SLOVENSKI STANDARD
SIST EN 17613:2022

01-september-2022

Oprema in pribor za utekočinjeni naftni plin (UNP) - Cevni sistemi iz kompozitnih materialov za UNP v tekoči in plinski fazi - Konstruiranje in izdelava

LPG equipment and accessories - Composite piping for use with LPG in liquid phase and vapour pressure phase - Design and manufacture

Flüssiggas-Geräte und Ausrüstungsteile - Verrohrung aus Verbundwerkstoffen zum Einsatz mit LPG in der Flüssig- und Gasdruck-Phase - Auslegung und Herstellung

Équipements pour gaz de pétrole liquéfié et leurs accessoires - Canalisations composites pour GPL en phase liquide et phase vapeur - Conception et fabrication

Ta slovenski standard je istoveten z: **EN 17613:2022**

ICS:

23.040.01	Deli cevovodov in cevovodi na splošno	Pipeline components and pipelines in general

SIST EN 17613:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 17613

August 2022

ICS 23.040.01

English Version

LPG equipment and accessories - Composite piping for use with LPG in liquid phase and vapour pressure phase - Design and manufacture

Équipements pour gaz de pétrole liquéfié et leurs accessoires - Canalisations composites pour GPL en phase liquide et phase vapeur - Conception et fabrication

Flüssiggas-Geräte und Ausrüstungsteile - Verrohrung aus Verbundwerkstoffen zum Einsatz mit LPG in der Flüssig- und Gasdruck-Phase - Auslegung und Herstellung

This European Standard was approved by CEN on 22 May 2022.

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, Türkiye 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

Ref. No. EN 17613:2022 E

Contents

Page

European foreword

This document (EN 17613:2022) 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 February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.

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.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

This document calls for the use of substances and procedures that may be injurious to health and/or the environment if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations at any stage.

This document is intended for users who take on the responsibility for the manufacturing of composite pipe.

Protection of the environment is a key political issue in Europe and elsewhere. For CEN/TC 286 this is covered in CEN/TS 16765 [1] and this Technical Specification should be read in conjunction with this document. This document provides guidance on the environmental aspects to be considered regarding equipment and accessories produced for the LPG industry and the following is addressed:

a) design;

b) manufacture;

c) packaging;

d) use and operation; and

e) disposal.

It is recommended that manufacturers develop an environmental management policy. For guidance see EN ISO 14004 [2]. 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 uses 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 could be beneficial to refer to the leaflet “measurement uncertainty leaflet (SP INFO 2000 27 uncertainty.pdf)” [9].

1 Scope

This document specifies requirements for the design, manufacture and testing of composite pipe for use with LPG in liquid phase and vapour pressure phase.

This document is applicable to LPG composite pipe having a maximum allowable pressure of less than or equal to 25 bar.

This document applies to pipe made from thermoplastics, which can include some degree of reinforcement.

It does not apply to fibre reinforced thermosets, commonly referred to as glass fibre reinforced plastic (GRP), nor rigid metals or corrugated metal pipe or hoses to EN ISO 10380 [6].

For the purpose of this document, composite pipe refers to the design requirements below:

a) Design 1: PE-based thick-walled pipe with multi-layer design without additional reinforcement than the wall thickness of the PE;

b) Design 2: Nylon-based multi-layer design with a polyester or aramid braid for reinforcement.

NOTE For installation of composite pipework systems, see EN 16125.

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 549, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

EN 1555-1, *Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 1: General*

EN 1555-2, *Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 2: Pipes*

EN 1555-3, *Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 3: Fittings*

EN 1555-4, *Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 4: Valves*

EN 1555-5, *Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 5: Fitness for purpose of the system*

EN 10088-1, *Stainless steels - Part 1: List of stainless steels*

EN 14125:2013, *Thermoplastic and flexible metal pipework for underground installation at petrol filling stations*

EN 14427:2022, *LPG equipment and accessories - Transportable refillable fully wrapped composite cylinders for LPG - Design and construction*

CEN/TS 16769, *LPG equipment and accessories - Terminology*

EN 60243-2, *Electric strength of insulating materials - Test methods - Part 2: Additional requirements for tests using direct voltage*

CLC/TR 60079-32-1, *Explosive atmospheres - Part 32-1: Electrostatic hazards, guidance*

EN ISO 8031, *Rubber and plastics hoses and hose assemblies - Determination of electrical resistance and conductivity (ISO 8031)*

EN ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 1: General method (ISO 1167-1)*

EN ISO 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 2: Preparation of pipe test pieces (ISO 1167-2)*

EN ISO 1167-3, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 3: Preparation of components (ISO 1167-3)*

EN ISO 1167-4, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 4: Preparation of assemblies (ISO 1167-4)*

ISO 11922-1, *Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances — Part 1: Metric series*

ISO 15105-2, *Plastics — Film and sheeting — Determination of gas-transmission rate — Part 2: Equal-pressure method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TS 16769 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
design temperature
T_{des}
for each design condition, maximum fluid temperature that can be reached during service

[SOURCE: ISO 14692-1:2017, 3.2.18 [8]]

3.2
fitting
pressure containing component fitted to an LPG pressure system

3.3
liquefied petroleum gas
LPG
low pressure liquefied gas composed of one or more light hydrocarbons which are assigned to UN 1011, UN 1075, UN 1965, UN 1969 or UN 1978 only and which consists mainly of propane, propene, butane, butane isomers, butene with traces of other hydrocarbon gases

3.4
maximum allowable pressure
maximum pressure for which the equipment is designed

Note 1 to entry: All pressures are gauge pressures unless otherwise stated.

4 Materials

All materials in contact with LPG shall be physically and chemically compatible with LPG under all operating conditions for which the pipe is designed.

Materials for pipe shall be selected to give adequate strength in service.

Materials and components shall comply with one or more of the following standards: EN 1555-1, EN 1555-2, EN 1555-3, EN 1555-4, EN 1555-5, ISO 11922-1, EN 10088-1 and EN 549.

5 Design criteria

Pipe used in accordance with this document shall be suitable for the following conditions:

— a minimum operating temperature of −20 °C. In service, temperatures below this can be encountered during short periods, for example, when filling. In some parts of Europe and in certain applications where a lower temperature than −20 °C can be encountered, the minimum design temperature shall be −20 °C;

— a maximum working temperature of +40 °C for above ground pipe and +40 °C for underground pipe;

— the design pressure for the parts subject to pressure, other than the pressure vessel and its pressure relief valve, is at least 25 bar;

— transportation and storage temperatures between −20 °C and +40 °C; and

— an estimated working life of at least 25 years.

NOTE 1 Vacuum conditions on the pipe arising from butane at low temperature or evacuation of the pipe can expose the pipe to a vacuum of 50 mbar absolute. The minimum pressure to which pipe is normally exposed is −1 bar.

NOTE 2 For design of composite pipework system installation refer to EN 16125.

All above ground pipe shall be limited in length, protected from sunlight, protected from mechanical damage, and primarily protrudes above ground for connection to other systems and equipment.

6 Environmental considerations

The manufacturer should acquire materials and components from suppliers who have a declared environmental policy, see EN ISO 14021 [3], EN ISO 14024 [4] and EN ISO 14025 [5].

7 Testing

7.1 General

7.1.1 Introduction

All tests shall be completed using appropriately designed couplings.

7.1.2 Number of samples

Three samples shall be used for each test. Unless otherwise specified, the samples shall be assemblies consisting of lengths of pipe, which shall have a minimum free length of 375 mm or three times the external diameter, whichever is the greater, together with examples of the connectors as appropriate. Connectors shall be fitted in accordance with the manufacturer's instructions.

7.1.3 Combined tests

For the sake of efficiency tests may be combined.

EXAMPLE The LPG compatibility test can be performed after a completed permeation test.

7.1.4 Protocol for retesting

Retesting shall be subject to the criteria outlined in Table 1.

Table 1 — Retesting criteria

Number of failures	Action
0	Product passes the test
1	Retest with 3 new samples. If any of the new samples fail, the product fails the test
2 or 3	Product fails the test

7.1.5 Summary of tests

A summary of the required tests is given in Table 2.

Table 2 — Summary of tests

	Type of test	Clause below	Description	# of samples	Requirements	Standard reference
1	Internal burst pressure	7.2.1		3	Burst pressure > 100 bar	
2	Hydrostatic strength test	7.2.2		3	1 000 hrs @ 80 °C @ 20 bar internal pressure without failure	
3	Fatigue test	7.2.3	Cycle test varied pressure between 3 bar and 30 bar	3	12 000 cycles without failure	EN 14427:2022, 5.2.6
4	Fitting pull-out test	7.2.4	Tensile load	3	5 mins without failure @ 4 000 N	EN 14125:2013, 7.2.11
6	Puncture resistance	7.2.5		3	Withstand > 25 bar pressure test for 5 min after applied tip load of 500 N @ 23 °C	EN 14125:2013, 7.2.7.2 and 7.1.3
7	Permeation test	7.2.6	Mass loss method or Film test method	3	< 0,25 g m^{-2} d^{-1}	ISO 15105-2 for Film Test
8	LPG compatibility	7.2.7	Internal burst test	3	Burst pressure > 100 bar after exposure to test liquid	
9	Static electricity	7.3.3	Dielectric strength	3	> 100 kV electrical breakthrough strength	EN 60243-2