BS EN 88-3:2022+A1:2024

BSI Standards Publication

Safety and control devices for gas burners and gas burning appliances

Part 3: Pressure and/or flow rate regulators for inlet pressures up to and including 500 kPa, electronic types

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Full document details: BS EN 88-3:2022+A1:2024

National foreword

This British Standard is the UK implementation of EN 88-3:2022+A1:2024. It supersedes BS EN 88-3:2022, which is withdrawn.

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The UK participation in its preparation was entrusted to Technical Committee GSE/22, Safety and control devices for gas and oil burners and gas burning appliances.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 88-3:2022+A1

November 2024

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English Version

Safety and control devices for gas burners and gas burning appliances - Part 3: Pressure and/or flow rate regulators for inlet pressures up to and including 500 kPa, electronic types

Dispositifs de sécurité et de contrôle pour les brûleurs à gaz et appareils utilisant des combustibles gazeux - Partie 3 : Régulateurs de pression et/ou de débit de type électronique pour pression amont inférieure ou égale à 500 kPa

Sicherheits- und Regeleinrichtungen für Gasbrenner und Gasgeräte - Teil 3: Druck- und/oder Durchflussregler für Eingangsdrücke bis einschließlich 500 kPa, elektronische Ausführung

This European Standard was approved by CEN on 8 August 2022 and includes Amendment 1 approved by CEN on 3 July 2024.

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European foreword

This document (EN 88-3:2022+A1:2024) 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of an identical text or by endorsement, at the latest by May 2025, and conflicting national standards shall be withdrawn at the latest by November 2027.

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 includes Amendment 1 approved by CEN on 3 July 2024.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ▌A1⟩ ⟨A1▌.

This document supersedes ▌A1⟩ EN 88-3:2022.

This standard differs from EN 88:2022 as follows:

a) Annex ZA has been brought in line with Mandate M/595 and the normative references are updated. ⟨A1▌

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.

The EN 88 series consists of the following parts:

— EN 88-1, *Safety and control devices for gas burners and gas burning appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*;

— EN 88-2, *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*;

— EN 88-3, *Safety and control devices for gas burners and gas burning appliances — Part 3: Pressure and/or flow rate regulators for inlet pressures up to and including 500 kPa, electronic types*.

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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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).

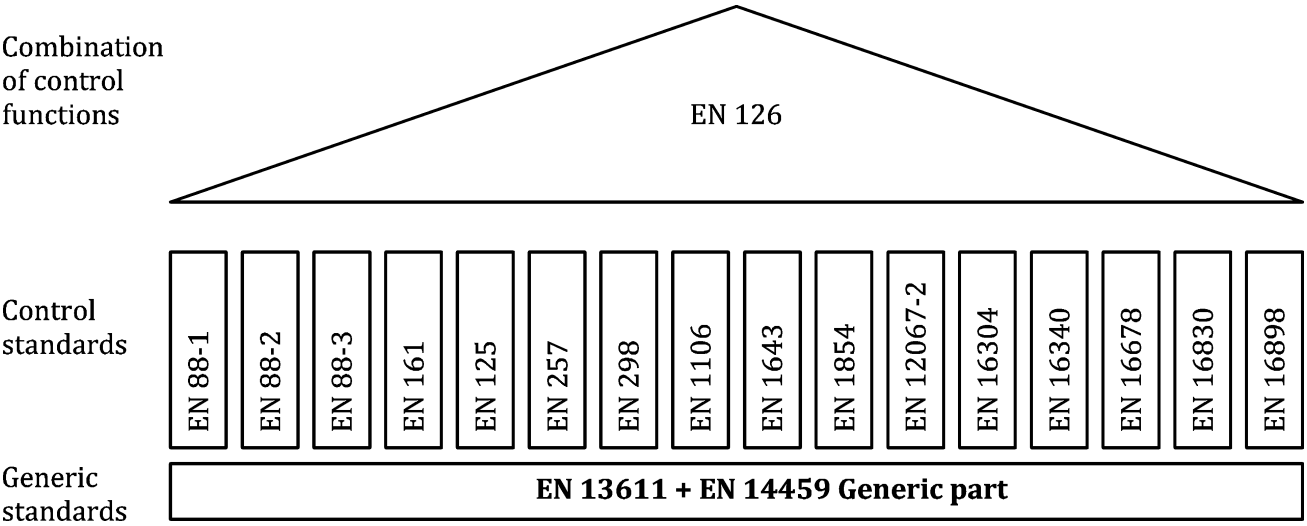

Figure 1 — Interrelation of control standards

EN 13611:2019 should be used in conjunction with the specific standard for a specific type of control (e.g. [A1⟩ EN 88-1:2022+A1:2023 ⟨A1], [A1⟩ EN 88-2:2022+A1:2024 ⟨A1], [A1⟩ EN 88-3:2022+A1:2024 ⟨A1], [A1⟩ EN 125:2022+A1:2024 ⟨A1], EN 126:2012, EN 161:2022, [A1⟩ EN 257:2022+A1:2023 ⟨A1], EN 298:2022, [A1⟩ EN 1106:2022+A1:2023 ⟨A1], EN 1643:2022, [A1⟩ EN 1854:2022+A1:2023 ⟨A1], EN 12067-2:2022, [A1⟩ EN 16304:2022+A1:2024 ⟨A1], EN 16340:2014, EN 16678:2022 and [A1⟩ EN 16898:2022+A1:2023 ⟨A1]), 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.

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.

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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. 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 “regulator”.

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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 electronic pressure and/or flow rate regulators for burners and appliances burning one or more gaseous fuels, hereafter referred to as "regulators".

This document is applicable to regulators 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:

— regulators which use auxiliary energy;

— regulators, which function by controlling a gas outlet pressure or a gas flow rate;

— regulators with a modular structure specified as a unit;

— regulators intended for gas appliances to be installed indoor or in the open air and exposed to the environment.

This document is not applicable to:

— regulators connected directly to a gas distribution network or to a container that maintains a standard distribution pressure.

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 13611:2019,[1] *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels — General requirements*

EN 14459:2021, *Safety and control devices for burners and appliances burning gaseous or liquid fuels — Control functions in electronic systems — Methods for classification and assessment*

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

[1] As impacted by EN 13611:2019/AC:2021.

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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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

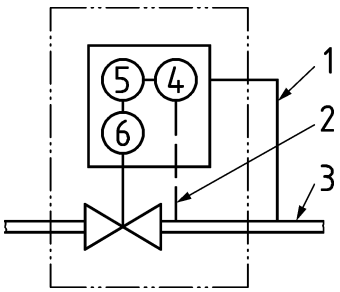
3.101
pressure regulator
device which maintains the outlet pressure constant, independent of the variations in inlet pressure and/or flow rate within defined limits

Note 1 to entry: Examples are shown in Figure 2 and Figure 3.

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.101]

3.102
flow rate regulator
device which maintains the flow rate constant, independent of the variations in inlet pressure and/or outlet pressure within defined limits

Note 1 to entry: Examples are shown in Figure 2 and Figure 3.



Key

1 rigid pipe
2 internal impulse line
3 gas line
4 sensing element
5 regulating controller including signal conditioner
6 actuator

Figure 2 — Illustration of the components of a pressure and/or flow rate regulator

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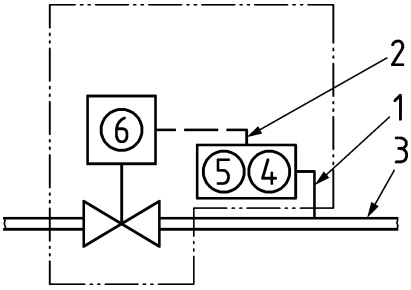

Key

1 rigid pipe
2 wire
3 gas line
4 sensing element
5 regulating controller including signal conditioner
6 actuator

Figure 3 — Illustration of the components of a pressure and/or flow rate regulator

3.103
adjustable regulator
regulator provided with means for changing the outlet pressure or flow rate set-point

3.104
control member
moveable part of the regulator which varies flow rate and/or outlet pressure directly

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.107, modified – “pressure” removed]

3.105
maximum inlet pressure
$p_{1\max}$
highest inlet pressure, as stated in the instructions, at which the regulator can be operated

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.109, modified – “pressure” removed]

3.106
minimum inlet pressure
$p_{1\min}$
lowest inlet pressure, as stated in the instructions, at which the regulator can be operated

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.110, modified – “pressure” removed]

3.107
inlet pressure range
difference between the maximum and minimum values of the inlet pressure, as stated in the instructions

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.108]

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3.108
maximum outlet pressure
$p_{2\max}$
upper limit of the outlet pressure, as stated in the instructions, at which the regulator can be operated

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.111, modified – "pressure" removed]

3.109
minimum outlet pressure
$p_{2\min}$
lower limit of the outlet pressure, as stated in the instructions, at which the regulator can be operated

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.112, modified – "pressure" removed]

3.110
outlet pressure range
difference between the maximum and minimum values of the outlet pressure, as stated in the instructions

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.113]

3.111
outlet pressure set-point
p_{2s}
outlet pressure to which the regulator is set

Note 1 to entry: p_{2s} can be an electrical signal which is equivalent to a desired pressure set-point.

3.112
maximum rated flow rate
$q_{\max}$
upper limit of the rated air flow rate, corrected to standard conditions, as stated in the instructions

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.116]

3.113
minimum rated flow rate
$q_{\min}$
lower limit of the rated air flow rate, corrected to standard conditions, as stated in the instructions

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▌, 3.117]

3.114
rated flow rate range
difference between the maximum and minimum values of the rated air flow rate, corrected to standard conditions, as stated in the instructions

3.115
rated flow rate set-point
q_s
rated flow rate to which the regulator is set

Note 1 to entry: q_s can be an electrical signal which is equivalent to a desired set flow rate set-point.

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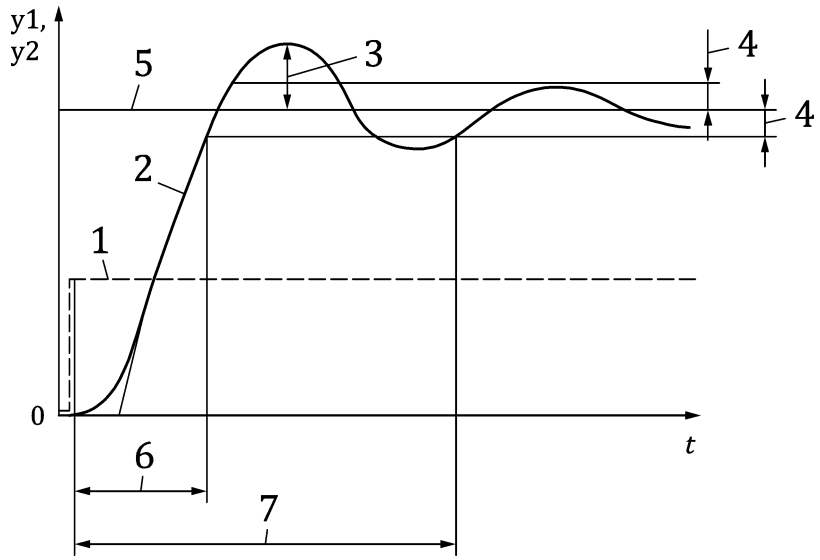
3.116
furnace pressure
pressure of combustion gases from the combustion chamber connected to the regulator

[SOURCE: ▌A1⟩ EN 88-1:2022+A1:2023 ⟨A1▐, 3.126, modified – “pressure” removed]

3.117
signal connection
connection that is used to convey pressure or flow from part of an installation to the electronic pressure or flow rate sensor (EPS)

3.118
step response
outlet pressure or flow rate change of the regulator having a step change of the outlet pressure or flow rate set-point signal (e.g. voltage)

Note 1 to entry: For further information refer to Figure 4.



Key

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

Figure 4 — Step response of a transfer element

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3.119
steady state value
outlet pressure or flow rate measured after step response remains constant

Note 1 to entry: For further information refer to Figure 4.

Note 2 to entry: Outlet pressure or flow rate set-point signal remains constant.

3.120
settling tolerance
maximum difference between the current outlet pressure or flow rate and its steady state value

Note 1 to entry: For further information refer to Figure 4.

3.121
response time
time counted from start of the step change of the outlet pressure or flow rate set-point signal (e.g. voltage) until the outlet pressure or flow rate is in the settling tolerance for the first time

Note 1 to entry: For further information refer to Figure 4.

3.122
settling time
time counted from start of the step change of the outlet pressure or flow rate set-point signal until the outlet pressure or flow rate remains within the settling tolerance

Note 1 to entry: For further information refer to Figure 4.

3.123
overshoot value
largest difference between the outlet pressure or flow rate and its steady state value after step change of the outlet pressure or flow rate set-point signal exceeding the setting tolerance for the first time

Note 1 to entry: For further information refer to Figure 4.

3.124
withstand pressure
pressure that is withstood without degraded characteristic after returning below the maximum inlet pressure

Note 1 to entry: The withstand pressure is equal to or higher than the maximum inlet pressure.

[SOURCE: ▌A1⟩ EN 1854:2022+A1:2023 ⟨A1▌, 3.115, modified – “at a PSD” removed from the definition and Note 1 to entry changed]

3.125
electronic pressure or flow rate sensor
EPS
assembly of electronic based pressure or flow rate sensing element and signal conditioner

Note 1 to entry: For further information refer to Figure 5.

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