

LPG equipment and accessories - Transportable
refillable brazed steel cylinders for liquefied petroleum
gas (LPG) - Design and construction

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 12807:2019 sisaldab Euroopa standardi EN 12807:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 12807:2019 consists of the English text of the European standard EN 12807:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 10.07.2019.	Date of Availability of the European standard is 10.07.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 23.020.35

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN 12807

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2019

ICS 23.020.35

Supersedes EN 12807:2009

English Version

**LPG equipment and accessories - Transportable refillable
brazed steel cylinders for liquefied petroleum gas (LPG) -
Design and construction**

Équipement et accessoires pour GPL - Bouteilles
transportables et rechargeables en acier brasé pour
gaz de pétrole liquéfié (GPL) - Conception et
fabrication

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

This European Standard was approved by CEN on 15 March 2019.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, 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: Rue de la Science 23, B-1040 Brussels

Contents		Page
European foreword.....		4
Introduction		5
1	Scope.....	6
2	Normative references.....	6
3	Terms, definitions and symbols.....	7
3.1	Terms and definitions	7
3.2	Symbols.....	7
4	Materials.....	8
5	Design	9
5.1	General requirements	9
5.2	Calculation of cylindrical shell thickness.....	10
5.3	Design of torispherical and semi-ellipsoidal ends concave to pressure.....	10
5.4	Design of ends of shapes other than torispherical and semi-ellipsoidal.....	14
5.5	Minimum wall thickness.....	14
5.6	Design of openings.....	15
5.7	Valve protection	15
5.8	Non-pressure containing attachments.....	15
6	Construction and workmanship	15
6.1	Brazing qualification.....	15
6.2	Plates and pressed parts	16
6.3	Brazed joints.....	16
6.4	Tolerances	16
6.4.1	Out of roundness	16
6.4.2	Straightness.....	17
6.4.3	Verticality.....	17
6.5	Heat treatment.....	17
6.6	Protective coating.....	17
6.7	Closure of openings	17
7	Tests and examinations.....	17
7.1	General.....	17
7.2	Types of test and evaluation of the test results.....	17
7.3	Material testing.....	18
7.4	Tensile test	19
7.4.1	Parent material.....	19
7.4.2	Joints	20
7.5	Bend test.....	20
7.5.1	Procedure.....	20
7.5.2	Requirements	21
7.6	Burst test under hydraulic pressure.....	22
7.6.1	Procedure.....	22
7.6.2	Requirements	23
7.7	Pressure test.....	24
7.7.1	Procedure.....	24
7.7.2	Requirements.....	24

7.8	Ultrasonic examination	24
7.8.1	Procedure	24
7.8.2	Assessment	24
7.8.3	Requirements	24
7.9	Macro examination	24
7.9.1	Procedure	24
7.9.2	Requirements	25
7.10	Visual examination of the surface of the joint	25
7.10.1	Procedure	25
7.10.2	Requirements	25
7.11	Fatigue test	25
7.11.1	Procedure	25
7.11.2	Requirement	25
8	Technical requirements for type approval	25
8.1	Extent of testing	25
8.2	Cylinder types	26
8.3	Type approval certificate	26
9	Production testing and examination requirements	27
9.1	Tests and examinations applicable to all cylinders	27
9.2	Ultrasonic examination	27
9.3	Macro examination	27
9.4	Examination of the valve boss joint	27
9.5	Examination of non-pressure containing joints	27
9.6	Unacceptable imperfections found by the ultrasonic or macro examinations	28
9.7	Batch testing (Mechanical / Burst tests)	28
9.7.1	Batch	28
9.7.2	Inspection lots	28
9.7.3	Rate of sampling	28
9.7.4	Additional checks	29
9.8	Failure to meet mechanical and burst test requirements	30
9.8.1	Mechanical	30
9.8.2	Burst	30
9.8.3	Re-test	30
9.8.4	Resubmission of an inspection lot	30
10	Marking	31
11	Certificates	31
	Bibliography	32

European foreword

This document (EN 12807:2019) 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 January 2020, and conflicting national standards shall be withdrawn at the latest by January 2020.

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 12807:2009.

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

The main technical changes include the updating of:

- the normative references;
- the environmental considerations; and
- definitions.

This document has been submitted for reference into the RID [6] and/or in the ADR [5].

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

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document 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 document that the execution of its provisions is entrusted to appropriately qualified and experienced people.

All pressures are gauge unless otherwise stated.

NOTE This document 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 document specifies the minimum requirements for the design, construction and testing during manufacture of transportable refillable brazed steel Liquefied Petroleum Gas (LPG) cylinders, of water capacity from 0,5 l up to and including 15 l, exposed to ambient temperatures.

This document applies only to cylinders having a circular cross-section without any longitudinal joint.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1044¹, *Brazing — Filler metals*

EN 10002-1², *Metallic materials - Tensile testing — Part 1: Method of test at ambient temperature*

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

EN 12797, *Brazing — Destructive tests of brazed joints*

EN 12799:2000, *Brazing — Non-destructive examination of brazed joints*

EN 13134, *Brazing — Procedure approval*

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

CEN/TS 16765, *LPG equipment and accessories — Environmental considerations for CEN/TC 286 standards*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

EN ISO 11117:2008, *Gas cylinders — Valve protection caps and valve guards — Design, construction and tests (ISO 11117:2008)*

EN ISO 11363-1, *Gas cylinders - 17E and 25E taper threads for connection of valves to gas cylinders - Part 1: Specifications (ISO 11363-1)*

EN ISO 13585, *Brazing — Qualification test of brazers and brazing operators (ISO 13585)*

EN ISO 17672, *Brazing — Filler metals (ISO 17672)*

¹ This standard has been withdrawn and was replaced by EN ISO 17672.

² This standard has been withdrawn and was replaced by EN ISO 6892-1.