



# SLOVENSKI STANDARD SIST EN 1440:1998

01-oktober-1998

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Transportable refillable welded steel cylinders for liquefied petroleum gas (LPG) -  
Periodic requalification

Ortsveränderliche, wiederbefüllbare geschweißte Flaschen aus Stahl für Flüssiggas -  
Regelmäßig wiederkehrende Prüfung

Bouteilles en acier soudé transportables et rechargeables pour gaz de pétrole liquéfié  
(GPL) - Requalification périodique

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Ta slovenski standard je istoveten z: EN 1440:1996

**ICS:**

23.020.30 V|æ } ^Á [ • [ á ^É ] ä • \ ^ Pressure vessels, gas  
b\ | ^ } \ ^ cylinders

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EUROPEAN STANDARD

EN 1440

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 1996

ICS 23.020.30

Descriptors: gas cylinders, liquefied petroleum gases, commercial butane, commercial propane, steels, welded construction, inspection, qualification, routine verification, defects, leak tests, repairs, marking

English version

**Transportable refillable welded steel cylinders for  
liquefied petroleum gas (LPG) - Periodic  
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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.

The European Standards exist 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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## Foreword

### iTeh STANDARD PREVIEW

This European Standard has been prepared by the Technical Committee CEN/TC 286 "Liquefied Petroleum Gas equipment and accessories" the secretariat of which is held by NSAI.

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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 March 1997, and conflicting national standards shall be withdrawn at the latest by March 1997.

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

## Introduction

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

The original periodic inspection and test procedures for transportable refillable welded steel LPG cylinders were based on those for other pressure vessels including those used for high pressure industrial gases. These early methods relied on a periodic hydraulic proof pressure test being carried out at intervals as frequent as two years (pre 1940). With increasing experience and confidence so gained, together with improved cylinder manufacturing quality it has been possible to allow the extension of the intervals between periodic tests to 15 years in many circumstances.

The very large populations of LPG cylinders in use have led to much automation in cylinder filling and control procedures, which in turn have led to the investigation of alternative methods of requalification. Requalification is normally carried out either at a test station operated under the responsibility of a marketing organisation or by a third party.

The specification has now been prepared to reflect the current state of the art for requalifying LPG cylinders, and is based upon the operating experience of many hundreds of millions of cylinder years service.

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.

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## 1 Scope

This European Standard specifies requalification intervals, procedures for requalification, inspection and testing, for transportable refillable welded steel LPG cylinders of water capacity from 0,5 l up to and including 150 l.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the test 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.

prEN 1442	Transportable refillable welded steel cylinders for liquefied petroleum gas (LPG) - design and construction.
EN 1439:1996	Transportable refillable welded steel cylinders for liquefied petroleum gas (LPG) - procedure for checking before, during and after filling.
ISO 8504	Preparation of steel substrates before application of paints and related products - Surface preparation methods

### 3 Definitions

For the purposes of this standard the following definitions apply:

#### 3.1 Competent body:

A person or corporate body defined by the national authority which by combination of appropriate qualification, training, experience and resources is able to make objective judgements on the subject [EN 1439].

#### 3.2 Competent person:

A person who by a combination of training, experience and supervision is able to make objective judgements on the subject [EN 1439].

#### 3.3 Requalification:

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 1440 and marking to attest conformity [EN 1439].

#### 3.4 Requalification test station:

A place where cylinders are tested and requalified [EN 1439].

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## 4 Intervals between periodic requalification

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### 4.1 General

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The determination of the interval between requalifications will be dependent on the content of a written scheme prepared by LPG marketing organisations who own or control the cylinders (See 4.2) and approved by a competent body.

### 4.2 Criteria

The following criteria shall be addressed:

4.2.1 Whether the cylinders are designed, manufactured and tested to prEN 1442, a national standard or an equivalent.

4.2.2 Whether there is a system of external protection against corrosion which is being maintained.

4.2.3 Whether the cylinders are being filled in accordance with the criteria contained in EN 1439, a national standard or an equivalent.

4.2.4 Whether the cylinders are filled with LPG of a quality in accordance with a specification/standard acceptable to a competent body, such that internal corrosion is not caused.

4.2.5 Whether the cylinders are under the control of any LPG marketing organisations responsible for their distribution, filling and maintenance. For the purposes of this standard, the concept of control of cylinders is as follows:

a) cylinders which are owned by any LPG marketing organisations which loan or hire them to distribution undertakings, consumers or other users under the following general conditions:

- 1) that they are to be returned for filling or maintenance to the owner or authorised distributor, or that they are to be exchanged for a full cylinder at a retail outlet serviced by the owner, or by another LPG distributor where arrangements have been made to ensure that they will be returned to the owner for filling and maintenance.
  - 2) that the owner has established appropriate filling and maintenance facilities under his control; or contracted with other organisations to provide such facilities.
  - 3) that the owner has a policy of taking all necessary measures to ensure that his cylinders are filled and maintained only at the facilities stated in 2).
- b) Cylinders which are not owned by, but the distribution, filling and maintenance of which are under the control of, an LPG marketing organisation which may contract the filling and maintenance to other organisations, ensuring that the cylinders are filled and maintained only as contracted in accordance with the procedures of that LPG marketing organisation.

4.3 When criteria 4.2.1 to 4.2.5 inclusive are fulfilled, a 15 year interval shall apply.

4.4 When criteria 4.2.1 and 4.2.2 are fulfilled, a 5 year interval shall apply.

4.5 When criteria 4.2.1 and 4.2.2 and at least one of either

- 4.2.3 or
- 4.2.4 or
- 4.2.5

are fulfilled, a 10 year interval shall apply.

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## 5 Procedures for requalification

5.1 The determination of the requalification procedures shall be dependent on the content of a written scheme prepared by any LPG marketing organisations who own or control the cylinders (see 4.2.5) and approved by a competent body.

### 5.2 Test procedures

In all cases, requalification procedures shall consist of an external visual inspection as given in 5.3 and additionally at least one of the following test procedures as agreed with a competent body.

- hydraulic test (see 5.4.1), or
- internal visual inspection (See 5.4.2) where the actual burst test pressure exceeds
  - a) 35 bar for commercial butane cylinders and
  - b) 70 bar for commercial propane cylinders, or
- pneumatic proof test and leak test (See 5.4.3)
- pneumatic leak test (See 5.4.4) where the actual burst test pressure exceeds
  - a) 35 bar for commercial butane cylinders and
  - b) 70 bar for commercial propane cylinders

### 5.3 External visual inspection

#### 5.3.1 Preparation for external visual inspection

If required, the cylinder shall be cleaned and have all loose coatings, corrosion products, tar, oil or other foreign matter removed from its external surface e.g. by steel wire brushing, shot blasting, e.g. in accordance with ISO 8504, water jet abrasive cleaning, chemical cleaning or other suitable methods.

Care shall be taken to avoid damaging the cylinder.

#### 5.3.2 Inspection procedure.

The entire surface of the cylinder shall be inspected for:

- a) dents, cuts, gouges, bulges, cracks, laminations or punctures applying the guidelines for rejection in **table 1**;
- b) corrosion, giving special attention to areas where water can be trapped, to the base of the cylinder, and to the junction between the body and the foot ring and the body and the valve guard or shroud in particular hidden corrosion e.g. data plate, applying the guidelines for rejection in **table 2**;
- c) Other defects e.g. depressed bung or fire damage applying the guidelines for rejection in **table 3**;
- d) integrity of all permanent attachments.

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

#### 5.3.3 Visible defects

Rejection criteria guidelines for physical and material defects on the cylinder shell are contained in the **Tables 1, 2 and 3**.

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Table 1

Defects	Description	Rejection limit
Bulge	Visible swelling of the cylinder	All
Dent	A depression in the cylinder that has neither penetrated or removed metal, and its width at any point is greater than 2% of the external cylinder diameter	When the depth of the dent exceeds one fourth of its width at any point. Consideration of appearance and location also plays a part in the evaluation of dents.
Cut or gouge	A sharp impression where metal has been removed or re-distributed.	Where the original calculated wall thickness is known, where depth of cut or gouge is such that the undamaged inner wall is less than the minimum thickness. Where the original calculated wall thickness is not known - all are rejected.
Intersecting cut or gouge	The point of intersection of two or more cuts or gouges.	All
Dent containing cut or gouge	A depression in the cylinder within which there is a cut or gouge.	When the size of the dent or cut or gouge approaches the dimensions for rejection as an individual defect.
Crack	A split or rift in the cylinder shell.	All SIST EN 1440:1998
Lamination	Lamination may show itself in the form of crack or bulge.	All <a href="https://standards.iteh.ai/catalog/standards/sist/275c619e-740c-454e-8c1f-e9afe446ed89/sist-en-1440-1998">https://standards.iteh.ai/catalog/standards/sist/275c619e-740c-454e-8c1f-e9afe446ed89/sist-en-1440-1998</a>