
**Varnostne in nadzorne naprave za plinske gorilnike in plinske aparate - 2. del:
Regulatorji tlaka za vstopne tlake nad 50 kPa do vključno 500 kPa in pripadajoče
varnostne naprave**

Safety and control devices for gas burners and gas burning appliances - Part 2: Pressure regulators for inlet pressures above 50 kPa up to and including 500 kPa and associated safety devices

Sicherheits- und Regeleinrichtungen für Gasbrenner und Gasgeräte - Teil 2: Druckregler für Eingangsdrücke über 50 kPa bis einschließlich 500 kPa und dazugehörigen Sicherheitseinrichtungen

Dispositifs de sécurité et de contrôle pour les brûleurs à gaz et appareils utilisant des combustibles gazeux - Partie 2 : Régulateurs de pression pour pressions amont comprises entre 50 kPa et 500 kPa et dispositifs de sécurité associés

Ta slovenski standard je istoveten z: prEN 88-2

ICS:

23.060.40	Tlačni regulatorji	Pressure regulators
27.060.20	Plinski gorilniki	Gas fuel burners

oSIST prEN 88-2:2020**en,fr,de**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 88-2:2020](#)

<https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 88-2

May 2020

ICS 23.060.40

Will supersede EN 88-2:2007

English Version

Pressure regulators and associated safety devices for gas appliances - Part 2: Pressure regulators for inlet pressures above 500 mbar up to and including 5 bar

Dispositifs de sécurité et de contrôle pour les brûleurs à gaz et appareils utilisant des combustibles gazeux - Partie 2 : Régulateurs de pression pour pressions amont comprises entre 50 kPa et 500 kPa et dispositifs de sécurité associés

Sicherheits- und Regeleinrichtungen für Gasbrenner und Gasgeräte - Teil 2: Druckregler für Eingangsdrücke über 50 kPa bis einschließlich 500 kPa und dazugehörigen Sicherheitseinrichtungen

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.

This draft European Standard was established by CEN 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, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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.....	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Classification	12
4.1 Classes of control	12
4.2 Groups of control	13
4.3 Classes of control function	13
4.4 Types of DC supplied controls	13
5 Test conditions and uncertainty of measurements	13
6 Design and construction	13
6.1 General	13
6.2 Mechanical parts of the control	13
6.2.1 Appearance	13
6.2.2 Holes	13
6.2.3 Breather holes	13
6.2.4 Screwed fastenings	13
6.2.5 Jointing	13
6.2.6 Moving parts	13
6.2.7 Sealing caps	13
6.2.8 Dismantling and reassembly	14
6.2.9 Auxiliary canals and orifices	14
6.2.10 Presetting device	14
6.2.101 External visual Indication of the position of the closure member	14
6.2.102 Parts transmitting actuating forces	14
6.2.103 Adjustments	14
6.2.104 Integral safety shut-off device	14
6.2.105 Resistance to pressure	15
6.2.106 Signal tube connections	15
6.2.107 Creep relief device	15
6.3 Materials	16
6.3.1 General material requirements	16
6.3.2 Housing	16
6.3.3 Zinc alloys	16
6.3.4 Springs	16
6.3.5 Resistance to corrosion and surface protection	16
6.3.6 Impregnation	16
6.3.7 Seals for glands for moving parts	16
6.4 Gas connections	16
6.5 Electrical parts of the control	16
6.6 Protection against internal faults for the purpose of functional safety	16
7 Performance	16
7.1 General	16
7.2 Leak-tightness	17

7.2.1	Requirements.....	17
7.2.2	Tests	17
7.3	Torsion and bending	17
7.4	Rated flow rate	17
7.4.1	Requirement.....	17
7.4.2	Test	17
7.4.3	Conversion of air flow rate.....	17
7.5	Durability.....	17
7.5.1	Elastomers in contact with gas	17
7.5.2	Marking	18
7.5.3	Resistance to scratching.....	18
7.5.4	Resistance to humidity	18
7.6	Performance tests for electronic controls.....	18
7.7	Long-term performance for electronic controls	18
7.8	Data exchange	18
7.101	Pressure regulator performance	18
7.101.1	General	18
7.101.2	General test procedure.....	18
7.102	Safety devices.....	24
7.102.1	Over-pressure safety shut-off devices	24
7.102.2	Under-pressure safety shut-off devices	28
7.102.3	Endurance	28
8	Electrical requirements.....	29
9	Electromagnetic compatibility (EMC).....	29
10	Marking, installation and operating instructions.....	29
10.1	Marking	29
10.2	Installation and operating instructions.....	30
10.3	Warning notice	30
Annex A (informative)	Abbreviations and Symbols.....	31
Annex B (informative)	Leak-tightness tests for gas controls – volumetric method	32
Annex C (informative)	Leak-tightness tests for gas controls – pressure loss method.....	33
Annex D (normative)	Conversion of pressure loss into leakage rate	34
Annex E (normative)	Electrical/electronic component fault modes	35
Annex F (normative)	Additional requirements for safety accessories and pressure accessories as defined in EU Directive 97/23/EC.....	36
Annex G (normative)	Materials for pressurized parts	37
Annex H (normative)	Additional materials for pressurized parts	38
Annex I (normative)	Requirements for controls used in DC supplied burners and appliances burning gaseous or liquid fuels.....	39
Annex J (normative)	Method for the determination of a Safety Integrity Level (SIL).....	40
Annex K (normative)	Method for the determination of a Performance Level (PL).....	41
Annex L (informative)	Relationship between Safety Integrity Level (SIL) and Performance Level (PL).....	42
Annex M (normative)	Reset functions.....	43
Annex N (informative)	Guidance document on environmental aspects.....	44

prEN 88-2:2020 (E)

Annex O (normative) Seals of elastomer, cork and synthetic fibre mixtures.....	45
Annex AA (informative) Typical pressure regulators and pressure regulator parts.....	46
AA.1 Main components of a pressure regulator	46
AA.2 Main components of a gas safety shut-off device.....	49
Annex BB (informative) Overview of requirements and test conditions (as given in Clause 7), and examples of performance curves for pressure regulators.....	51
Annex CC (normative) Creep relief device	54
CC.1 General.....	54
CC.2 Terms and definitions	54
CC.3 Design and construction.....	54
CC.4 Performance requirements.....	54
CC.5 Marking, installation and operating instructions	55
Annex DD (informative) Comparison between EN 334:2005+A1:2009 and prEN 88-2:2020.....	56
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Regulation (EU) 2016/426 aimed to be covered.....	57
Annex ZB (informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU aimed to be covered.....	63
Bibliography.....	65

iTech STANDARD PREVIEW
(standards.itech.ai)

oSIST prEN 88-2:2020

<https://standards.itech.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020>

European foreword

This document (prEN 88-2:2020) 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 88-2:2007.

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 Annexes ZA and ZB, which are an integral part of this document.

prEN 88-2:2020 includes the following significant technical changes with respect to EN 88-2:2007:

- a) scope extended to “Pressure regulators incorporating safety devices”;
- b) alignment with EN 13611:2019;
- c) requirements and tests added for pressure regulators which use auxiliary energy;
- d) classifications according to accuracy, lock-up pressure, and over-pressure shut-off added;
- e) Clause 6 extended to “Design and construction”;
- f) Clause 6.2.104 “Integral safety shut-off device” added;
- g) Clause 6.2.105 “Resistance to pressure” added;
- h) Clause 6.2.107 “Creep relief device” added;
- i) Clause 7.2.2 “Test for leak-tightness”, new value for test pressure;
- j) design of all Figures adapted to design of Figures in EN 13611:2019;
- k) Annex BB “Overview of requirement and test conditions” added;
- l) Annex CC “Creep relief device” added;
- m) Annex DD “Comparison between EN 334:2005+A1:2009 and prEN 88-2:2020” added.

EN 88 consists of the following parts:

- *Part 1: Pressure regulators for inlet pressures up to and including 50 kPa;*
- *Part 2: Pressure regulators for inlet pressures above 500 mbar up to and including 5 bar;*
- *Part 3: Pressure and/or flow rate regulators for inlet pressures up to and including 500 kPa, electronic types.*

Introduction

This document is a particular standard for pressure Regulators for gas-burners and gas-burning appliances which cites the generic requirements of EN 13611:2019 wherever possible. This document supplements or modifies the corresponding clauses of EN 13611:2019. The construction and performance requirements are as far as applicable in total conformity with EN 13611:2019.

This document is intended to be used in conjunction with EN 13611:2019. 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. It should be noted that these clauses and subclauses are not indicated as an addition. 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.

Performance Level (PL) or Safety Integrity Level (SIL) classifications according to EN ISO 13849-1 or EN 61508-1 cannot automatically be claimed based upon compliance with this document. Pressure regulators with SIL classification do not automatically meet the requirements of this document.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 88-2:2020](https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020)

<https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020>

1 Scope

This document specifies the safety, design, construction as well as performance requirements and testing for pneumatic pressure regulators and safety devices for burners and appliances burning one or more gaseous fuels, hereafter referred to as 'pressure regulators'.

This document is applicable to:

- pressure regulators with declared maximum inlet pressure above 50 kPa up to and including 500 kPa, of nominal connection size up to and including DN 250 for use with one or more fuel gases in accordance with EN 437;
- pressure regulators incorporating safety devices;
- pressure regulators and safety devices which use auxiliary energy; and
- stand-alone pressure regulators or pressure regulators equipped with a control device for maximum or minimum gas pressure.

This document is not applicable to:

- pressure regulators that are connected directly to mains pipe-work or to a container that maintains a standard distribution pressure;
- pressure regulators intended for gas appliances to be installed in the open air and exposed to the environment.

iTech STANDARD PREVIEW
(standards.iteh.ai)

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

EN 682, *Elastomeric Seals - Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids*

EN 13611:2019, *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels - General requirements*

EN 13787, *Elastomers for gas pressure regulators and associated safety devices for inlet pressures up to 100 bar*

EN 60534-2-3:2016, *Industrial-process control valves - Part 2-3: Flow capacity - Test procedures (IEC 60534-2-3)*

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

pressure regulator

device that maintains the outlet pressure constant independent of the variations in inlet pressure and/or flow rate within defined limits

[SOURCE: EN 88-1:2011+A1:2016, 3.101]

3.102

control member

movable part of the pressure regulator which varies flow rate and/or outlet pressure directly

[SOURCE: EN 88-1:2011+A1:2016, 3.107]

3.103

safety shut-off device

SSD

device the function of which is to stay in the open position under normal operating conditions and to shut off the gas flow automatically and completely when the monitored pressure deviates above or below the pre-set value

<https://standards.iteh.ai/catalog/standards/sist/65b37871-ae3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.104

housing

part of the pressure regulator and/or SSD that is the main pressure containing envelope

3.105

valve seat

corresponding sealing surfaces within a pressure regulator or SSD that make full contact only when the pressure regulator or SSD is in the closed position

3.106

controller

device which normally includes a setting element, normally a spring, to obtain a set value of the outlet pressure and a pressure detector element, normally a diaphragm for the outlet pressure

3.107

actuator

device or mechanism which changes the signal from the controller into a corresponding movement controlling the position of the control member

3.108**working diaphragm**

flexible member which, under the influence of the forces arising from loading and pressure, operates the control member

Note 1 to entry: Diaphragms used as a control member are not covered by this definition.

3.109**pressure containing part**

part where failure would result in release of gas to the atmosphere

Note 1 to entry: Such parts comprise housings, inner partition walls, control member, bonnets, the housing of the actuator, blind flanges and pipes for process and sensing lines.

3.110**signal connection**

part that is used to convey pressure from part of an installation to the signal chamber

3.111**breather line**

line between the controller and/or pilot regulator and atmosphere which equalizes the pressure on a detector element when it changes its position

3.112**fixture**

functional device connected to the main components of the pressure regulator or SSD

3.113**exhaust line**

line to atmosphere between the regulator or fixtures for the safe venting of gas in the event of a component failure

3.114**trip mechanism**

mechanism that releases the closure member when activated by the controller

3.115**SSD-actuator**

device that is activated by the trip mechanism which shuts the closure member

3.116**relatching device**

device that enables the complete opening of an SSD

3.117**motorization chamber**

chamber at the higher pressure of two chambers under pressure within the housing of actuator

3.118**monitored pressure**

pressure monitored and safeguarded by the SSD

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN 88-2:2020

<https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-0009186c81e8/sist-pr-en-88-2-2020>

0009186c81e8/sist-pr-en-88-2-2020

prEN 88-2:2020 (E)**3.119****trip pressure**

pressure value at which the closing member starts to move

3.120**upper trip pressure**

p_{do}

upper limit of the monitored over-pressure

3.121**lower trip pressure**

p_u

lower limit of the monitored under-pressure

3.122**outlet setting pressure**

p_{2s}

outlet pressure at which the pressure regulator is set for test purposes

[SOURCE: EN 88-1:2011+A1:2016, 3.113]

3.123**maximum outlet pressure**

p_{2max}

upper limit of the outlet pressure, as stated in the installation and operating instructions

[SOURCE: EN 88-1:2011+A1:2016, 3.109]

[oSIST prEN 88-2:2020](https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020)

[https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-](https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020)

[06813fbf6e8f/osist-pren-88-2-2020](https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020)

3.124**minimum outlet pressure**

p_{2min}

lower limit of the outlet pressure, as stated in the installation and operating instructions

[SOURCE: EN 88-1:2011+A1:2016, 3.110]

3.125**outlet pressure range**

difference between minimum and maximum values of the outlet pressure

[SOURCE: EN 88-1:2011+A1:2016, 3.111]

3.126**steady state value**

outlet pressure measured after step response (control signal remains constant)

[SOURCE: EN 88-1:2011+A1:2016, 3.127]

3.127**settling tolerance**

maximum difference between the current outlet pressure and its steady state value

[SOURCE: EN 88-1:2011+A1:2016, 3.128]

3.128**regulation tolerance**

settling tolerance, expressed as a percentage of the outlet setting pressure

3.129**performance curve**

graphic representation of the outlet pressure as a function of the rated flow rate

Note 1 to entry: This curve is determined by increasing and then decreasing the rated flow rate with constant inlet pressure and constant outlet setting pressure (see Figure BB.1).

3.130**family of performance curves**

set of the performance curves for each value of inlet pressure determined for a given outlet setting pressure

Note 1 to entry: See Figure BB.2.

3.131**accuracy**

percentage of the outlet pressure relative to the outlet setting pressure within the operation range

3.132**accuracy class**

AC

maximum permissible value of the accuracy

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.133**inlet pressure range**

range between the minimum and maximum values of the inlet pressure

oSIST prEN 88-2:2020

<https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-00151b0c81e8/sist-prEN-88-2-2020>

[SOURCE: EN 88-1:2011+A1:2016, 3.108]

3.134**lock-up time**

t_f

time taken for the control member to move from an open position to the closed position

3.135**lock-up pressure**

p_{2f}

outlet pressure at which a pressure regulator closes when the outlet of the pressure regulator is sealed

[SOURCE: EN 88-1:2011+A1:2016, 3.120]

prEN 88-2:2020 (E)

3.136

lock-up pressure class

SG

maximum permissible positive difference between the actual lock-up pressure(s) p_{2f} and the corresponding outlet setting pressure(s) at a certain percentage of the maximum rated flow rate q_{\max} expressed as a percentage of the outlet setting pressure

Note 1 to entry: The lock-pressure pressure class, SG , is given by the following equation:

$$SG = 100 \cdot \frac{(p_{2f} - p_2)}{p_2} \quad (1)$$

where

SG is the lock-up pressure class;

p_{2f} is the lock-up pressure; and

p_2 is the outlet setting pressure.

3.137

maximum allowable pressure

PS

maximum pressure for which the pressure regulator and/or SSD is designed as stated in the installation and operating instructions

Note 1 to entry: In accordance with the strength requirements of this document.

<https://standards.iteh.ai/catalog/standards/sist/65b37871-ae3d-4b48-b12f-06813fbf6e8f/osist-pren-88-2-2020>

3.138

limit pressure p_l

pressure at which yielding becomes apparent in any component of the pressure regulator or its fixtures

3.139

safety factor S_b, S

ratio of the value of the limit pressure p_l to the value of the maximum allowable pressure PS

Note 1 to entry: This term applies to two separate discrete regions of the pressure regulator:

- applied to the pressure regulator housing: S_b ;
- applied to the other pressure containing parts of the pressure regulator: S

4 Classification**4.1 Classes of control**

EN 13611:2019, 4.1 is replaced by the following:

Pressure regulators shall be classified according to regulator accuracy class (7.101.2.4) $AC 1, AC 2,5, AC 5, AC 10,$ and $AC 20,$ according to lock-up pressure class (7.101.2.5) $SG 5, SG 10, SG 20,$ and $SG 30,$ and according to over-pressure shut-off accuracy group (7.102.1) $AG 5, AG 10, AG 20,$ and $AG 30.$

4.2 Groups of control

Shall be according to EN 13611:2019, 4.2 with the following addition:

Pressure regulators shall fulfil Group 2 classification.

4.3 Classes of control function

EN 13611:2019, 4.3 is not applicable.

4.4 Types of DC supplied controls

EN 13611:2019, 4.4 is not applicable.

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

6.2.3.1 Requirements

Shall be according to EN 13611:2019, 6.2.3.1 with the following addition:

If the vented capacity is greater than 70 dm³/h of air, a connection for a vent pipe shall be provided.

6.2.3.2 Test for leakage of breather holes

Shall be according to EN 13611:2019, 6.2.3.2.

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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 88-2:2020](https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-11911021287/osist-pren-88-2-2020)

<https://standards.iteh.ai/catalog/standards/sist/65b37871-ac3d-4b48-b12f-11911021287/osist-pren-88-2-2020>