



SLOVENSKI STANDARD
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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 brûleurs à gaz et appareils à gaz

Ta slovenski standard je istoveten z: prEN 161

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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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 58.

If this draft becomes a European Standard, 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.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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prEN 161:2020 (E)**European foreword**

This document (prEN 161:2020) has been prepared by Technical Committee CEN/TC 58 “Safety and control devices for burners and appliances burning gaseous or liquid fuels”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 161+A3:2011:2013.

This document has been prepared under a standardization request 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 and B, which is an integral part of this document.

This document is intended to be used in conjunction with EN 13611:2007+A2:2011. This document refers to clauses of EN 13611:2007+A2:2011 or adapts clauses by stating “with the following modification”, “with the following addition”, “is replaced by the following” or “is not applicable” in the corresponding clause. This European Standard adds clauses or sub-clauses to the structure of EN 13611:2007+A2:2011 which are particular to this European Standard. Subclauses which are additional to those in EN 13611:2019 are numbered starting from 101. Additional Annexes are designed as Annex AA, BB, CC, etc.

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It should be noted that the following significant editorial changes compared to the previous edition have been incorporated in this European Standard:

- a) alignment to EN 13611:2018;
- b) terms and definitions are aligned to EN 13611:2018.

1 Scope

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

This document is applicable to valves with declared maximum inlet pressures up to and including 500 kPa (5 bar) of nominal connection sizes up to and including DN 250 for use with one or more fuel gases in accordance with EN 437.

This document is applicable 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 document.

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

This document is also applicable to valves fitted with closed position indicator switches.

NOTE Provisions for final product inspection and testing by the manufacturer are not specified.

This document establishes methodologies for the determination of a Performance Level (PL) in accordance with EN 13611:2019, Annexes K and L.

2 Normative references (standards.iteh.ai)

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

EN 298:2012, *Automatic gas burner control systems for gas burners and gas burning appliances with or without fans*

EN 13611:2019, *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 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 modified + A1:2001 (Equivalent))*

EN 175301-803, *Detail Specification: Rectangular connectors — Flat contacts, 0,8 mm thickness, locking screw not detachable*

prEN 161:2020 (E)**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN 13611:2019 and the following apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.101**automatic shut-off valve**

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

3.102**actuating mechanism**

part of the valve which moves the closure member

3.103**valve with step control**

valve which controls the flow rate in steps

3.104**valve with modulating control**

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

3.105**closed position indicator switch**

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

3.106**actuating energy**

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

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

3.107**opening force**

force required to move the closure member to the open position

3.108**closing force**

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

3.109**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

3.110**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

3.111**actuating pressure**

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

3.112**opening time**

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

3.113**closing time**

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

3.114**delay time**

time interval between energizing the valve and the start of flow

3.115**control valve**

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

3.116**rated voltage**

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

3.117**rated current**

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

3.118**balanced valve**

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

Note to entry: The closure member may close more than one opening.

4 Classification**4.1 Classes of control**

EN 13611:2019 is replaced by the following:

— 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 7.105.1. Balanced valves according to this standard are class A valves.

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— 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 7.105.1.

4.2 Groups of control

Shall be according to EN 13611:2019, 4.2.

4.3 Classes of control functions

Shall be according to EN 13611:2019, 4.3.

4.4 Types of DC supplied controls

Shall be according to EN 13611:2019, 4.4.

5 Test conditions and uncertainty of measurements

Shall be according to EN 13611:2019, Clause 5.

6 Design and construction

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6.1 General

Shall be according to EN 13611:2019 6.1.

6.2 Mechanical parts of the control**6.2.1 Appearance**

Shall be according to EN 13611:2019, 6.2.1.

6.2.2 Holes

Shall be according to EN 13611:2019, 6.2.2.

6.2.3 Breather holes

Shall be according to EN 13611:2019, 6.2.3.

6.2.4 Screwed fastenings

Shall be according to EN 13611:2019, 6.2.4.

6.2.5 Jointing

Shall be according to EN 13611:2019, 6.2.5.

6.2.6 Moving parts

Shall be according to EN 13611:2019, 6.2.6.

6.2.7 Sealing caps

Shall be according to EN 13611:2019, 6.2.7.

6.2.8 Dismantling and reassembly

Shall be according to EN 13611:2019, 6.2.8.

6.2.9 Auxiliary channels and orifices

Shall be according to EN 13611:2019, 6.2.9.

6.2.10 Presetting device

Shall be according to EN 13611:2019, 6.2.10.

6.2.101 Design

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

6.2.102 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.

6.2.103 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 88-1, prEN 88-3, and EN 12067-2.

6.2.104 Controls assembled to a valve

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

6.2.105 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.

For a balanced valve with one port a resulting force in the closing direction shall remain, if the balancing force is removed, and the closure member shall have the same closing direction as the flow direction through the valve.

prEN 161:2020 (E)**6.2.106 Closing and sealing****6.2.106.1 Closing and/or sealing by means of springs**

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

6.2.106.2 Other means for closing and/or sealing**6.2.106.2.1 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 “class of control function A, B or C” is **not** related to the sealing force classes but to the class of control function 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 control function 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 class of control function of each of them being considered equal.

Although this European Standard is not based on a fault assessment approach as specified in EN 13611:2019, 6.6, the combination of two automatic shut-off valves is considered equal to a control function class C. This assumption is based on the construction and performance requirements of this European Standard.

6.2.106.2.2 New designs for closing and/or sealing

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

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.

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 EN 13611:2019, 6.6. 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:xxxx);
- 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 EN 13611:2019, Annex E 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 EN 13611:2019, 6.6.

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.

6.2.107 Additional requirements for shut-off function

6.2.107.1 Diaphragms that assist the shut-off function

Shut-off functions using a diaphragm to apply (part of) the closing force to the closure member shall be designed in such a way that, when the diaphragm is damaged, the closure member closes and the maximum internal leakage rate of the valve is limited to 1 dm³/h. Conformity shall be verified by the method given in 6.2.107.2.

6.2.107.2 Leakage test

Remove or rupture the part(s) assisting the shut-off function. De-energize the valve. Measure the internal leakage rate of the valve according to 7.3.

6.3 Materials

6.3.1 General material requirements

Shall be according to EN 13611:2019, 6.3.1.

6.3.2 Housing

Shall be according to EN 13611:2019, 6.3.2.

6.3.3 Zinc alloys

Shall be according to EN 13611:2019, 6.3.3.

6.3.4 Springs

Shall be according to EN 13611:2019, 6.3.4.

6.3.5 Resistance to corrosion and surface protection

Shall be according to EN 13611:2019, 6.3.5.