

# Pressure relief valves for LPG tanks

The European Standard EN 14129:2004 has the status of a  
British Standard

ICS 23.060.40

# National foreword

This British Standard is the official English language version of EN 14129:2004.

The UK participation in its preparation was entrusted to Technical Committee PVE/19, LPG containers and their associated fittings, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

## Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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

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## Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 19 and a back cover.

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## Amendments issued since publication

Amd. No.	Date	Comments

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.

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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.

## 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.

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

#### 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)

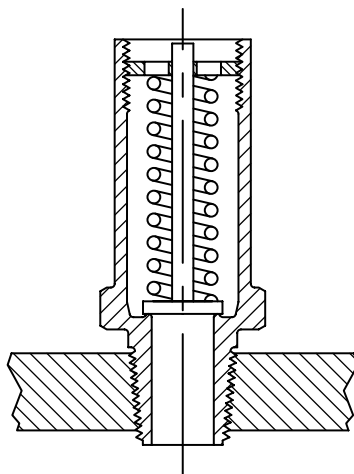


Figure 1 — External pressure relief valve

#### 3.5

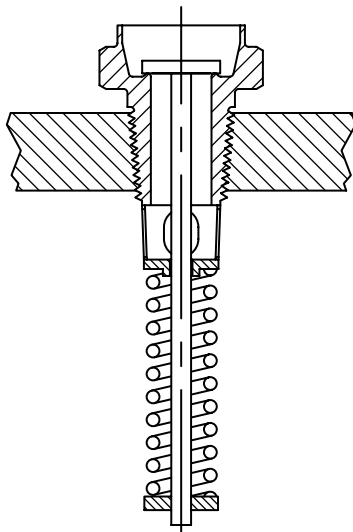
##### **internal pressure relief valve**

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)

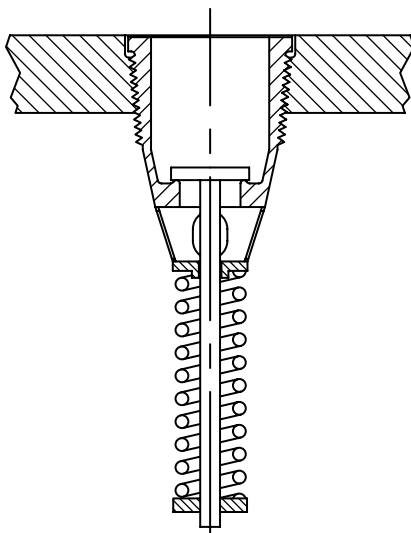


**Figure 2 — Semi-internal pressure relief valve**

### 3.5.2

#### **fully internal pressure relief valves**

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)



**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

### 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)]

## 4 Operating conditions

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. Lead 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.

Non-metallic parts shall be provided with certificates confirming their conformance with the specification stated on the purchase order.

Certificates of material conformity with the requirement of the specification and the order shall be obtained by the manufacturer for all materials. For metallic materials certificates in accordance with EN 10204 for the complete consignment shall be obtained.

## 6 Design

### 6.1 Introduction

All requirements described in this standard for “pressure relief valves” are also applicable to “thermal expansion valves” unless otherwise specified.

A pressure relief valve shall be:

- an external pressure relief valve,
- a semi-internal pressure relief valve, or
- a fully internal pressure relief valve.

### 6.2 Design parameters

The valve components shall be designed with adequate strength and clearances to ensure correct operation in service.

The valve shall be designed to operate with the characteristics identified in 7.4.

Pressure relief valves shall be designed to operate with a pop action. Pop action shall take place between the start to discharge pressure and the flow rating pressure. Thermal expansion valves are not required to operate with a pop action.

The blowdown shall not be more than 35 % of the nominal set pressure for a pressure relief valve. This requirement does not apply to thermal expansion valves.

Valves shall reseal at a pressure above 90 % of the nominal set pressure.

### 6.3 Threads

**6.3.1** Pressure relief valves intended to be directly connected into the tank shall be connected by means of a taper thread in accordance with ANSI/ASME B1.20.1 – 1983 or by a flange connection in accordance with EN 1092-1. To avoid mismatching with ANSI/ASME B1.20.1 - 1983 threads, ISO 7-1 shall not be used.

**6.3.2** Pressure relief valves intended to be connected to isolating devices shall be connected by means of a parallel thread used in conjunction with a seal in accordance with prEN 14071.

Pressure relief valve connections, not shown in prEN 14071 shall be designed to prevent connection with the isolating devices shown in prEN 14071.

**6.3.3** Pressure relief valves intended to be fitted to manifolds shall be connected by means of flanges, parallel threads used in conjunction with a gasket or a taper thread.

**6.3.4** Only right hand threads shall be used.

## 6.4 Springs

Cylindrical helical compression springs shall be designed in accordance with the appropriate part of EN 13906.

Springs shall be designed to prevent design stresses being exceeded at the flow rating pressure. Stops may be provided to avoid excessive stress. There shall be sufficient spring compression to allow the full lift of the sealing element at the flow rating pressure.

## 6.5 Other requirements

**6.5.1** The design shall incorporate guiding arrangements of the sealing element housing necessary to ensure reliable operation and leak tightness.

**6.5.2** The sealing element shall be secured within its housing to avoid it becoming loose in operation.

The sealing element housing shall be manufactured from a metallic material with a minimum melting point of 450 °C. Non-metallic materials may be used if they are able to meet the same requirements without deformation or degradation which might impair the operation of the valve.

**6.5.3** The setting of the pressure relief valve shall be secured in a way that discourages and reveals any interference.

**6.5.4** External and semi-internal pressure relief valves shall be provided with a means of drainage to prevent accumulation of water on the discharge side of the valve. If LPG is expelled from the drain holes of the pressure relief valve during operation it shall be done in a safe manner.

**6.5.5** Pressure relief valves shall be fitted with a removable protection cap or means of protection to prevent the ingress of water or foreign matter. Such protection shall be designed so as not to be inadvertently displaced except by the discharge of the valve and shall not affect the performance of the valve.

For mobile applications, the pressure relief valve shall withstand a deceleration of 100 times gravity and shall remain leak tight and operate correctly afterwards.

**6.5.6** A valve shall achieve the required leak tightness where the leakage rate does not exceed 15 cm<sup>3</sup> per hour of air measured at STP rounded down to one decimal place.

## 6.6 Pressure relief valve with parallel thread

Pressure relief valves intended for use with isolating devices or manifolds shall have positive means to determine that closure of the isolating device has occurred. This shall be achieved by:

- the use of two tell-tale holes in the pressure relief valve which shall be visible above the combination seal, when 3 full turns of engagement remain;
- a noticeable audible change in the release of gas which shall have taken place when removing the pressure relief valve indicating closure of the isolating device while a minimum of 3 threads remain engaged.

Where the pressure relief valve is used with an isolating device or manifold, it shall be in accordance with prEN 14071.

## 7 Testing of the design

### 7.1 General

The strength, operating and flow characteristics of pressure relief valves shall be determined by type tests in conformity with this section.

Extrapolation or interpolation of test results is not acceptable and only actual measured results shall be used.

### 7.2 Hydraulic proof test

This test shall be carried out on one sample pressure relief valve prior to other tests and under the following conditions:

- the body seat of the relief valve shall be blanked off so that the pressure is only applied to those parts on the inlet side of the seat;
- pressure shall be applied through a fitting reproducing the tank boss or isolating device;
- the test medium shall be water or other suitable fluid;
- the pressure shall be raised continuously and gradually;
- the test pressure shall be 1,43 times the maximum allowable pressure;
- the test duration shall be two minutes minimum.

The valve shall withstand the test without permanent deformation or rupture, and shall pass the leak tightness test. Otherwise the design shall be rejected.

### 7.3 Overtorquing test

Another sample pressure relief valve shall be subject to an overtorquing test to ensure the correct operation and tightness in that condition.

The valve body shall be fitted on a test fixture representative of its expected use.

A parallel thread pressure relief valve shall be torqued to 1,5 times the manufacturer's maximum recommended fitting torque.

A taper threaded pressure relief valve shall be torqued to 5 Nm. It shall then be tightened a further 3 revolutions.

After the torque has been applied, the pressure relief valve shall be checked for:

- freedom of movement of all operating parts;
- leak tightness (see 6.5.6).

The valve shall withstand the test. Otherwise the design shall be rejected.

## 7.4 Operating and flow characteristics

### 7.4.1 General

The test medium for all tests shall be air or nitrogen and shall be dry to avoid any condensation in the full test loop including the pressure relief valve itself.

### 7.4.2 Operation test

**7.4.2.1** At least three further samples of the design shall be tested.

**7.4.2.2** A tightness test shall be carried out at 0,9 times the nominal set pressure and the leakage rate through the valve shall not exceed 15 cm<sup>3</sup> per hour of air measured at STP rounded down to one decimal place.

**7.4.2.3** Ensure the start to discharge pressure is within + 5 % and – 5 % of the nominal set pressure by subjecting the valve to a start to discharge pressure test.

**7.4.2.4** The tests shall determine the absence of chatter, flutter, sticking and harmful vibration. Otherwise the design shall be rejected.

### 7.4.3 Flow characteristics test

**7.4.3.1** The three test valves set at the same nominal set pressure shall be discharged once at the flow rating pressure (120 % of the nominal set pressure) and the discharge capacity measured.

Between 90 % of the nominal set pressure and the pop pressure, the rate of pressure increase shall not exceed 0,1 bar.

**7.4.3.2** The range of results of all the tests shall be within +5 % to –5 % of the mean value.

**7.4.3.3** The mean of the three test results shall be deemed to be the discharge capacity and shall be quoted in cubic metres per minute of air measured at STP rounded down to one decimal place.

**7.4.3.4** Thermal expansion valves are not subject to this test.

### 7.4.4 Reseal pressure

**7.4.4.1** The three valves tested in 7.4.3, shall be subjected to the start to discharge pressure.

**7.4.4.2** The pressure shall be gradually reduced until the valve has resealed and the reseal pressure shall be noted.

**7.4.4.3** The reseal pressure for each valve shall be in accordance with 6.2 or the design shall be rejected.

### 7.4.5 Blowdown

**7.4.5.1** The three valves tested in 7.4.4, shall be discharged at the flow rating pressure.

**7.4.5.2** The pressure shall be gradually reduced until the valve has reseated and the reseal pressure shall be noted.

**7.4.5.3** The blowdown for each valve shall be in accordance with 6.2 or the design shall be rejected.

**7.4.5.4** Thermal expansion valves are not subject to this test.

## 8 Marking

### 8.1 Pressure relief valves

The following minimum information shall be marked on the body of the pressure relief valve:

- a) manufacturer's name or trademark;
- b) type number;
- c) date (code) indicating month and year of manufacture;
- d) nominal set pressure in bar;
- e) discharge capacity of air, quoted in cubic metres per minute, specified at 120 % of the nominal set pressure;
- f) -40 °C for pressure relief valves fulfilling the requirements of Annex B;
- g) where the relief valve is intended to be used in combination with an isolating device, the system capacity shall be marked on the relief valve.

NOTE Council Directive 1999/36/EC and Directive 97/23/EC also have marking requirements.

### 8.2 Thermal expansion valves

The following minimum information shall be marked on the body:

- a) manufacturer's name or trademark;
- b) type number;
- c) date (code) indicating month and year of manufacture;
- d) nominal set pressure in bar.

NOTE Council Directive 1999/36/EC and Directive 97/23/EC also have marking requirements.

## 9 Operating instructions

Operating instructions shall be provided with each consignment of pressure relief valves, and shall contain at least the following information:

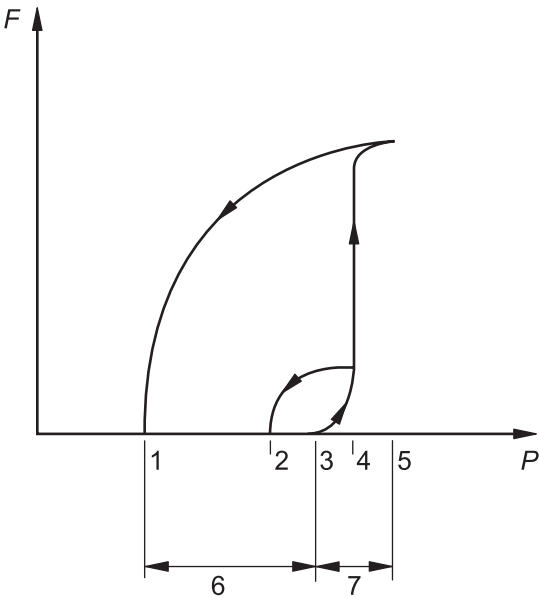
- a) manufacturer's name and address;
- b) type number and data on performance;
- c) details for fitting, removal and replacement of the pressure relief valve;
- d) method and torque requirements for sealing connecting threads;
- e) information on maintenance;
- f) number of this standard;
- g) details of the isolating device to be used where the pressure relief valve is used with an isolating device;
- h) if applicable, details on the importance of keeping "tell tale" holes and means of drainage free;



- i) a warning using the following words: "**Warning**: Pressure relief valves, which have operated up to their pop pressure, shall be removed from service for reconditioning or destruction. No spring shall be reused once removed from a pressure relief valve that has been in service"

**Annex A**  
(Informative)

**Terms used with LPG pressure relief valves**



**Key**

- 1 Reseat pressure
- 2 Reseal pressure
- 3 Nominal set pressure
- 4 Pop pressure
- 5 Flow rating pressure
- 6 Blowdown
- 7 Overpressure

*F* Flow  
*P* Pressure

**Figure A.1 — Terms used with LPG pressure relief valves**

## **Annex B**

### **(Normative)**

### **Special low temperature requirements for valves**

Valves which are used under extreme low temperature conditions (temperatures below  $-20\text{ }^{\circ}\text{C}$ ) shall meet the following requirement:

- the valve shall be subjected to a temperature of  $-40\text{ }^{\circ}\text{C}$  for 24 hours;
- a leak tightness test shall be carried out at 0,9 times the nominal set pressure and the leakage rate through the valve shall not exceed  $15\text{ cm}^3$  per hour of air measured at STP rounded down to one decimal place,
- the temperature shall not exceed  $-30\text{ }^{\circ}\text{C}$  during the test.

## Annex ZA (informative)

### Relationship between this European Standard and the Essential Requirements of EU Directive 97/23/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission to provide a means of conforming to Essential Requirements of the New Approach Directive 97/23/EC – of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in table Z.A.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

**Table Z.A.1 — Correspondence between this European Standard and Directive 97/23/EC**

Clause(s)/sub-clause(s) of this EN	Essential requirements (ERs) of Directive 97/23/EC Annex I	Qualifying remarks/Notes
7.2, 7.3	2.1	Safe throughout intended life
5, 6, 7	2.2.1	Design for adequate strength
7	2.2.4	Experimental design method
6, 7.4	2.3	Safe handling and operation
5	2.6	Corrosion and other chemical attack
8	3.3	Marking and labelling
9	3.4	Operating instructions
5	4	Materials

**WARNING:** Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

## Bibliography

- [1] EN ISO 11114-2, Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials (ISO 11114-2:2000).
- [2] EN 12252, Equipping of Liquefied Petroleum Gas (LPG) road tankers
- [3] prEN 14570, Equipping of LPG Tanks overground and underground.
- [4] Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment.
- [5] Council Directive 1999/36/EC of 29 April 1999 on transportable pressure equipment.

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