



SLOVENSKI STANDARD

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**Tlačni regulatorji in pripadajoče varnostne naprave za plinske aparate - 1. del:
Tlačni regulatorji za vstopne tlake do vključno 500 mbar (50 kPa)**

Pressure regulators and associated safety devices for gas appliances - Part 1: Pressure regulators for inlet pressures up to and including 50 kPa

Druckregler und zugehörige Sicherheitseinrichtungen für Gasgeräte - Teil 1: Druckregler für Eingangsdrücke bis einschließlich 50 kPa

Régulateurs de pression et dispositifs de sécurité associés pour appareils à gaz - Partie 1: Régulateurs de pression pour pression amont inférieure ou égale à 50 kPas

Ta slovenski standard je istoveten z: EN 88-1:2011

ICS:

23.060.40 Tlačni regulatorji Pressure regulators

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English Version

Pressure regulators and associated safety devices for gas appliances - Part 1: Pressure regulators for inlet pressures up to and including 50 kPa

Régulateurs de pression et dispositifs de sécurité associés pour appareils à gaz - Partie 1: Régulateurs de pression pour pression amont inférieure ou égale à 50 kPa

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This European Standard was approved by CEN on 26 February 2011.

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Foreword

This document (EN 88-1:2011) 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of an identical text or by endorsement, at the latest by October 2011, and conflicting national standards shall be withdrawn at the latest by April 2014.

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

This document supersedes EN 88-1:2007, EN 12067-1:1998 and EN 12078:1998.

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 document is intended to be used in conjunction with EN 13611:2007. This document refers to clauses of EN 13611:2007 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 which are particular to this European Standard. It should be noted that these clauses and sub-clauses are not indicated as an addition. Sub-clauses or annexes which are additional to those in EN 13611:2007 are numbered starting from 101 or are designated as Annex AA, BB, CC etc.

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

- a) alignment with EN 13611:2007;
- b) requirements and tests of Pneumatic gas/air ratio pressure regulators (EN 12067-1) and Zero pressure regulators (EN 12078) included in this European Standard;
- c) requirements and tests for breather holes changed;
- d) requirements and tests for housings changed;
- e) general requirement for leak tightness changed;
- f) requirement for rated flow rate changed;
- g) tests for class A and B regulators changed;
- h) declarations of nominal diameters and maximum inlet pressure extended.

EN 88 *Pressure regulators and associated safety devices for gas appliances* consists of the following parts:

- EN 88-1, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*;
- EN 88-2, *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*.

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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 European Standard. Pressure regulators with PL or SIL classification do not automatically meet the requirements of this European 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, Croatia, 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 the United Kingdom.

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1 Scope

This European Standard specifies the safety, construction and performance requirements for pressure regulators and pneumatic gas/air ratio pressure regulators (zero pressure regulators are included as a special type of pneumatic gas/air ratio pressure regulator), intended for use with gas burners, gas appliances and similar use, hereafter referred to as 'pressure regulators'.

This European Standard is applicable to

- pressure regulators with declared maximum inlet pressures up to and including 50 kPa (500 mbar) of nominal connection sizes up to and including DN 250 for use with one or more fuel gases in accordance with EN 437,
- pressure regulators which use auxiliary energy,
- pneumatic gas/air ratio pressure regulators, which function by controlling a gas outlet pressure in response to an air signal pressure, air signal differential pressure, and/or to a furnace pressure signal (zero pressure regulators are included as a special type of pneumatic gas/air ratio pressure regulator),
- gas/air ratio pressure regulators which change an air outlet pressure in response to a gas signal pressure or a gas signal differential pressure.

This European Standard does not cover

- pressure regulators connected directly to gas distribution network or to a container that maintains a standard distribution pressure, [standards.iteh.ai](https://standards.iteh.ai/catalog/standards/sist/056d96ab-0634-4857-8a84-3e8b2126c51/sist-en-88-1-2011)
- pressure regulators intended for gas appliances to be installed in the open air and exposed to the environment, [SIST EN 88-1:2011](https://standards.iteh.ai/catalog/standards/sist/056d96ab-0634-4857-8a84-3e8b2126c51/sist-en-88-1-2011)
- mechanically linked gas/air ratio controls, <https://standards.iteh.ai/catalog/standards/sist/056d96ab-0634-4857-8a84-3e8b2126c51/sist-en-88-1-2011>
- electronic gas/air ratio controls (EN 12067-2).

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 161:2011¹⁾, *Automatic shut-off valves for gas burners and gas appliances*

EN 13611:2007, *Safety and control devices for gas burners and gas burning appliances — General requirements*

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

¹⁾ To be published.

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13611:2007 and the following apply.

3.101

pressure regulator

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

3.102

direct regulator

pressure regulator where the spring or pressure signal acts directly on the working diaphragm

3.103

indirect regulator

pressure regulator where the spring or pressure signal acts directly on a regulator diaphragm that controls the working diaphragm or the control member with pneumatic, hydraulic or electric means

3.104

adjustable pressure regulator

pressure regulator provided with means for changing the outlet pressure setting

3.105

pneumatic gas/air ratio pressure regulator

pressure regulator, which supplies gas at specified pressure at it's outlet in response to control pressure

3.106

zero pressure regulator

pressure regulator, which maintains the outlet pressure constant at atmospheric pressure

3.107

control member

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

3.108

inlet pressure range

difference between the minimum and maximum values of the inlet pressure

3.109

maximum outlet pressure

P_{2max}

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

3.110

minimum outlet pressure

P_{2min}

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

3.111

outlet pressure range

difference between minimum and maximum values of the outlet pressure

3.112

inlet setting pressure

P_{1s}

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

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3.113
outlet setting pressure

p_{2s}

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

3.114
signal pressure

p_3

pressure, differential pressure or a combination of both applied to the regulator in order to provide the specified outlet pressure

3.115
signal pressure range

range of signal pressure between the minimum and maximum values

3.116
load determining pressure

p_4

underpressure as a result of an air flow, e.g. produced by a sucking fan, through a restriction

3.117
gas/air ratio

slope of a straight line relationship between the outlet pressure p_2 and signal pressure p_3

3.118
working diaphragm

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

3.119
diaphragm plate

stiffening plate fitted to the diaphragm

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3.120
lock-up pressure

p_{2f}

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

3.121
put out of action

block the operation of the pressure regulator by fixing the control member in the fully open position

3.122
furnace pressure

pressure of combustion gases from the combustion chamber connected to the pressure regulator

3.123
signal chamber

part of the regulator to which the air signal pressure, gas pressure, or furnace pressure signal is connected

3.124
signal connection

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

3.125
offset

outlet pressure shift at pneumatic gas/air ratio pressure regulators independent of signal or load determining pressure(s)

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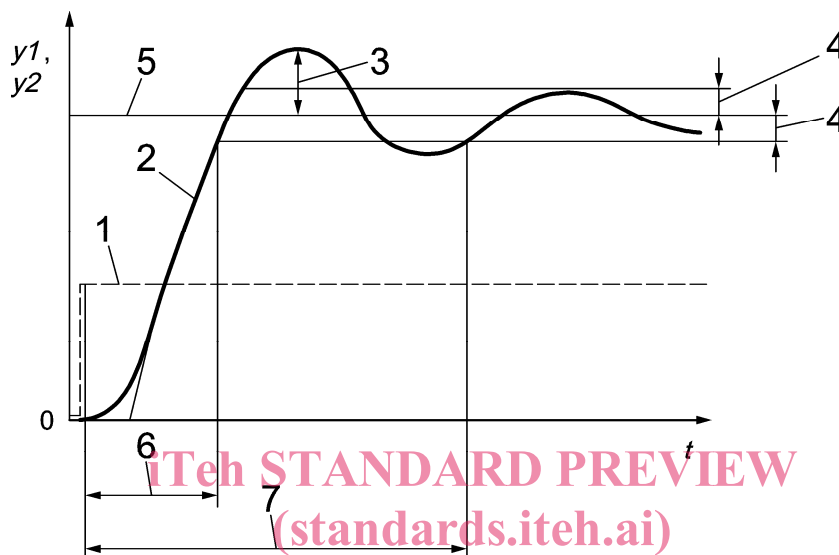
NOTE Typically this is achieved by means of a spring.

3.126

step response

outlet pressure change of a pneumatic gas/air ratio pressure regulator having a step change of the signal pressure or load determining pressure

NOTE For further information refer to Figure 1.

**Key**

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1	step function (y_1)	5	steady state value
2	step response (y_2)	6	response time
3	overshoot value	7	settling time
4	settling tolerance	t	time

Figure 1 — Step response of a transfer element

3.127

steady state value

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

3.128

settling tolerance

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

3.129

response time

time counted from start of the step change of the signal pressure or load determining pressure until the outlet pressure is in the settling tolerance for the first time

3.130

settling time

time counted from start of the step change of the signal pressure or load determining pressure until the outlet pressure remains in the settling tolerance

3.131**overshoot value**

largest difference between the outlet pressure and its steady state value after step change of the signal pressure or load determining pressure exceeding the settling tolerance for the first time

3.132**withstand pressure**

pressure that is withstood without degraded characteristic after returning below the maximum inlet pressure

[EN 1854:2010, 3.116]

NOTE The withstand pressure is equal to or higher than the maximum inlet pressure.

3.133**safety shut-off device**

SSD

device whose function 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

[EN 88-2:2007, 3.3.1]

4 Classification**4.1 Classes of control**

EN 13611:2007, 4.1 is replaced by the following:

Pressure regulators shall be classified A, B, or C according to the appropriate outlet pressure and rated flow rate limits given in 7.101.1.

Gas/air ratio pressure regulators are not classified.

4.2 Groups of control

Shall be according to EN 13611:2007, 4.2.

4.3 Classes of control functions

EN 13611:2007, 4.3 is not applicable.

5 Units of measurement and test conditions

Shall be according to EN 13611:2007, Clause 5.

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6 Construction requirements**6.1 General**

Shall be according to EN 13611:2007, 6.1 with the following addition:

The withstand pressure shall be stated in the installation and operating instructions. If no withstand pressure is stated, the withstand pressure is equal to the maximum inlet pressure.

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

Shall be according to EN 13611:2007, 6.2.1.

6.2.2 Holes

Shall be according to EN 13611:2007, 6.2.2.

6.2.3 Breather holes

Shall be according to EN 13611:2007, 6.2.3 with the following addition:

Use the withstand pressure instead of the maximum inlet pressure, if applicable.

Alternatively, for indirect regulators the requirement of a maximum leakage rate of 70 dm³/h for breather holes can be replaced by the following requirement:

- the breather hole has a maximum diameter of 1 mm;
- a ruptured regulator diaphragm shall lead to a situation where the control member moves to the closed or the fully open position;
- stress the diaphragm with the temperature and pressure stress test of 6.2.4;
- after the tests of 6.2.4 the leakage rate shall fulfil the requirements of 7.2.

6.2.4 Test for leakage of breather holes

Shall be according to EN 13611:2007, 6.2.4 with the following addition:

If for indirect regulators the alternative requirement of 6.2.3 is used, the following test applies:

- leave the regulator diaphragm as is;
- store one pressure regulator for 1 h ± 5 min at 135 °C ± 2 °C ambient temperature;
- keep the regulator at this temperature and apply a pressure of three times the withstand pressure to gas-carrying compartments for 5 min ± 10 s;
- wait for the pressure regulator to return to room temperature;
- measure the external leakage rate according to 7.3.2.

6.2.5 Screwed fastenings

Shall be according to EN 13611:2007, 6.2.5.

6.2.6 Jointing

Shall be according to EN 13611:2007, 6.2.6.

6.2.7 Moving parts

Shall be according to EN 13611:2007, 6.2.7.

6.2.8 Sealing caps

Shall be according to EN 13611:2007, 6.2.8.

6.2.9 Dismantling and reassembly

Shall be according to EN 13611:2007, 6.2.9.

6.2.101 Adjustments

The adjustments (e.g. outlet pressure, offset and gas/air-ratio) shall be readily accessible to authorised persons, but there shall be provision for sealing after adjustment. Means shall be provided to discourage interference by unauthorised persons. If it is stated in the installation and operating instructions that a pressure regulator can be put out of action, appropriate means shall be provided to put the pressure regulator out of action.

6.2.102 Resistance to pressure

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Parts of the pressure regulator that are subjected to inlet pressure under normal operating conditions, or could be subjected to inlet pressure in the event of a failure, shall resist a pressure equal to the withstand pressure.

6.2.103 Blockage of canals and orifices

Blockage of auxiliary canals and orifices shall not lead to an unsafe situation otherwise they shall be protected against blockage by suitable means.

6.2.104 Signal tube connections

Requirements on connections for gas pressure, air pressure or furnace pressure signal tubes shall be stated in the installation and operating instructions.

6.3 Materials**6.3.1 General material requirements**

Shall be according to EN 13611:2007, 6.3.1.

6.3.2 Housing

Shall be according to EN 13611:2007, 6.3.2 with the following modification:

The withstand pressure shall be used instead of maximum inlet pressure, if applicable.