



SLOVENSKI STANDARD

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Nadomešča:

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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: **EN 161:2022**

ICS:

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27.060.20	Plinski gorilniki	Gas fuel burners

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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 1 August 2022.

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EN 161:2022 (E)**European foreword**

This document (EN 161:2022) 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 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of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by October 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 161:2011+A3:2013.

The following significant changes compared to the previous edition have been incorporated in this document:

- a) alignment with EN 13611:2019;
- b) requirements from EU Directive 2014/68/EU were not adopted;
- c) terms and definitions are aligned with EN 13611:2019;
- d) reference to EN 437 removed;
- e) different leak-tightness requirement for balanced valves;
- f) EN 13611:2019, 6.5.2 switching elements and EN 13611:2019, 6.5.3.3 sensing elements are not applicable any more;
- g) general requirements of 7.1 moved to EN 13611:2019, 7.1;
- h) pressure limit for nipples for pressure test removed;
- i) requirements of 6.4.8 moved to EN 13611:2019, 6.4.8, except from Class J valves;
- j) requirements of 6.6 protection against internal faults for the purpose of functional safety, 7.6 performance tests and 7.7 long-term performance of electronic parts are not applicable anymore;
- k) requirements of 7.107.2, Table 2 test cycles, endurance test was adapted.

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) / Regulation(s).

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

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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

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EN 161:2022 (E)

Introduction

This document is intended to be used in conjunction with EN 13611:2019.

EN 13611:2019 recognizes the safety level specified by CEN/TC 58 and is regarded as a horizontal standard dealing with the safety, construction, performance and testing of controls for burners and appliances burning gaseous and/or liquid fuels.

The general requirements for controls are given in EN 13611:2019, and methods for classification and assessment for new controls and control functions are given in EN 14459:2021 (see Figure 1). EN 126:2012 (see Figure 1) specifies multifunctional controls combining two or more controls and Application Control Functions, one of which is a mechanical control function. The requirements for controls and Application Control Functions are given in the specific control standard (see Figure 1, control functions).

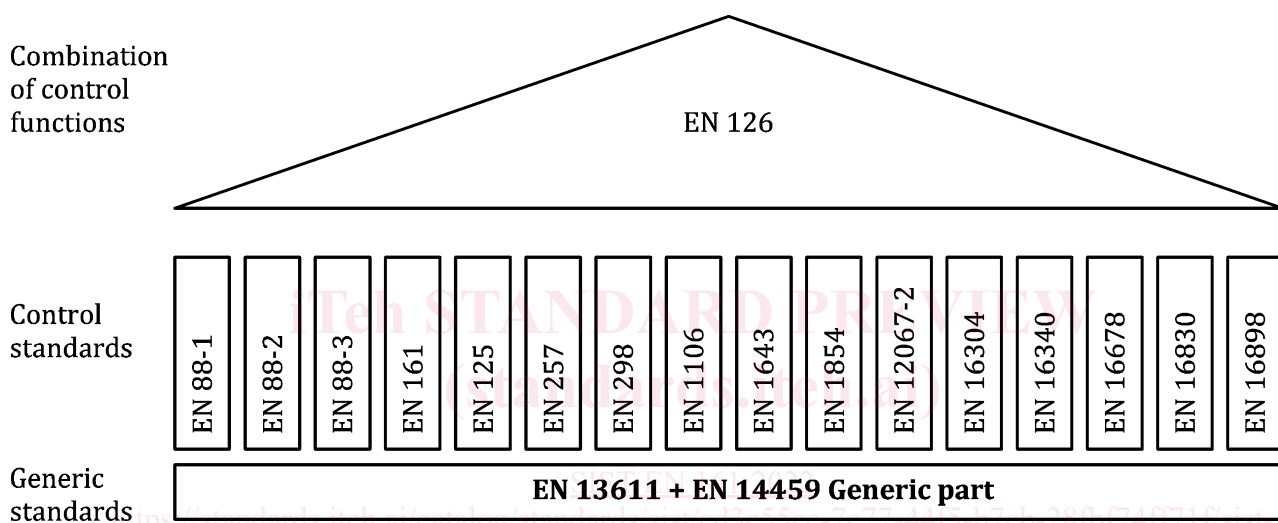


Figure 1 — Interrelation of control standards

EN 13611:2019 should be used in conjunction with the specific standard for a specific type of control (e.g. EN 88-1:2022, EN 88-2:2022, EN 88-3:2022, EN 125:2022, EN 126:2012, EN 161:2022, EN 257:2022, EN 298:2022, EN 1106:2022, EN 1643:2022, EN 1854:—¹, EN 12067-2:2022, EN 16304:2022, EN 16340:2014, EN 16678:2022 and EN 16898:2022), or for controls for specific applications.

EN 13611:2019 can also be applied, so far as reasonable, to controls not mentioned in a specific standard and to controls designed on new principles, in which case additional requirements can be necessary. EN 14459:2021 provides methods for classification and assessment of new control principles.

Primarily in industrial applications it is common practice to rate the safety of a plant based on values describing the likelihood of a dangerous failure. These values are being used to determine Safety Integrity Levels or Performance Levels when the system is being assessed in its entirety.

CEN/TC 58 standards for safety relevant controls do go beyond this approach, because for a certain life time for which the product is specified, designed and tested a dangerous failure is not allowed at all. Failure modes are described and assessed in greater detail.

¹ Under preparation. Stage at the time of publication: FprEN 1854:2022.

Measures to prevent from dangerous situations are defined. Field experience over many decades is reflected in the CEN/TC 58 standards. Requirements of EN 13611:2019 can be considered as proven in practice.

This document refers to clauses of EN 13611:2019 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 document adds clauses or subclauses to the structure of EN 13611:2019 which are particular to this document. Subclauses which are additional to those in EN 13611:2019 are numbered starting from 101. Additional Annexes are designated as Annex AA, Annex BB, Annex CC etc. It should be noted that these clauses, subclauses and Annexes are not indicated as an addition.

If by reference to EN 13611:2019 the term “control” is given, this term should be read as “valve”.

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

EN 161 compliance for valves cannot be claimed based upon Performance Level (PL) classification according to EN ISO 13849-1:2015 or Safety Integrity Level (SIL) classification according to EN 61508-1:2010.

Valves with PL or SIL classification do not automatically meet the requirements of this document.

Performance Level (PL) classification according to EN ISO 13849-1:2015 or Safety Integrity Level (SIL) classification according to EN 61508-1:2010 cannot be claimed based upon compliance with this standard only.

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EN 161:2022 (E)**1 Scope**

EN 13611:2019, Clause 1 applies with the following modification and addition:

Modification:

The 1st paragraph of EN 13611:2019, Clause 1 is replaced by:

This document specifies the safety, design, construction, and performance requirements and testing for automatic shut-off valves for burners and appliances burning one or more gaseous fuels, hereafter referred to as “valves”.

This document is applicable to valves with declared maximum inlet pressures up to and including 500 kPa and of nominal connection sizes up to and including DN 250.

Addition:

This document is applicable to:

- electrically actuated valves;
- 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;
- valves where the flow rate is controlled by external electrical signals, either in discrete steps or proportional to the applied signal;
- valves fitted with closed position indicator switches.

An assessment method for valve designs is given by this document.

The 4th paragraph of EN 13611:2019, Clause 1 is removed.

2 Normative references

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 30-1-4:2012, *Domestic cooking appliances burning gas — Safety — Part 1-4: Appliances having one or more burners with an automatic burner control system*

EN 298:2022, *Automatic gas burner control systems for gas burners and gas burning appliances with or without fans*

EN 13611:2019², *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels — General requirements*

EN 13906-1:2013, *Cylindrical helical springs made from round wire and bar — Calculation and design — Part 1: Compression springs*

EN 13906-2:2013, *Cylindrical helical springs made from round wire and bar — Calculation and design — Part 2: Extension springs*

² As impacted by EN 13611:2019/AC:2021.

EN 60730-1:2016³, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:2013, modified)*

EN IEC 61058-1:2018, *Switches for appliances — Part 1: General requirements (IEC 61058-1:2016)*

EN 175301-803:2006, *Detail Specification: Rectangular connectors — Flat contacts, 0,8 mm thickness, locking screw not detachable*

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 <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://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 1 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 As impacted by EN 60730-1:2016/A1:2019 and EN 60730-1:2016/A2:2022.

EN 161:2022 (E)**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**balanced valve**

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

Note 1 to entry: The closure member can close more than one opening.

3.117**power saving circuit**

circuit, which reduces the power consumption of the valve during the open phase

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.

- Class D valves

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

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

EN 13611:2019, 4.3 is not applicable.

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

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.

EN 161:2022 (E)**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 canals 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. Conformity with these requirements is determined by the test according to 7.107.3.

6.2.103 Valve with modulating control

Flow rates of valves with modulating control shall be adjustable over the full range as stated in the instructions. If the adjustment of one flow rate affects the setting of any other flow rate, this shall be clearly indicated in the 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 gas/air ratio controls see EN 88-1:2022 and EN 12067-2:2022.

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.

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 13906-1:2013 or EN 13906-2:2013 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/or 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 document 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 document.

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.

Other means for closing and/or sealing shall be described in the design documentation.

For the assessment of the new design the requirements of this document shall be used in combination with EN 13611:2019, 6.6. If this leads to aspects that are not described in this document, a failure mode analysis on the new design shall be supplied with the design documentation.

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 automatic burner control system according to EN 298:2022;
- f) no uncontrolled opening of the automatic shut-off valve.