



SLOVENSKI STANDARD SIST EN 161:2007

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Samodejni zaporni ventili za plinske gorilnike in plinske aparate

Automatic shut-off valves for gas burners and gas appliances

Automatische Absperrventile für Gasbrenner und Gasgeräte

Robinets automatiques de sectionnement pour bruleurs a gaz et appareils a gaz

Ta slovenski standard je istoveten z: **EN 161:2007**

ICS:

23.060.20	Zapirni ventili (kroglasti in pipe)	Ball and plug valves
27.060.20	Plinski gorilniki	Gas fuel burners

SIST EN 161:2007

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Automatic shut-off valves for gas burners and gas appliances

Robinets automatiques de sectionnement pour brûleurs à gaz et appareils à gaz

Automatische Absperrventile für Gasbrenner und Gasgeräte

This European Standard was approved by CEN on 8 December 2006.

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 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 Management Centre has the same status as the official versions.

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Foreword

This document (EN 161:2007) has been prepared by Technical Committee CEN/TC 58 “Safety and control devices for gas-burners and gas-burning appliances”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by July 2007, and conflicting national standards shall be withdrawn at the latest by July 2007.

This document supersedes EN 161:2001.

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).

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

This European Standard is intended to be used in conjunction with prEN 13611:2005, *Safety and control devices for gas burners and gas-burning appliances — General requirements*. This control standard refers to clauses of prEN 13611:2005 or adapting it by stating “Addition”, “Modification” or “Replacement” in the corresponding clause. It introduces requirements for balanced valves and a method for the assessment of other means for closing and/or sealing in automatic shut-off valves.

SIL classification according to EN 61508 cannot be claimed based upon compliance with this standard. Valves with SIL classification do not meet automatically the requirements of this standard.

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

EN 161:2007 (E)**1 Scope**

This European Standard specifies the safety, construction and performance requirements for automatic shut-off valves for gas burners, gas appliances and similar use, hereafter referred to as valves.

This European Standard covers type testing only.

It applies to valves with declared maximum inlet pressures up to and including 5 bar, for use on burners or in appliances using fuel gases of the first, second, and third families.

It applies to electrically operated valves and to valves actuated by fluids where the control valves for these fluids are actuated electrically, but not to any external electrical devices for switching the control signal or actuating energy. An assessment method for valve designs is given by this European Standard.

It also applies to valves where the flow rate is controlled by external electrical signals, either in discrete steps or proportional to the applied signal.

It also applies to valves fitted with closed position indicator switches.

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 30 (all parts), *Domestic cooking appliances burning gas fuel*

EN 298, *Automatic gas burner control systems for gas burners and gas burning appliances with or without fans*

prEN 13611:2005, *Safety and control devices for gas burners and gas-burning appliances — General requirements*

EN 13906-1, *Cylindrical helical springs made from round wire and bar — Calculation and design — Part 1: Compression springs*

EN 13906-2, *Cylindrical helical springs made from round wire and bar — Calculation and design — Part 2: Extension springs*

EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60730-1:2000, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:1999, modified)*

EN 61058-1, *Switches for appliances - Part 1: General requirements (IEC 61058-1:2000 + A1:2001, modified)*

ISO 4400, *Fluid power systems and components - Three-pin electrical plug connectors with earth contact - Characteristics and requirements*

ISO 6952, *Fluid power systems and components — Two-pin electrical plug connectors with earth contact — Characteristics and requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 13611:2005 and the following apply.

3.1

automatic shut-off valve

valve which opens when energized and closes automatically when de-energized

3.2

closure member

according to prEN 13611:2005, 3.2

3.3

actuating mechanism

part of the valve which moves the closure member

3.4

external leak-tightness

according to prEN 13611:2005, 3.4

3.5

internal leak-tightness

according to prEN 13611:2005, 3.5

3.6

inlet pressure

according to prEN 13611:2005, 3.6

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3.7

outlet pressure

according to prEN 13611:2005, 3.7

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3.8

pressure difference

according to prEN 13611:2005, 3.8

3.9

maximum inlet pressure

according to prEN 13611:2005, 3.9

3.10

minimum inlet pressure

according to prEN 13611:2005, 3.10

3.11

flow rate

according to prEN 13611:2005, 3.11

3.12

rated flow rate

according to prEN 13611:2005, 3.12

3.13

maximum ambient temperature

according to prEN 13611:2005, 3.13

EN 161:2007 (E)**3.14****minimum ambient temperature**

according to prEN 13611:2005, 3.14

3.15**mounting position**

according to prEN 13611:2005, 3.15

3.16**valve with step control**

valve which controls the flow rate in steps

3.17**valve with modulating control**

valve which controls the flow rate continuously between two limits in response to external electrical signals

3.18**closed position indicator switch**

switch fitted to a valve which indicates when the closure member is in the closed position

3.19**actuating energy**

required energy for the actuating mechanism to move the closure member to the open position

NOTE The actuating energy can have an external source (electrical, pneumatic or hydraulic) and can be transformed inside the valve.

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3.20**opening force**

force required to move the closure member to the open position

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3.21**closing force**

force available to close the valve, independent of any force provided by fuel gas pressure

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3.22**sealing force**

force acting on the valve seat when the closure member is in the closed position, independent of any force provided by fuel gas pressure

3.23**frictional force**

largest force required to move the actuating mechanism and the closure member from the open position to the closed position with the closure spring removed, independent of any force provided by fuel gas pressure

3.24**actuating pressure**

hydraulic or pneumatic pressure supplied to the actuating mechanism of the valve

3.25**opening time**

time interval between energizing the valve and the attainment of the maximum or other defined flow rate

3.26**closing time**

time interval between de-energizing the valve and the closure member attaining the closed position

3.27**delay time**

time interval between energizing the valve and the start of flow

3.28**control valve**

valve which controls the fluid (e. g. compressed air) supplied to the actuating mechanism

3.29**rated voltage**

voltage declared by the manufacturer at which the valve may be operated

3.30**rated current**

current declared by the manufacturer at which the valve may be operated

3.31**balanced valve**

valve with a balanced closure member where the inlet pressure acts on the closure member in the opening and closing direction

NOTE The closure member may close more than one opening.

4 Classification

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4.1 Classes of valve

— Class A, B and C valves

Valves where the sealing force is not decreased by the gas inlet pressure. They are classified A, B or C according to the sealing force requirements of 7.13. Balanced valves according to this standard are class A valves.

— Class D valves

Valves which are not subject for requirements for the sealing force and fixed closing time.

NOTE Class D valves are intended to be used for control functions only.

— Class J valves

Disc-on-seat valves where the sealing force is not decreased by the gas inlet pressure and which meet the requirements of 7.13.

4.2 Groups of valve

According to prEN 13611:2005, 4.2

4.3 Classes of control functions, safety classes

According to prEN 13611:2005, 4.3

5 Units of measurement and test conditions

According to prEN 13611:2005, Clause 5

EN 161:2007 (E)**6 Construction requirements****6.1 General**

According to prEN 13611:2005, 6.1

6.2 Mechanical parts of valves**6.2.1 Appearance**

According to prEN 13611:2005, 6.2.1

6.2.2 Holes

According to prEN 13611:2005, 6.2.2

6.2.3 Breather holes

According to prEN 13611:2005, 6.2.3

6.2.4 Test for leakage of breather holes

According to prEN 13611:2005, 6.2.4

6.2.5 Screwed fastenings

According to prEN 13611:2005, 6.2.5

6.2.6 Jointing

According to prEN 13611:2005, 6.2.6

6.2.7 Moving parts

According to prEN 13611:2005, 6.2.7

6.2.8 Sealing caps

According to prEN 13611:2005, 6.2.8

6.2.9 Dismantling and reassembly

According to prEN 13611:2005, 6.2.9

6.2.10 Design

There shall be no exposed shafts or operating levers which could adversely affect the ability of valves to close.

6.2.11 Closed position indicator switch

Closed position indicator switches, where fitted, shall not impair the correct operation of valves. Adjusters shall be sealed to indicate interference. Any drift of the switch and actuating mechanism from its setting shall not impair correct valve operation.

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6.2.12 Valve with modulating control

Flow rates of valves with modulating control shall be adjustable over the full range declared by the manufacturer. If the adjustment of one flow rate affects the setting of any other flow rate, this shall be clearly indicated in the manufacturer's instructions for setting up. The setting of any flow rate shall require the use of mechanical or electrical tools and shall be designed to discourage unauthorized adjustment.

NOTE For air-gas ratio controls see EN 12067-1 and -2.

6.2.13 Controls assembled to a valve

Other controls assembled to a valve shall not interfere with its shut-off function.

6.2.14 Balanced valves

The closure member of a balanced valve shall have a resulting force in the closing direction where the sealing force is not decreased by the gas inlet pressure.

6.2.15 Closing and sealing

6.2.15.1 Closing and/or sealing by means of springs

If springs are used for closing and/or sealing the valve, they shall be designed to EN 13906-1 or EN 13906-2 for static and dynamic loading.

6.2.15.2 Other means for closing and/or sealing

6.2.15.2.1 General

This clause defines a method for the assessment of other means for closing and sealing in automatic shut-off valves.

By this clause the term "safety class A, B or C" is **not** related to the sealing force classes but to the safety classes as described in 4.3.

Sealing force of valves shall be classified according to 4.1.

The basic risks of fire and explosion in a gas appliance as a result of uncontrolled gas flow requires a safety class C system for the gas shut-off function. This is based on a comparison, made between automatic burner controller and gas shut-off function, the safety class of each of them being considered equal.

Although this European Standard is not based on a fault assessment approach as described in 6.6 of prEN 13611:2005, the combination of two automatic shut-off valves is considered equal to safety class C requirement. This assumption is based on the construction and performance requirements of this European Standard.

6.2.15.2.2 New designs for closing and/or sealing

New designs for closing and/or sealing shall fulfil at least safety class B requirements. In all cases the gas shut-off function shall be a class C function.

NOTE For further information see prEN 14459.

During the testing the valve shall fulfil the performance requirements of Clause 7.

New designs may consist of a combination of closure members, electronic controller, sensing elements, actuators, lockout and reset.

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The manufacturer shall declare the other means for closing and/or sealing.

For the assessment of the new design the requirements of this European Standard shall be used in combination with 6.6 of prEN 13611:2005. If this leads to aspects that are not described in this European Standard, the manufacturer shall supply a failure mode analysis on the new design.

This analysis shall describe the specific failure modes for the type of technology used in relation to the following basic safety requirements:

- a) closing function at power interruption;
- b) leak tightness;
- c) sealing force (ability to withstand backpressure, to be checked by testing or calculation);
- d) closing force > friction force;
- e) closing time including the influence to the Burner Control (EN 298);
- f) no uncontrolled opening of the automatic shut-off valve.

As a result of this failure mode analysis, additional constructional requirements shall be fulfilled and/or additional faults compared to Annex E of prEN 13611:2005 shall be included into the fault assessment.

The outcome of the analysis shall provide a set of conditions under which the new design can be used in an automatic shut-off valve. These conditions involve construction requirements, safety requirements, performance requirements and test methods.

The fault reaction time shall be declared by the manufacturer.

Failure of mechanical parts adversely affecting the performance requirements of this European Standard is considered as an abnormal situation and can therefore be considered as a first fault according to the test method in 6.6 of prEN 13611:2005.

However, if mechanical parts are designed according to the constructional requirements of Clause 6 of this European Standard, failure of these parts is not considered.

6.3 Materials**6.3.1 General material requirements**

According to prEN 13611:2005, 6.3.1

6.3.2 Housing

According to prEN 13611:2005, 6.3.2

6.3.3 Test for leakage of housing after removal of non-metallic parts

According to prEN 13611:2005, 6.3.3

6.3.4 Zinc alloys

According to prEN 13611:2005, 6.3.4

6.3.5 Springs providing closing and/or sealing force

According to prEN 13611:2005, 6.3.5