BS EN 12186:2025

BSI Standards Publication

Gas infrastructure — Gas pressure control stations for transmission and distribution — Functional requirements

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National foreword

This British Standard is the UK implementation of EN 12186:2025. It supersedes BS EN 12186:2014, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GSE/33, Gas supply.

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

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European foreword

This document (EN 12186:2025) has been prepared by Technical Committee CEN/TC 234 “Gas infrastructure”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2026, and conflicting national standards shall be withdrawn at the latest by June 2026.

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 12186:2014.

EN 12186:2025 includes the following significant technical changes with respect to EN 12186:2014:

— the scope of the standard is expanded and now covers natural gas, blends of natural gas with hydrogen and hydrogen, as mentioned in CEN/TR 17797;

— measures to avoid greenhouse gas emissions were further detailed throughout the document;

— measures for adapting to climate change were included;

— as part of comprehensive automation, regulators, valves and safety devices are increasingly being equipped with communication interfaces so that they can be integrated into the overall information management of a pressure control station. The relevant requirements for these smart systems and equipment are defined in this document;

— gas pressure control stations are increasingly being integrated into operators' communication infrastructures. This has been taken into account in this edition of EN 12186 by including basic requirements for information security and safety-related electrical/electronic solutions.

Annex E provides the details of significant technical changes between this document and the previous edition.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

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

The gas infrastructure is complex and the importance on safety of its construction and use has led to the development of very detailed codes of practice and operating manuals in the member countries. These detailed statements embrace recognized standards of gas engineering and the specific requirements imposed by the legal structures of the member countries.

There is a complete suite of functional standards prepared by CEN/TC 234 “Gas Infrastructure” to cover all parts of the gas infrastructure from the input of gas into the on-shore transmission network up to the inlet connection of gas appliances, including injection, transmission, compression, pressure control, storage, blending, gas treatment, odorization, distribution, measuring, and associated installation pipework, as well as related requirements such as safety, gas quality, sustainability, environment and emissions. Within the scope of CEN/TC 234, gaseous energy carriers and blends describe gases which are in the gaseous state when conveyed in the gas pipeline infrastructure such as hydrogen, hydrogen rich, and methane rich gases, dimethyl ether (DME) and propane and butanes used for combustion and/or as feedstock, excluding steam and compressed air.

In preparing this document, a basic understanding of gas infrastructure by the user has been assumed. CEN/TC 234 standards are maintained to provide the state of the art and especially to facilitate the use of green gases in the gas infrastructure.

As gas pressure control stations for transmission and distribution are specifically designed for pipelines, they are considered as annexed equipment, and as such are excluded from the scope of the Directive 2014/68/EU (Pressure Equipment Directive – PED [3]). However, standard pressure equipment installed in these stations, e.g. gas pressure regulators, safety valves, valves, filters, heat exchangers, vessels, is covered by the directive [4].

Directive (EU) 2024/1788 [9] on common rules for the internal markets for renewable gas, natural gas and hydrogen and the related Regulation (EU) 2024/1789 [10] on the internal markets for renewable gas, natural gas and hydrogen also aim at technical safety (security) including technical reliability of the European gas and hydrogen system. These aspects and Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources [5] are also in the focus of CEN/TC 234 standardization. In this respect CEN/TC 234 evaluated the indicated EU legislation and amended this technical standard accordingly, where required and appropriate.

This document has been adapted to the requirements of the Regulation (EU) 2024/1787 on the reduction of methane emissions in the energy sector [8].

In this edition of EN 12186 environmental aspects relevant to the design, construction and testing, operation and maintenance, decommissioning and disposal of pressure control stations in the scope of this document are covered in accordance with CEN Guide 4 and CEN/TR 16388.

This document supports the mainstreaming climate adaptation into European standards according to the European Climate Law ((EU) 2021/1119 [6]) and the 2021 EU Adaptation Strategy for adaptation to climate change.

This document specifies common basic principles for the gas infrastructure. Users of this document are expected be aware that more detailed national standards and/or codes of practice can exist in the CEN member countries.

This document is intended to be applied in association with these national standards and/or codes of practice setting out the basic principles as outlined in Clause 1 of this document.

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1 Scope

This document specifies the functional requirements relevant for design, materials, construction, testing, operation and maintenance of gas pressure control stations to ensure their reliability in terms of safety of the station itself and the downstream system and continuity of service.

This document is applicable for gas pressure control stations which are part of gas transmission or distribution systems for hydrogen, and hydrogen rich, and methane rich gases. Additional requirements in the case of gases heavier than air and/or toxic or corrosive gases are not covered by this document.

This document does not apply to gas pressure control stations in operation prior to the publication of this document. However, Annex D of this document can be used as guidance for the evaluation of stations in operation prior to the publication of this document, regarding the change of the type of gas, e.g. repurposing for the use with hydrogen.

The stations covered by this document have a maximum upstream operating pressure, which does not exceed 100 bar. For higher maximum upstream operating pressures, this document can be used as a guideline.

If the inlet pipework of the station is a service line and the maximum upstream operating pressure does not exceed 16 bar and the design flow rate is equal to 2000 kW based on the gross calorific value or less, EN 12279 applies.

This document contains the basic system requirements for gas pressure control stations. Requirements for individual components (valves, regulators, safety devices, pipes, etc.) or installation of the components are contained in the appropriate European Standards.

NOTE For combined control and measuring stations, the additional requirements of EN 1776 can apply.

The requirements in this document do not apply to the design and construction of auxiliary facilities such as sampling, calorimetering, odorization systems and density measuring. These facilities are covered by the appropriate European Standards, where existing, or applicable national standards.

The requirements of this document are based on good gas engineering practice under conditions normally encountered in the gas industry. Requirements for unusual conditions cannot be specifically provided for, nor are all engineering and construction details prescribed.

The objective of this document is to ensure the safe operation of such stations. This does not, however, relieve all concerned of the responsibility for taking the necessary care and applying effective quality and safety management during the design, construction, operation and maintenance.

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 334, *Gas pressure regulators for inlet pressures up to 10 MPa (100 bar)*

EN 1127-1, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 1594, *Gas infrastructure — Pipelines for maximum operating pressure over 16 bar — Functional requirements*

EN 10204, *Metallic products — Types of inspection documents*

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EN 12007-1, *Gas infrastructure — Pipelines for maximum operating pressure up to and including 16 bar — Part 1: General functional requirements*

EN 12007-3, *Gas infrastructure — Pipelines for maximum operating pressure up to and including 16 bar — Part 3: Specific functional requirements for steel*

EN 12327, *Gas infrastructure — Pressure testing, commissioning and decommissioning procedures — Functional requirements*

EN 12732, *Gas infrastructure — Welding steel pipework — Functional requirements*

EN 14382, *Gas safety shut-off devices for inlet pressures up to 10 MPa (100 bar)*

EN 17649, *Gas infrastructure — Safety Management System (SMS) and Pipeline Integrity Management System (PIMS) — Functional requirements*

EN ISO 4126-1, *Safety devices for protection against excessive pressure — Part 1: Safety valves (ISO 4126-1)*

EN ISO 4126-4, *Safety devices for protection against excessive pressure — Part 4: Pilot-operated safety valves (ISO 4126-4)*

EN ISO 4126-5, *Safety devices for protection against excessive pressure — Part 5: Controlled safety pressure relief systems (CSPRS) (ISO 4126-5)*

EN ISO 80079-36, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements (ISO 80079-36)*

EN IEC 60079-10-1, *Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres*

EN IEC 60079-14, *Explosive atmospheres — Part 14: Electrical installation design, selection and installation of equipment, including initial inspection*

EN IEC 61000-6-4, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments*

EN IEC 61340-5-1, *Electrostatics — Part 5-1: Protection of electronic devices from electrostatic phenomena — General requirements*

EN IEC 62443 (all parts), *Security for industrial automation and control systems*

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the following terms, definitions, symbols and abbreviations apply. Annex A provides a glossary and gives translation to French and German.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

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

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

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3.1 General

3.1.1
authorized person
competent person who is appointed to fulfil a given task on gas pressure control stations

Note 1 to entry: The appointment procedure is defined in each member country.

3.1.2
competent person
person who is trained, experienced and approved to perform activities relating to gas pressure control stations

Note 1 to entry: Means of approval, if any, will be determined within each member country.

3.1.3
gas
energy carrier, which is in the gaseous state when conveyed in the gas pipeline infrastructure used for combustion and/or as feedstock

Note 1 to entry: For the purpose of this document, the term gas refers to a non-toxic, non-corrosive methane rich gas, hydrogen rich gas or hydrogen.

3.1.4
hazardous area
area in which an explosive or flammable gas atmosphere is present or can be expected to be present, in quantities such that special precautions for the construction, installation and use of equipment are required

[SOURCE: EN IEC 60079-10-1:2021, 3.3.1 – modified: added “or flamable gas“]

3.1.5
hazardous area zone
hazardous area classification based on the frequency of the occurrence and duration of the explosive atmosphere

[SOURCE: EN IEC 60079-10-1:2021, 3.3.3 – modified: added “hazardous area”]

3.2 Station

3.2.1
cavity wall
wall formed from two layers such as brick or blockwork with a space between

3.2.2
enclosed installation
plant installed in an enclosed space (apart from any necessary ventilation apertures)

3.2.3
open-air installation
plant installed outdoors, which can be protected by a canopy

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3.2.4
separate building
building which is detached from any other building and is used exclusively for the enclosed installation of gas pressure control and/or measuring equipment and ancillaries and can be accessed by personnel

3.2.5
cabinet station
enclosed space (apart from any necessary ventilation apertures), which is used exclusively to house gas pressure control and/or measuring equipment and ancillaries and is too small for access by personnel

3.2.6
underground station
space, partly or totally below ground level in which the gas pressure control and/or measuring equipment and ancillaries are installed

3.2.7
component
item from which a gas pressure control station is constructed

Note 1 to entry: A distinction is drawn between the following groups of components:

— equipment – e.g. valves, meters, preheaters, line filters, safety shut-off devices and pressure regulators which are used to control the flow of gas into and out of the station;

— pipework – e.g. pipe, reducers, bends, tees, flanges and insulating joints which are used to connect the equipment;

— ancillaries – additional devices and instrumentation which ensure that the equipment functions correctly.

3.2.8
inlet pipework
connecting pipework through which gas enters the station

3.2.9
main
pipework in the gas infrastructure to which service lines are connected

3.2.10
outlet pipework
connecting pipework through which gas leaves the station

3.2.11
pressure control station
installation comprising all components including the inlet and outlet pipework and any structure within which the components are installed, used for gas pressure regulation and over-pressure protection

3.2.12
service line
pipework from the main to the point of delivery of the gas into the installation pipework

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3.2.13
standard pressure equipment
equipment covered by Directive 2014/68/EU (Pressure Equipment Directive - PED) [3]

EXAMPLE Gas pressure regulators, safety valves, valves, filters, heat exchangers, vessels.

Note 1 to entry: See Article 1 No. 2 (A) of Directive 2014/68/EU [3] and Guideline A-17 of the Commission's Working Group "Pressure" [4].

3.2.14
commissioning
activities required to fill pipework, equipment and assemblies with gas for the first time and to perform test runs to check the system's integrity

3.2.15
decommissioning
activities required to take out of service any pipework, station, equipment or assemblies filled with gas and to disconnect them from the system

3.2.16
inspection
process of measuring, examining, testing, gauging or otherwise determining the status of items of the pipeline system or installation and comparing it with the applicable requirements

3.2.17
maintenance
combination of all technical and associated administrative actions intended to keep an item in, or restore it to, a state in which it can perform its required function

Note 1 to entry: Maintenance includes surveillance, inspection, function check-out, overhaul and repair.

Note 2 to entry: For further terms and definitions related to maintenance, see EN 13306.

3.2.18
disposal
activities to be performed after components of a decommissioned gas pressure control station have been dismantled

3.2.19
station availability
ability to be in a state to perform as and when required under given conditions, assuming that the required external resources are provided

[SOURCE: EN 13306:2017, 4.7 – modified: added "station"; deleted: "of an item"]

3.2.20
reliability
ability of a component or system to perform a required function under given conditions for a given time interval

[SOURCE: EN 13306:2017, 4.1 – modified: substitute: "an item" with "a component or system"]

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3.3 Pressure, design and testing

3.3.1
design factor
f_o
factor applied when calculating the wall thickness or design pressure

3.3.2
design flow rate
flow rate on which the design calculations are based

3.3.3
design pressure
DP
pressure on which design calculations are based

Note 1 to entry: A part of a pressure control station designed for a design pressure DP can comprise components designed for a different maximum allowable pressure (PS).

3.3.4
pressure
gauge pressure of the fluid inside the system, measured in static conditions

3.3.5
operating pressure
OP
pressure which occurs within a system under normal operating conditions

3.3.6
maximum operating pressure
MOP
maximum pressure at which a system can be operated continuously under normal operating conditions

Note 1 to entry: Normal operating conditions are: no fault in any device or stream.

3.3.7
temporary operating pressure
TOP
pressure at which a system can be operated temporarily under control of regulating devices

3.3.8
maximum incidental pressure
MIP
maximum pressure which a system can experience during a short time, limited by the safety devices

3.3.9
maximum allowable pressure
PS
maximum pressure for which the equipment is designed, as specified by the manufacturer

Note 1 to entry: Definition according to Directive 2014/68/EU [3].

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3.3.10
strength test
specific procedure to verify that the pipework and/or station meets the requirements for mechanical strength

3.3.11
tightness test
specific procedure to verify that the pipework and/or station meets the requirements for tightness

3.3.12
combined test
specific procedure to verify that the pipework and/or station meets the requirements for mechanical strength and tightness

3.3.13
test pressure
TP
pressure at which pressure tests are conducted

3.3.14
strength test pressure
STP
pressure applied to a system during strength testing

3.3.15
combined test pressure
CTP
pressure applied to a system during combined testing, i.e. tightness and strength testing

3.4 Pressure control

3.4.1
alarm
signal of a situation in which manual intervention might be needed or in which the system itself might perform a safety action

3.4.2
creep relief device
pressure relief device designed to discharge small amounts of gas resulting from a gradual pressure increase (creep) downstream of the control system in its closed position

Note 1 to entry: A creep relief device cannot be considered a safety device.

3.4.3
direct-acting
requiring no auxiliary energy for operation

3.4.4
indirect-acting
requiring auxiliary energy for operation

3.4.5
instrumentation
system or combination of equipment for measurement and control

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3.4.6
instrumentation pipework
pipework required for the proper functioning of the pressure control equipment installed within the pressure control station

EXAMPLE Sensing, auxiliary and sampling lines.

3.4.7
monitor
second regulator used as a safety device in series with the active regulator which assumes control of the pressure at a higher set value in the event of the active regulator failing open

3.4.8
safety slam-shut device
device designed to quickly shut off the gas flow in the event of an unacceptable pressure being detected within the system it protects

3.4.9
safety cut-off device
device designed to shut off the gas flow which responds slower dynamically than a slam shut device in the event of an unacceptable pressure being detected within the system it protects

3.4.10
safety relief device
device designed to release gas in the event of an unacceptable pressure being detected within the system it protects

3.4.11
pressure regulating system
system which ensures that a pressure is maintained in the outlet system within required limits

3.4.12
pressure safety system
system which, independent of the pressure regulating system, ensures that the outlet pressure of that system does not exceed the safety limits

3.4.13
pressure alarm system
system which alerts the system operator in the case of an undesired pressure

Note 1 to entry: For definition of 'system operator' see EN 17649.

3.4.14
pressure control system
combined system including pressure regulating, pressure safety and possibly pressure recording and alarm systems

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