SLOVENSKI STANDARD
SIST EN 13175:2003

01-december-2003

Specifikacija in preskušanje ventilov in fitingov za rezervoarje za utekočinjeni naftni plin (UNP)

Specification and testing for Liquefied Petroleum Gas (LPG) tank valves and fittings

Spezifikation und Prüfung für Armaturen und Ausrüstungsteile von Flüssiggasbehältern

Spécifications et essais des équipements et accessoires des réservoirs pour gaz de pétrole liquéfié (GPL)

Ta slovenski standard je istoveten z: EN 13175:2003

ICS:

23.020.10	Nepremične posode in rezervoarji	Stationary containers and tanks
23.060.01	Ventili na splošno	Valves in general
75.180.01	Oprema za industrijo nafte in zemeljskega plina na splošno	Equipment for petroleum and natural gas industries in general

SIST EN 13175:2003 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13175

April 2003

ICS 23.060.01

English version

Specification and testing for Liquefied Petroleum Gas (LPG) tank valves and fittings

Spécifications et essais des équipements et accessoires des réservoirs pour gaz de pétrole liquéfié (GPL)

Spezifikation und Prüfung für Armaturen und Ausrüstungsteile von Flüssiggasbehältern

This European Standard was approved by CEN on 12 December 2002.

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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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 13175:2003 E

Contents

Foreword

This document (EN 13175:2003) has been prepared by 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of an identical text or by endorsement, at the latest by October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) and the objectives of the framework Directives on Transport of Dangerous Goods.

The 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 the present standard are normative only when the standards themselves are referred to the in the RID and/or in the technical annexes of the ADR.

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

Annexes A, B and C are normative.

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

1 Scope

This European Standard specifies minimum requirements for the design and testing of valves, including appropriate fittings, which are connected to mobile or static LPG tanks above 150 litre water capacity. Pressure relief valves and their ancillary equipment, contents gauges and automotive LPG components are outside the scope of this European Standard.

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 text, 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 (including amendments).

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

EN 837-1, *Pressure gauges – Part 1: Bourdon tube pressure gauges - Dimensions, metrology, requirements and testing.*

EN 1092–1, *Flanges and their joints – Circular flanges for pipes, valves, fittings and accessories, PN designated – Part 1: Steel flanges.*

EN 1267, *Valves – Test of flow resistance using water as test fluid.*

EN 1503-1, *Valves – Materials for bodies, bonnets and covers – Part 1: Steels specified in European Standards.*

EN 1503-2, *Valves – Materials for bodies, bonnets and covers – Part 2: Steels other than those specified in European Standards.*

EN 1503-3, *Valves – Materials for bodies, bonnets and covers – Part 3: Cast Irons specified in European Standards.*

EN 1503-4, *Valves – Materials for bodies, bonnets and covers – Part 4: Copper alloys specified in European Standards.*

EN 1563, *Founding – Spheroidal graphite cast irons.*

prEN 1983, *Industrial valves – Steel ball valves.*

EN 10270-3, *Steel wire for mechanical springs – Part 3: Stainless spring steel wire.*

EN 12164, *Copper and copper alloys – Rod for free machining purposes.*

prEN 12360, *Industrial valves – Copper alloy globe valves.*

EN 12420, *Copper and copper alloys – Forgings.*

prEN 12516-1, *Industrial valves – Shell design strength – Part 1: Tabulation method for steel valves.*

prEN 12516-2, *Industrial valves – Shell design strength – Part 2: Calculation method for steel valves.*

prEN 12516-3, *Valves – Shell design strength – Part 3: Experimental method.*

prEN 13547, *Industrial valves – Copper alloy ball valves.*

prEN 13709, *Industrial valves – Steel globe and globe stop and check valves.*

prEN 13789, *Industrial valves – Cast iron globe valves.*

EN 13906, *Cylindrical helical springs made from round wire and bar – Calculation and design.*

EN 50014, *Electrical apparatus for potentially explosive atmospheres – General requirements.*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation.*

ISO 2859-1, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.*

ISO 6957, *Copper alloys – Ammonia test for stress corrosion resistance.*

ANSI/ASME B1.20.1 – 1983, *Pipe threads, general purpose (inch) issued by American National Standards Institute on 19983.*

ASME B1.5 – 1990, *ACME Screw Threads issued by American Society of Mechanical Engineers on 1990.*

3 Terms and definitions

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

3.1
LPG
mixture of light hydrocarbons, gaseous under standard atmospheric conditions, which can be liquefied by increased pressure or decreased temperature. The main components are propane, propene, butane and butene isomers

3.2
self closing valve
normally closed valve that provides a leak tight seal and opens by the engagement of a special connector or by fluid passing through it. It closes automatically upon removal of the connector or by stopping the fluid flow

3.3
sealing element
element used to provide internal leak tightness

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

3.5
internal leak tightness
resistance to leakage across the valve seal or other internal sealing components when the valve is closed

3.6
excess flow valve
valve designed to close automatically, with a small residual flow, when the fluid flow passing through it exceeds a predetermined value, and to re-open when the pressure differential across the valve has been restored below a certain value

3.7
non return valve
valve designed to close automatically to restrict reverse flow

3.8
residual flow
allowable flow past the seat of an excess flow valve or a non return valve, when the valve is in the closed position

3.9
shut-off valve
valve to provide a leak-tight seal which is operated either manually, remotely or is self-closing

3.10
filler valve
valve system for liquid fill service

3.11
occasional liquid withdrawal valve
normally blanked valve, used for occasional liquid withdrawal which is designed to be opened by the engagement of a special connector valve

3.12
internal valve
valve which has its seal within the profile of the tank

3.13
vapour equalising valve
valve which permits vapour to flow in either direction in order to equalise vapour pressure between tanks during liquid transfer, and which incorporates an excess flow valve and a self closing valve opened by a special connector valve.

3.14
multipurpose valve
valve which incorporates two or more service functions and which meets the combined requirements of the individual functions

3.15
breakaway coupling
coupling which separates at a predetermined section when required and each separated section contains a self-closing shut-off valve, which seals automatically

3.16
test pressure
pressure at which the valve, fitting or component is tested

NOTE All pressures are gauge pressures unless otherwise stated.

3.17
plug
component which seals a female connection

3.18
cap
component which seals a male connection

3.19
fitting
pressure containing component fitted to an LPG pressure system

3.20
STP
Standard Temperature and Pressure [15,6 °C (288,7 K), 1,013 bar absolute (0,1013 MPa absolute)]

4 Operating conditions

Valves and fittings designed in accordance with this standard shall be suitable for the following conditions:

— a minimum operating temperature of minus 20 °C. In service, temperatures below this can be encountered during short periods, for example, when filling;

— for some parts of Europe and certain applications, temperatures lower than minus 20 °C can be encountered, for these conditions the requirements of annex B shall be met;

— the maximum operating temperature is 65 °C. The maximum allowable pressure for valves or fittings is 25 bar;

— the minimum pressure to which a valve or fitting is normally exposed is 0 bar. Vacuum conditions on the valve, arising from butane at low temperature or evacuation of the tank may expose the valve or fitting to a vacuum of 50 mbar absolute.

5 Materials

5.1 General

5.1.1 All materials in contact with LPG shall be physically and chemically compatible with LPG under all normal operating conditions for which the valve or fitting is intended to be used.

5.1.2 Materials for valve components shall be selected to give adequate strength in service. Consideration shall also be given to other modes of failure such as atmospheric corrosion, brass dezincification, stress corrosion, impact or material failure.

5.1.3 Alternative materials to those listed in 5.2 are not precluded, providing they comply with a standard or specification that ensures control of chemical and physical properties and quality appropriate to the end use.

5.2 Metallic materials

5.2.1 Valves and fittings shall be made from steel, stainless steel, copper alloys or other suitable materials.

5.2.2 For pressure containing components steel and stainless steels shall comply with EN 1503-1 or EN 1503-2, cast iron shall comply with EN 1503-3 and copper alloys shall comply with EN 1503-4.

Materials for steel flanges shall be in accordance with EN 1092-1.

5.2.3 Components made from stainless steel shall contain not less than 17 % chromium, and not less than 7 % nickel.

Springs shall be manufactured from stainless steel in accordance with EN 10270-3 or material with an equivalent resistance to corrosion.

5.2.4 Hot stamped brass shall be non-porous and shall be suitable for machining or other process.

Leaded brass shall be CW614N or CW617N in accordance with EN 12420 or EN 12164. Sand-cast brass shall not be used.

Cold drawn brass rods up to 45 mm in cross-section shall only be used after heat treatment and adequate testing for internal cracking. Cold drawn brass rods greater than 45 mm in cross-section shall not be used.

Components produced from stamping brass shall not exhibit cold shuts also known as folds, or surface defects.

5.2.5 Spheroidal graphite cast iron shall comply with EN 1563, with an elongation at fracture of more than 18 %. Other ductile irons or cast irons shall not be used.

5.2.6 Castings shall be free from inclusions and surface defects, which could adversely affect the strength, leak tightness or performance of the valve or fitting.

5.3 Non-metallic components

All non-metallic materials in contact with LPG shall be compatible with LPG and shall not distort, harden or adhere to the body or seat face to such an extent as to impair the function of the valve. They shall also comply with the appropriate requirements of EN 549.

All elastomeric materials in contact with LPG shall meet the specific requirements of EN 549 for resistance to the following:

— gas (pentane test);

— lubricants;

— ageing;

— low temperature;

— high temperature;

— compression;

— ozone (where gasket/seal is exposed to atmosphere).

5.4 Lubricants, sealants, and adhesives

When in contact with LPG, lubricants, sealants and adhesives shall be compatible with LPG, and shall not interfere with the normal operation of the valve or fitting.

6 Design – general requirements

6.1 General

6.1.1 All valves and fittings shall be capable of withstanding the tests specified in Table 1 where appropriate.

6.1.2 Moving parts shall have sufficient clearance to ensure freedom of movement under all normal conditions of service. Where necessary, means of guidance shall be provided to ensure correct seating or sealing.

6.1.3 All components vital to the function of a valve or fitting shall be secured to prevent disassembly during normal operation.

6.1.4 Valves and fittings shall be designed to ensure external and internal leak tightness, and its function shall not be affected, as a result of vibration during transportation.

6.1.5 The design shall take account of the use of dissimilar materials, e.g. electrochemical corrosion or material expansion.

6.1.6 Electrical equipment, when used in an integral part of a valve or fitting, shall meet the requirements of EN 50014 where appropriate.

6.1.7 Valves shall have their flow resistance determined using water as a test fluid

6.1.8 Possible stress corrosion shall be eliminated by either design or heat treatment.

6.2 Seats and seals

6.2.1 Valves and fittings shall be so designed that they can be installed without damaging non-metallic seats or seals.

6.2.2 Sealing may be achieved by either elastomeric or other non-metallic material. When a metal to metal closure is used, the residual flow shall meet the requirements of 8.5.

6.2.3 The sealing element ensuring internal leak tightness shall be attached or otherwise assembled such that it will not become dislocated under service conditions. The means to secure the sealing element shall not rely solely on adhesive.

6.3 Springs

Springs shall be designed in accordance with EN 13906.