



NSAI
Standards

Irish Standard
I.S. EN 1442:2017

LPG equipment and accessories - Transportable refillable welded steel cylinders for LPG - Design and construction

I.S. EN 1442:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 1442:2017

Published:

2017-05-10

This document was published under the authority of the NSAI and comes into effect on:

2017-05-28

ICS number:

23.020.35

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN 1442:2017 is the adopted Irish version of the European Document EN 1442:2017, LPG equipment and accessories - Transportable refillable welded steel cylinders for LPG - Design and construction

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

EN 1442

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2017

ICS 23.020.35

Supersedes EN 1442:2006+A1:2008

English Version

LPG equipment and accessories - Transportable refillable welded steel cylinders for LPG - Design and construction

Équipements pour GPL et leurs accessoires - Bouteilles en acier soudé transportables et rechargeables pour gaz de pétrole liquéfiés (GPL) - Conception et fabrication

Flüssiggas-Geräte und Ausrüstungsteile - Ortsbewegliche, wiederbefüllbare, geschweißte Flaschen aus Stahl für Flüssiggas (LPG) - Auslegung und Bau

This European Standard was approved by CEN on 20 February 2017.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	5
Introduction	6
1 Scope.....	7
2 Normative references.....	7
3 Terms, definitions and symbols.....	8
3.1 Terms and definitions	8
3.2 Symbols.....	9
4 Materials.....	10
5 Design.....	11
5.1 General requirements	11
5.2 Calculation of cylindrical shell thickness.....	12
5.3 Design of torispherical and semi-ellipsoidal ends concave to pressure.....	12
5.4 Design of ends of shapes other than torispherical and semi-ellipsoidal.....	16
5.5 Minimum wall thickness.....	16
5.6 Design of openings.....	17
5.7 Valve protection	17
5.8 Non-pressure containing attachments.....	17
5.9 Over-moulded cylinders.....	17
6 Construction and workmanship	17
6.1 General.....	17
6.2 Welding qualification	18
6.3 Plates and formed parts.....	18
6.4 Welded joints.....	18
6.5 Tolerances	20
6.5.1 Out-of-roundness	20
6.5.2 Straightness.....	20
6.5.3 Verticality.....	20
6.6 Closure of openings	20
6.7 Heat treatment.....	20
7 Tests and examinations.....	21
7.1 General.....	21
7.2 Types of test and evaluation of test results	21
7.3 Test specimens and related tests and examinations	22
7.3.1 All cylinders	22
7.3.2 Two-piece cylinders.....	22
7.3.3 Three-piece cylinders.....	23
7.3.4 Valve boss welds.....	25
7.4 Tensile test	25
7.4.1 Parent metal.....	25
7.4.2 Welds	25
7.5 Bend test.....	25
7.5.1 Procedure.....	25
7.5.2 Requirements.....	26

7.6	Burst test under hydraulic pressure	28
7.6.1	Procedure	28
7.6.2	Requirements.....	28
7.7	Pressure test.....	29
7.7.1	Procedure	29
7.7.2	Requirements.....	29
7.8	Radiographic examination	30
7.8.1	Procedure	30
7.8.2	Assessment.....	31
7.8.3	Requirements.....	31
7.9	Macro examination	31
7.9.1	Procedure	31
7.9.2	Requirement.....	31
7.10	Visual examination of the surface of the weld	32
7.10.1	Procedure	32
7.10.2	Requirements.....	32
7.11	Fatigue test.....	32
7.11.1	Procedure	32
7.11.2	Requirements.....	32
8	Technical requirements for type approval	32
8.1	General	32
8.2	Extent of testing.....	33
8.3	Cylinder types	33
8.4	Type approval certificate.....	34
9	Initial inspection and tests.....	34
9.1	Tests and examinations applicable to all cylinders	34
9.2	Radiographic examination	34
9.3	Macro examination	35
9.4	Examination of valve boss weld	35
9.5	Examination of non-pressure containing attachment welds.....	35
9.6	Unacceptable imperfections found by the radiographic or macro examinations	35
9.7	Production batch testing (mechanical / burst tests).....	35
9.7.1	Production batch	35
9.7.2	Inspection lots.....	36
9.7.3	Rate of sampling.....	36
9.7.4	Verification of conformance with type approval	37
9.8	Failure to meet mechanical and burst test requirements	37
9.8.1	Mechanical	37
9.8.2	Burst.....	38
9.8.3	Production batch retest.....	38
9.8.4	Resubmission of a production batch	38
9.8.5	Weld repairs	38
10	Marking	39
11	Documentation	39
12	Certificate	39
Annex A (normative) Standard specific marking.....		40
Annex B (normative) Over-moulded cylinders.....		41
B.1	Over-moulded cylinder case design.....	41
B.2	Tests and examinations.....	41

EN 1442:2017 (E)

B.2.1	General	41
B.2.2	Types of additional test and evaluation of results	42
B.2.3	Coated cylinder - resistance to external corrosion	42
B.2.3.1	Procedure	42
B.2.3.2	Requirements	42
B.2.4	Over-moulding adhesion test procedure	44
B.2.4.1	General	44
B.2.4.2	Preparation	44
B.2.4.3	Breaking strength	44
B.2.4.4	Results	44
B.2.4.5	Test report	44
B.2.4.6	Requirements	45
B.2.5	Over-moulding material requirements	45
B.2.6	Additional technical requirements for type approval	46
B.2.7	Additional initial inspection and tests	46
B.2.7.1	Production adhesion test for over-moulded cylinders	46
B.2.7.2	Production water absorption test	47
B.3	Over-moulded cylinder identification system	47
B.3.1	Requirements	47
B.4	Certification	48
	Annex C (informative) Example of over-moulded cylinder	49
	Bibliography	50

European foreword

This document (EN 1442:2017) has been prepared by Technical Committee CEN/TC 286 “LPG 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 November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1442:2006+A1:2008.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

All stages of the manufacture, distribution and disposal of these cylinders may have an effect on the environment. CEN/TS 16765 [1] sets out environmental considerations for this European Standard.

This European Standard has been submitted for reference into the RID [4] and/or in the technical annexes of the ADR [5]. Therefore 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 [4] and/or in the technical annexes of the ADR [5].

NOTE These regulations take precedence over any clause of this European Standard. It is emphasized that RID/ADR are being revised regularly at intervals of two years which may lead to temporary non-compliances with the clauses of this European Standard.

This European Standard has been extensively re-formatted to align with other more recent LPG cylinder standards.

The main technical changes include:

- the inclusion of over-moulded cylinders; and
- re-establishing 50 bar as the minimum burst pressure.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 1442:2017 (E)

Introduction

This European Standard calls for the use of substances and procedures that may 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.

All pressures are gauge pressures unless otherwise stated.

NOTE This European Standard requires measurement of material properties, dimensions and pressures. All such measurements are subject to a degree of uncertainty due to tolerances in measuring equipment, etc. It may be beneficial to refer to the leaflet “measurement uncertainty leaflet (SP INFO 2000 27 uncertainty pdf)” [7].

1 Scope

This European Standard specifies the minimum requirements for the design, construction and testing during manufacture of transportable refillable welded steel Liquefied Petroleum Gas (LPG) cylinders, of water capacity from 0,5 l up to and including 150 l.

This European Standard applies only to cylinders having a circular cross-section.

Cylinders designed and constructed to the requirements of this European Standard may be over-moulded; additional requirements for these cylinders are set out in Annex B.

2 Normative references

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

EN 10120, *Steel sheet and strip for welded gas cylinders*

EN 10204, *Metallic products - Types of inspection documents*

EN 14784-1, *Non-destructive testing - Industrial computed radiography with storage phosphor imaging plates - Part 1: Classification of systems*

EN 14784-2, *Non-destructive testing - Industrial computed radiography with storage phosphor imaging plates - Part 2: General principles for testing of metallic materials using X-rays and gamma rays*

EN 14894, *LPG equipment and accessories - Cylinder and drum marking*

EN ISO 14245, *Gas cylinders - Specifications and testing of LPG cylinder valves - Self-closing (ISO 14245)*

EN ISO 15995, *Gas cylinders - Specifications and testing of LPG cylinder valves - Manually operated (ISO 15995)*

EN ISO 643, *Steels - Micrographic determination of the apparent grain size (ISO 643)*

EN ISO 2409, *Paints and varnishes - Cross-cut test (ISO 2409)*

EN ISO 2812-2, *Paints and varnishes - Determination of resistance to liquids - Part 2: Water immersion method (ISO 2812-2)*

EN ISO 3231:1997, *Paints and varnishes - Determination of resistance to humid atmospheres containing sulfur dioxide (ISO 3231:1993)*

EN ISO 4136, *Destructive tests on welds in metallic materials - Transverse tensile test (ISO 4136)*

EN ISO 4624, *Paints and varnishes - Pull-off test for adhesion (ISO 4624)*

EN ISO 5173, *Destructive tests on welds in metallic materials - Bend tests (ISO 5173)*

EN ISO 5817, *Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections (ISO 5817)*

EN ISO 6520-1, *Welding and allied processes - Classification of geometric imperfections in metallic materials - Part 1: Fusion welding (ISO 6520-1)*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-