 2006, and conflicting national standards shall be withdrawn at the latest by June 2006.

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

Photographs presented in Annex B should be considered in colour in order to improve pictorial guidance.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

The primary objective of the periodic inspection of transportable refillable composite liquefied petroleum gas (LPG) cylinders is that, at the completion of the tests, the cylinders can be re-introduced into service for a further period of time.

Periodic inspection is normally carried out at a test station operated under the responsibility of a competent gas organisation, or of a third party.

This European Standard has now been prepared to reflect the current state of the art for periodically inspecting composite LPG cylinders.

This European Standard calls for the use of substances and procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

It has been assumed in the drafting of this European Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

Where judgements are called for, it has been assumed that they are made by competent persons who have been trained specifically for the tasks.

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1 Scope

This European Standard specifies periodic inspection intervals, procedures for inspection, inspection and testing for transportable refillable composite LPG cylinders with a water capacity from 0,5 l up to and including 150 l.

This European Standard is applicable to cylinders that comprise a liner of metallic material (welded or seamless), or non-metallic material, (or a mixture thereof), reinforced by a wound composite consisting of fibres of glass or carbon or aramid (or a mixture thereof) embedded in a matrix.

This European Standard is also applicable to composite cylinders without liners.

2 Normative references

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

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 — Dimensions, metrology, requirements and testing*

EN 13152, *Specification and testing of LPG cylinder valves — Self closing*

EN 13153, *Specification and testing of LPG cylinder valves — Manually operated*

EN 14427:2004, *Transportable refillable fully wrapped composite cylinders for Liquefied Petroleum Gases (LPG) — Design and construction*

EN 14763, *LPG equipment and accessories — Transportable refillable composite cylinders for Liquefied Petroleum Gas (LPG) — Procedure for checking before, during and after filling*

prEN 14894, *LPG equipment and accessories — Cylinders and drum marking*

prEN 14912, *LPG equipment and accessories — Inspection and maintenance of LPG cylinder valves at time of periodic inspection of cylinders*

3 Terms and definitions

For the purpose of this European Standard, the following terms and definitions apply.

3.1

competent body

person or corporate body defined by the national authority, which by a combination of appropriate qualification, training, experience and resources is able to make objective judgements on the subject

3.2

competent person

person who by a combination of training, experience and supervision is able to make objective judgements on the subject

3.3

periodic inspection

activities carried out at defined intervals, such as examining, measuring, testing or gauging the characteristics of a cylinder and comparing these with specified requirements as defined in EN 14427 and marking to attest conformity

3.4

LPG (liquefied petroleum gas)

mixture of predominantly butane or propane with traces of other hydrocarbon gases classified in accordance with UN number 1965, hydrocarbon gases mixture, liquefied, NOS or UN number 1075, petroleum gases, liquefied

NOTE In some countries, UN number 1011, 1978 may also be designated LPG.

3.5

tare weight

sum of the mass of the empty cylinder, the mass of the valve including a dip tube where fitted, and the mass of all other parts that are permanently attached to the cylinder when it is being filled, e.g. fixed valve guard

3.6

casing

permanently attached sleeve covering part of or the whole of the pressure containing envelope usually incorporating a foot ring and a shroud

NOTE Permanently attached means that the casing cannot be removed during service without being destroyed, or by using special tools.

4 Written scheme of inspection

The determination of the interval between periodic inspections shall be dependent on the content of a written scheme that shall be approved by a competent authority as complying with the conditions outlined in Annex A.

NOTE The interval between periodic inspections shall be 5 years. Nevertheless, a longer interval may be agreed provided the requirements of Annex A are fully met.

The inspection procedures to be applied shall be selected from the alternatives given in Clause 5.

5 Procedures for periodic inspection

5.1 General

Procedures for periodic inspection shall consist of an external visual inspection as described in 5.2, an internal visual inspection as described in 5.3, and additionally, at least one of the procedures listed in 5.4. For transparent composite cylinders, the internal visual inspection may be made from outside.

Periodic inspections/tests shall be carried out under the responsibility of a body approved by a competent authority.

5.2 External visual inspection

5.2.1 Preparation

If required the cylinder shall be cleaned and have all labels, tar oil or other foreign matter removed from its external surface e.g. by water jet cleaning, chemical cleaning or other suitable methods.

Care shall be taken to avoid damaging the cylinder.

Cylinders rejected shall be segregated for rendering unserviceable.

NOTE In some countries, render unserviceable means scrapping.

5.2.2 Inspection procedure

The entire surface of the cylinder shall be inspected for:

- a) Cuts, gouges, bulges, cracks or de-laminations, applying the criteria for acceptance/rejection in 5.2.3.
- b) Other defects e.g. depressed bung or fire damage applying to the criteria for acceptance/rejection in Table 1.
- c) Integrity of all permanent attachments.
- d) The integrity of the mandatory permanent marking.

Any cylinder rejected by the competent person shall be segregated for scrapping.

5.2.3 Visible defects

The owner (or his authorized representative) shall provide to the filler acceptance/rejection criteria for physical and material defects and heat damage on the cylinder/casing.

Those criteria shall be at least those established by the manufacturer taking into account the design conditions of the cylinder type (e.g.: nature of the casing if any, nature and type of the fibre and of the resin system).

Rejection criteria for defects on cylinders are described in Table 1.

For rejection criteria described in Table 1, if applicable, the limit shall be defined in accordance with the following method:

- for each type of cylinder as defined in EN 14427:2004, A.2.1, the manufacturer shall provide samples;
- for each rejection criteria, the manufacturer shall provide at least 4 cylinders with the same defect. The size of this defect is recorded. If the defects of the cylinders are different sizes, the size of the smaller defect shall be recorded;
- two cylinders shall be submitted to the burst test (see EN 14427:2004, 5.2.5) and two cylinders shall be submitted to the pressure cycle test (see EN 14427:2004, 5.2.6);
- if the cylinders pass the tests, the defect is acceptable. The rejection limit can be defined by the size of that defect;
- when all rejection criteria have been established for a design of cylinder as defined in EN 14427:2004, A.2.1, Table 1 shall be completed by the owner/manufacturer of the cylinder. Annex B shows an example of a completed table.

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Table 1 —Acceptance/Rejection criteria

Defect	Description	Rejection limit
Abrasion damage or damage from cuts	Abrasion damage caused by wearing, grinding or rubbing material away by friction. Cuts or gouges caused by contact with sharp objects in such a way as to cut into the composite, reducing its thickness at that point.	See 5.2.3
De-lamination and impact damage	Inter-laminar de-lamination where there is a separation of layers of strands. Intra-laminar de-lamination where there is a separation between strands within the same layer. Impact damage appearing as hairline cracks in the resin or de-lamination or cuts of the composite material.	See 5.2.3
Chemical damage	Chemical attack appearing as the dissolution of the resin matrix surrounding the fibres, where the cylinder surface is sticky. If the casing is not drainable, chemical attack might appear inside the casing	See 5.2.3
Damage of casing	<p style="text-align: center;">SIST EN 14767:2006 https://standards.iteh.ai/catalog/standards/sist/4d98786c558b/sist-en-14767-2006</p>	Minor damage that does not affect the protecting function of the casing is acceptable. If it cannot be established that the cylinder is unaffected, the cylinder shall be put aside for further investigation. Unacceptable damage is, for example, a broken casing. The casing is then to be removed and the cylinder inspected underneath. A damaged cylinder shall be rejected. If the cylinder is not damaged, a new casing can be assembled.
Heat/fire damage of casing or cylinder	Heat or fire damage evident by discolouration, scarring or burning of the composite overwrap, casing, labels and non-metallic components of the valve.	See 5.2.3
Other defects		See 5.2.3, if applicable

NOTE 1 Inter-laminar de-lamination is a separation of layers of strands, while intra-laminar de-lamination is separation between strands within the same layer.

NOTE 2 For cylinders with liners, an area with no adhesion between liner and composite is not regarded as de-lamination.

5.3 Internal visual inspection

5.3.1 General

An internal visual inspection shall be performed to detect internal defects or presence of foreign matter in non-transparent cylinders.

5.3.2 Preparation of cylinders

- a) The cylinders shall be depressurized in a safe and controlled manner before proceeding.
- b) Cylinders with inoperative or blocked valves shall be brought to a place for safe valve removal.
- c) Valves shall be removed from cylinders. For inspection, maintenance and scrapping of cylinder valves see prEN 14912.
- d) Care shall be taken when clamping composite cylinders in order to avoid damage of the overwrapping.

5.3.3 Procedure

After removing, where necessary, residual liquid and any other foreign matter from the interior, cylinders shall be inspected internally for any signs of internal corrosion (for metallic liner) or other signs that may affect its integrity, using a safe inspection lighting system with appropriate internal illumination (e.g. an endoscope).

Cylinders showing signs of internal defects, e.g. cracks, damaged liner, internal corrosion or chemical attack, shall be scrapped. If cleaning is required, care shall be taken to avoid damaging the cylinder walls. Cylinders shall be re-inspected after cleaning.

5.4 Additional inspection /test procedures

5.4.1 General: preparation of cylinders

As a minimum:

- a) Cylinders with inoperative or blocked valves shall be brought to a place for safe valve removal.
- b) Valves shall be checked in accordance with prEN 14912 at every third periodic inspection (this assumes that the periodic inspection interval is 5 years).

5.4.2 Hydraulic proof pressure test

5.4.2.1 General

A liquid shall be used as the test medium, e.g. water or kerosene.

5.4.2.2 Preparation of cylinders

In addition to requirements in 5.4.1, the external surface of the cylinder shall be in such condition that any leak can be detected. If the cleaning method involves the wetting of the outside surface, the outside surface shall be completely dried before commencing the test procedure.

The cylinders shall be emptied of any liquid and depressurised in a safe and controlled manner before proceeding.

5.4.2.3 Test equipment

Pressure gauges that are used to read the cylinder test pressure shall be in accordance with EN 837-1 and EN 837-3 accuracy class 1,6 or better. They shall be calibrated or checked for accuracy against a master gauge at regular intervals and in any case not less frequently than once a month. The master gauge shall be re-calibrated in accordance with national requirements.

The design and installation of the equipment and the cylinders connected to it shall ensure that no air is trapped in the system.