



**SLOVENSKI STANDARD**  
**SIST EN 14129:2005**  
**01-januar-2005**

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Pressure relief valves for LPG tanks

Sicherheitsventile für Flüssiggas-Behälter

Soupapes de sécurité pour réservoirs de GPL

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Ta slovenski standard je istoveten z: **EN 14129:2004**

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23.060.40

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**en**

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ICS 23.060.40

English version

## Pressure relief valves for LPG tanks

Soupapes de sûreté pour réservoirs de GPL

Sicherheitsventile für Flüssiggas-Behälter

This European Standard was approved by CEN on 23 August 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

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

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## Foreword

This document (EN 14129:2004) 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of an identical text or by endorsement, at the latest by April 2005, and conflicting national standards shall be withdrawn at the latest by April 2005.

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 97/23/EC.

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

This European Standard has been submitted for reference into the technical annexes of the European Agreement concerning the international carriage of dangerous goods by road (ADR).

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

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## 1 Scope

This document specifies the requirements for the design and testing of spring loaded pressure relief valves and thermal expansion valves for use in:

- static LPG tanks,

NOTE The tanks can be situated above ground, underground or mounded.

- LPG tanks on road tankers, rail tankers, tank-containers or demountable tanks.

This document does not address production testing.

Normative annex B prescribes testing with conditioning at – 40 °C for valves for use under extreme low temperature conditions.

The requirements for pressure relief valve accessories such as isolating devices, manifolds and vent pipes are specified in prEN 14071.

prEN 14570 identifies the requirements for the pressure relief valve capacities for static tanks. See EN 12252 for road tankers.

## 2 Normative references

The following referenced documents are indispensable for the application 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.

- [SIST EN 14129:2005](https://standards.iteh.ai/catalog/standards/sist/1e48de0-1837-4ba8-a7a2-437d0a422a35/sist-en-14129-2005)
- EN 549, *Rubber materials for seals and diaphragms for gas appliances and gas equipment.*
- EN 1092-1, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges.*
- 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.*
- EN 10088-1, *Stainless steels - Part 1: List of stainless steels*
- EN 10088-3, *Stainless steels - Part 3: Technical delivery conditions for semi-finished products, bars, rods and sections for general purposes*
- EN 10204:2004, *Metallic products — Type of inspection documents.*
- EN 12165, *Copper and copper alloys - Wrought and unwrought forging stock*

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

EN 13906 (all parts), *Cylindrical helical springs made from round wire and bar – Calculation and design*

prEN 14071, *Pressure relief valves for LPG tanks – Ancillary equipment*

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

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

### 3 Terms and definitions

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

#### 3.1

##### **pressure relief valve**

self-closing valve which automatically, without the assistance of any energy other than that of the vapour concerned, discharges vapour at a predetermined pressure, and operates with a pop action

#### 3.2

##### **thermal expansion valve**

self-closing valve which automatically, without the assistance of any energy other than that of the fluid concerned, discharges fluid at a predetermined pressure

#### 3.3

##### **spring loaded pressure relief valve**

valve in which the loading due to the vapour pressure underneath the sealing element is opposed only by the force of a spring

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#### 3.4

##### **external pressure relief valve**

pressure relief valve which when fitted to the LPG tank has the spring external to the pressure envelope (see figure 1)

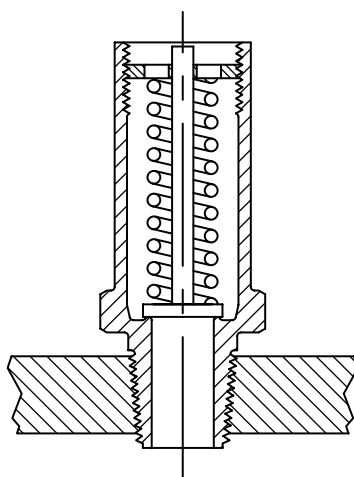


Figure 1 — External pressure relief valve

#### 3.5

##### **internal pressure relief valve**

pressure relief valve which when fitted to the LPG tank has the spring internal to the pressure envelope

3.5.1

**semi-Internal pressure relief valve**

internal pressure relief valve in which some of the working parts and the wrenching section are outside the pressure envelope (see Figure 2)

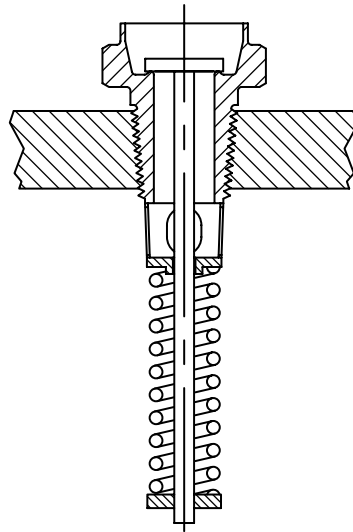


Figure 2 — Semi-internal pressure relief valve

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3.5.2

**fully internal pressure relief valves**

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internal pressure relief valve in which all the working parts and the wrenching section are recessed and within the profile of the tank (see Figure 3)

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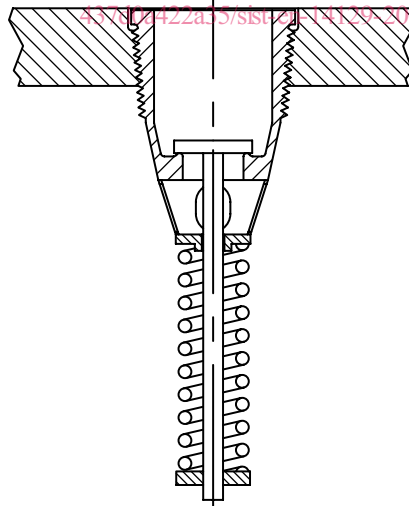


Figure 3 — Fully internal pressure relief valve

3.6

**pressure/flow terms**

NOTE 1 Terms used with LPG pressure relief valves are described graphically in Annex A.

NOTE 2 All pressures are gauge pressures unless otherwise specified.



**3.6.1****nominal set pressure**

predetermined pressure of the pressure relief valve at which the valve is set to start to discharge

**3.6.2****start to discharge pressure**

inlet pressure at which the first of a stream of bubbles appears at the outlet of a pressure relief valve through a water seal of not more than 50 mm water column, or other equivalent method

**3.6.3****overpressure**

pressure increase between the nominal set pressure and the flow rating pressure, usually expressed as a percentage of nominal set pressure

**3.6.4****reseal pressure**

inlet pressure at which leakage ceases through a water seal of not more than 50 mm water column on the outlet of the valve, after the valve has been subjected to a pressure equal to or above the start to discharge pressure but below the "pop" pressure

**3.6.5****reseal pressure**

inlet pressure at which the sealing element effects a seal with the valve seat after the valve has been subjected to pop action

**3.6.6****flow rating pressure**

inlet pressure at which the discharge capacity is measured

**3.6.7****maximum allowable pressure**

maximum pressure for which the valve is designed, as specified by the manufacturer

**3.7****blowdown**

difference between start to discharge and reseal pressures, usually expressed as a percentage of the nominal set pressure

**3.8****discharge capacity**

capacity at the flow rating pressure of a pressure relief valve expressed in cubic metres per minute of free air at STP

**3.9****pop action**

rapid opening of the valve sealing element to achieve full lift, resulting from an increase of inlet pressure creating a sudden increase in force and compression of the spring

**3.10****sealing element**

non-metallic moveable resilient component which effects a seal by contact with the pressure relief valve seat

**3.11****valve seat**

normally raised area of the pressure relief valve body on to which the sealing element effects the seal

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3.12

**pressure relief valve isolating device**

device fitted between the storage tank and an external pressure relief valve, which permits replacement of the pressure relief valve without depressurising the tank

3.13

**manifold**

device fitted to a storage tank permitting two or more pressure relief valves to be fitted, only one of which can be isolated at a time, which permits replacement of the isolated pressure relief valve without depressurising the tank

3.14

**LPG**

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

3.15

**leak tightness**

resistance to leakage to atmosphere across the valve seat or any other pressure containing component when the valve is closed

3.16

**STP**

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

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**4 Operating conditions** (standards.iteh.ai)

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

- The minimum operating temperature to which the valve is expected to be exposed during normal use is minus 20 °C. Temperatures below this may be encountered during short periods, for example, during discharge.
- In some parts of Europe, and for certain applications, lower minimum operating temperatures are encountered. When equipment is designed for a temperature lower than minus 20 °C, it shall meet the requirements of Annex B.
- The maximum operating temperature to which the valve is expected to be exposed during normal operation is 65 °C.
- 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 can 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 is intended to be used.

5.1.2 Material for components shall be selected for adequate strength in service. The material shall resist, brass dezincification, stress corrosion, impact or material failure. Where stress corrosion could be present in a material, stress relieving heat treatment shall be carried out where necessary.

**5.1.3** The components exposed to atmosphere shall be manufactured from corrosion resistant materials or suitably protected against corrosion.

**5.1.4** 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 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

**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 10088-1 and EN 10088-3 or material with an equivalent resistance to corrosion.

When carbon steel is used for a spring for an external relief valve, due to material strength requirements, it shall be adequately protected against corrosion.

**5.2.4** Hot stamped brass shall be non-porous and suitable for machining or other processes. Leaded brass shall be CW614N or CW617N in accordance with EN 12420 or EN 12165. Sand-cast brass shall not be used. Cold drawn brass rods shall only be used for machining after adequate testing for internal cracking, porosity or other inclusions and shall be heat treated if required. 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.

## **5.3 Non-metallic components**

All non-metallic materials in contact with LPG shall not distort, harden or adhere to the body or seat face to such an extent as to impair the function of the valve.

All rubber materials shall also comply with the requirements of EN 549. The ozone test in EN 549 shall only be carried out where gaskets/seals are exposed to the atmosphere.

For guidance on the selection of non-metallic materials, see EN ISO 11114-2

## **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.

## **5.5 Certification**

The main metallic pressure-bearing parts shall be provided with a material manufacturers certificates conforming to EN 10204 : 2004 certificate 3.1 B.

Springs and other metallic parts shall have certificates conforming to EN 10204:2004 certificate type 2.2.