

GAASIPÕLETITE JA GAASISEADMETE OHUTUS- JA
JUHTSEADMED. AUTOMAATSED SULGEVENTIILID
TÖÖRÕHUGA ÜLE 500 KPA KUNI 6300 KPA (K.A)

Safety and control devices for gas burners and gas
burning appliances - Automatic shut-off valves for
operating pressure of above 500 kPa up to and
including 6 300 kPa

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 16678:2022 sisaldab Euroopa standardi EN 16678:2022 ingliskeelset teksti.	This Estonian standard EVS-EN 16678:2022 consists of the English text of the European standard EN 16678:2022.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 12.10.2022.	Date of Availability of the European standard is 12.10.2022.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 23.060.40

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis-ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis-ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Safety and control devices for gas burners and gas burning appliances - Automatic shut-off valves for operating pressure of above 500 kPa up to and including 6 300 kPa

Équipements auxiliaires pour brûleurs à gaz et appareils à gaz - Robinets automatiques de sectionnement pour pression de service supérieure à 500 kPa et inférieure ou égale à 6300 kPa

Sicherheits- und Regeleinrichtungen für Gasbrenner und Gasbrennstoffgeräte - Automatische Absperrventile für einen Betriebsdruck über 500 kPa bis einschließlich 6 300 kPa

This European Standard was approved by CEN on 8 August 2022.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

Contents

Page

European foreword.....	4
Introduction	5
1 Scope	7
2 Normative references	7
3 Terms and definitions.....	9
4 Classification	10
4.1 Classes of control	10
4.2 Groups of control	10
4.3 Classes of control functions	10
4.4 Types of <i>DC</i> supplied controls.....	10
5 Units of measurement and test conditions	10
6 Construction requirements	10
6.1 General	10
6.2 Mechanical parts of the control.....	10
6.3 Materials.....	12
6.4 Gas connections.....	13
6.5 Electrical parts of the control.....	14
6.6 Protection against internal faults for the purpose of functional safety.....	14
6.101 Pneumatic and hydraulic actuating mechanisms.....	14
7 Performance.....	15
7.1 General	15
7.2 Leak-tightness	15
7.3 Torsion and bending	15
7.4 Rated flow rate	16
7.5 Durability	16
7.6 Performance tests for electronic controls.....	17
7.7 Long-term performance for electronic controls	17
7.8 Data Exchange.....	17
7.101 Closing function.....	17
7.102 Closing force	18
7.103 Delay time and opening time.....	18
7.104 Closing time	18
7.105 Sealing force	19
7.106 Closed position indicator switch.....	19
7.107 Endurance	20
8 Electrical requirements	21
8.1 General	21
8.2 Protection by enclosure	21
8.101 Switches	21
8.102 Plug connections.....	22
8.103 Power saving circuits.....	22
9 Electromagnetic compatibility (EMC)	22
9.1 Protection against environmental influences.....	22
9.2 Supply voltage variations below 85 % of rated voltage	23

9.3	Voltage dips and interruptions	23
9.4	Supply frequency variations	23
9.5	Surge immunity tests	23
9.6	Electrical fast transient/burst	23
9.7	Immunity to conducted disturbances induced by radio frequency fields	23
9.8	Immunity to radiated disturbances induced by radio frequency fields	23
9.9	Electrostatic discharge tests	23
9.10	Power frequency magnetic field immunity tests	23
9.11	Harmonics and interharmonics including mains signalling at a. c. power port, low frequency immunity tests	23
10	Marking, instructions	23
10.1	Marking	23
10.2	Instructions	24
10.3	Warning notice	25
Annex A (informative)	Abbreviations and Symbols	26
Annex B (informative)	Leak-tightness test for gas controls – volumetric method	27
Annex C (informative)	Leak-tightness test for gas controls – pressure loss method	28
Annex D (normative)	Calculation of pressure loss into leakage rate	29
Annex E (normative)	Electrical/electronic component fault modes	30
Annex F (normative)	Additional requirements for safety accessories and pressure accessories as defined in EU Directive 2014/68/EU	31
Annex G (normative)	Materials for pressurized parts	32
Annex H (normative)	Additional materials for pressurized parts	33
Annex I (normative)	Requirements for controls used in DC supplied gas burners and appliances burning gaseous or liquid fuels	34
Annex J (normative)	Method for the determination of a Safety Integrity Level (SIL)	35
Annex K (normative)	Method for the determination of a Performance Level (PL)	36
Annex L (informative)	Relationship between Safety Integrity Level (SIL) and Performance Level (PL)	39
Annex M (normative)	Reset functions	40
Annex N (informative)	Guidance document on Environmental Aspects	41
Annex O (normative)	Seals of elastomer, cork and synthetic fibre mixtures	42
Annex ZA (informative)	Relationship between this European Standard and the essential requirements of Regulation (EU) 2016/426 aimed to be covered	43

European foreword

This document (EN 16678:2022) 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 16678:2015.

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

- a) alignment with EN 13611:2019;
- b) terms and definitions are aligned with EN 13611:2019;
- c) requirements from EU Directive 2014/68/EU were not adopted;
- d) reference to EN 437 removed;
- e) valves fitted with closed position indicator switches added to the scope;
- f) Clause “Other controls assembled” to a valve removed;
- g) Clause “Resistance to pressure” / safety factor removed;
- h) Clause “Electronic component – sensing element” is not applicable;
- i) Clause “Protection against internal faults for the purpose of functional safety” is not applicable;
- j) information on lifetime for safe function (designed lifetime) added to instructions.

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.

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).

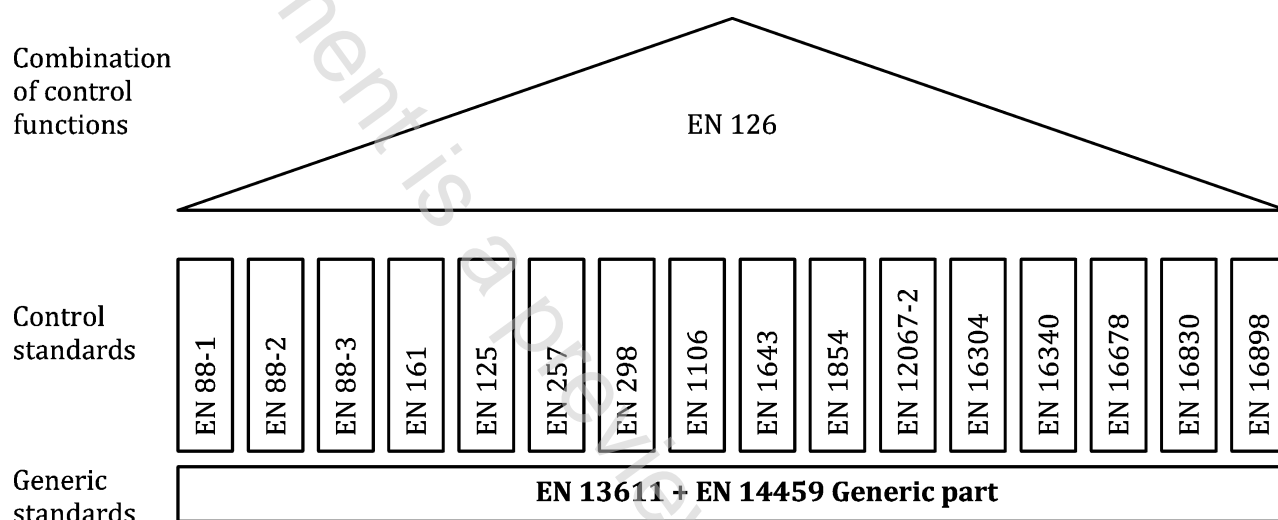


Figure 1 — Interrelation of control standards

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 16678 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.

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 of more than 500 kPa and up to and including 6 300 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 including the pilot valves for these fluids if actuated electrically and including release valves, but not to any external electrical devices for switching the actuating energy;
- valves where the flow rate is controlled by external electrical signals proportional to the applied signal;
- valves fitted with closed position indicator switches.

This document is not applicable to valves specifically designed for use in transmission and distribution networks.

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 161:2022, *Automatic shut-off valves for gas burners and gas appliances*

EN 549:2019, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

EN 1092-1:2018, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 1092-2:1997, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 2: Cast iron flanges*

EN 1092-3:2003², *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 3: Copper alloy flanges*

² As impacted by EN 1092-3:2003/AC:2007.

EN 1092-4:2002, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 4: Aluminium alloy flanges*

EN 1759-1:2004, *Flanges and their joint — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 1: Steel flanges, NPS 1/2 to 24*

EN 1759-3:2003³, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 3: Copper alloy flanges*

EN 1759-4:2003, *Flanges and their joint — Circular flanges for pipes, valves, fittings and accessories, class designated — Part 4: Aluminium alloy flanges*

EN 10226-1:2004, *Pipe threads where pressure tight joints are made on the threads — Part 1: Taper external threads and parallel internal threads — Dimensions, tolerances and designation*

EN 10226-2:2005, *Pipe threads where pressure tight joints are made on the threads — Part 2: Taper external threads and taper internal threads — Dimensions, tolerances and designation*

EN 12266-1:2012, *Industrial valves — Testing of metallic valves — Part 1: Pressure tests, test procedures and acceptance criteria — Mandatory requirements*

EN 12516-1:2014+A1:2018, *Industrial valves — Shell design strength — Part 1: Tabulation method for steel valve shells*

EN 12516-2:2014+A1:2021, *Industrial valves — Shell design strength — Part 2: Calculation method for steel valve shells*

EN 12516-3:2002⁴, *Valves — Shell design strength — Part 3: Experimental method*

EN 12516-4:2014+A1:2018, *Industrial valves — Shell design strength — Part 4: Calculation method for valve shells manufactured in metallic materials other than steel*

EN 12627:2017, *Industrial valves — Butt welding ends for steel valves*

EN 12760:2016, *Industrial valves — Socket welding ends for steel valves*

EN 13611:2019⁵, *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels — General requirements*

EN 60730-1:2016⁶, *Automatic electrical controls — 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)*

³ As impacted by EN 1759-3:2003/AC:2004.

⁴ As impacted by EN 12516-3:2002/AC:2003.

⁵ As impacted by EN 13611:2019/AC:2021.

⁶ As impacted by EN 60730-1:2016/A1:2019 and EN 60730-1:2016/A2:2022.

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

ISO 188:2011, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 1431-1:2022, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

ISO 1817:2022, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 8573-1:2010, *Compressed air — Part 1: Contaminants and purity classes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13611:2019, EN 161:2021 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

pilot valve

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

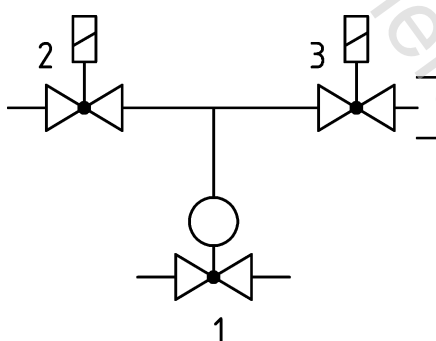
Note 1 to entry: A typical pilot and release valve application is shown in Figure 2.

3.102

release valve

valve in the line from the pilot valve to the actuating mechanism which closes the vent automatically when the actuating fluid is released by the pilot valve and opens it automatically when the pilot valve is closed

Note 1 to entry: A typical pilot and release valve application is shown in Figure 2.



Key

- 1 control under test
- 2 pilot valve (normally closed)
- 3 release valve, normally open

Figure 2 — Typical pilot and release valve application