SLOVENSKI STANDARD
SIST EN 12186:2000

01-julij-2000

Sistemi oskrbe s plinom - Plinske postaje za regulacijo tlaka za transport in distribucijo - Funkcionalne zahteve

Gas supply systems - Gas pressure regulating stations for transmission and distribution - Functional requirements

Gasversorgungssysteme - Gas-Druckregelanlagen für Transport und Verteilung - Funktionale Anforderungen

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Systemes d'alimentation en gaz - Postes de détente-régulation de pression de gaz pour le transport et la distribution - Prescriptions fonctionnelles

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SIST EN 12186:2000 **en**

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EUROPEAN STANDARD
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English version

Gas supply systems - Gas pressure regulating stations for transmission and distribution - Functional requirements

Systèmes d'alimentation en gaz - Postes de détente-régulation de pression de gaz pour le transport et la distribution - Prescriptions fonctionnelles

Gasversorgungssysteme - Gas-Druckregelanlagen für Transport und Verteilung - Funktionale Anforderungen

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 234 "Gas supply", 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of an identical text or by endorsement, at the latest by August 2000, and conflicting national standards shall be withdrawn at the latest by August 2000.

There is a complete suite of functional standards prepared by CEN/TC 234 „Gas supply"to cover all parts of the gas supply system from the input of gas to the transmission system up to the inlet connection of the gas appliances, whether tor domestic, commercial or industrial purposes.

In preparing this standard a basic understanding of gas supply by the user has been assumed.

Gas supply systems are complex and the importance on safety of their 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 recognised standards of gas engineering and the specific requirements imposed by the legal structures of the member countries.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard contains the relevant functional requirements for gas pressure regulating stations, which form part of gas transmission or distribution systems. It is applicable to the design, materials, construction, testing, operation and maintenance of gas pressure regulating stations.

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This European Standard does not apply to gas pressure regulating stations commissioned prior to the publication of this standard.

The stations covered by this European Standard have a maximum upstream operating pressure which does not exceed 100 bar. For higher maximum upstream operating pressures this standard should 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 flowrate is equal to or less than 200 m^3/h under normal conditions, EN 12279 applies.

Basic system requirements for gas pressure regulating stations are contained in this European Standard. Requirements for individual components (valves, regulators, safety devices, pipes, etc.) or installation of the components are contained in the appropriate European Standards.

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

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

The requirements of this European standard 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 requirements in this European standard are based on the physical and chemical data of gaseous fuels in accordance with table 1 of EN 437:1993 for first and second family gases. Additional requirements in the case of gaseous fuels heavier than air are and/or sour gases are not covered by this European Standard.

The objective of this European standard 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 management during the design, construction and operation.

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This European Standard specifies common basic principles for gas supply systems. Users of this European Standard should be aware that more detailed national standards and/or codes of practice can exist in the CEN member countries.

This European Standard is intended to be applied in association with these national standards and/or codes of practice setting out the above mentioned principles.

In the event of conflicts in terms of more restrictive requirements in national legislation/regulation with the requirements of this standard, the national legislation/regulation shall take precedence.

2 Normative references

This European Standard incorporates by dated or undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 334	Gas pressure regulators for inlet pressures up to 100 bar
EN 437:1993	Test gases - Test pressures - Appliance categories
EN 1594	Gas supply systems - Pipelines - Maximum operating pressure over 16 bar - Functional requirements
EN 1775	Gas supply systems - Gas pipework for buildings - Maximum operating pressure ≤ 5 bar - Functional recommendations
EN 1776	Gas supply - Natural gas measuring stations - Functional requirements
EN 10204	Metallic products - Types of inspection documents
EN 12007-1	Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar - Part 1: General functional recommendations
EN 12279	Gas supply systems - Gas pressure regulating installations on service lines - Functional requirements
EN 12327	Gas supply systems - Pressure testing, commissioning and decommissioning procedures - Functional requirements
EN 12732	Gas supply systems - Welding steel pipework - Functional requirements
prEN 50154	Electrical installations in potentially explosive gas atmospheres (other than mines)
EN 60079-10	Electrical apparatus for explosive gas atmospheres - Part 10: Classification of hazardous areas (IEC 60079-10:1995)

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3 Definitions, symbols and abbreviations

For the purpose of this standard, the following definitions, symbols and abbreviations apply:

3.1 General

3.1.1 authorized person: A competent person who is appointed to fulfill a given task on gas supply systems or installation pipework.

NOTE: The appointment procedure is defined in each member country.

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3.1.2 competent person: A person who is trained, experienced and approved to perform activities relating to gas supply systems or installation pipework is approved.

NOTE: Means of approval, if any, will be determined within each member country.

3.1.3 cavity wall: A wall formed from two layers such as brick or blockwork with a space between.

3.1.4 enclosed installation: A plant installed in an enclosed space (apart from any necessary ventilation apertures).

3.1.5 open-air installation: A plant installed in the open air, which may or may not be protected by a canopy.

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

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

3.1.8 underground station: A space, partly or totally below ground level in which the gas pressure regulating and/or measuring equipment and ancillaries are installed.

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3.2 Station

3.2.1 gas: The gaseous fuel, which is in a gaseous state at a temperature of 15 °C and under atmospheric pressure (1,013 25 bar absolute).

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3.2.2 m^3 under normal conditions: A quantity of gas which in a dry state occupies a volume of 1 m^3 at a pressure of 1,013 25 bar absolute and at a temperature of 0 °C.

3.2.3 hazardous area: An area in which an explosive or flammable gas atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of apparatus.

3.2.4 hazardous area zones: Hazardous areas are classified in zones based upon the frequency of the occurrence and the duration of a flammable atmosphere (see EN 60079-10).

3.2.5 component: Any item from which a gas supply system or installation pipework is constructed. A distinction is drawn between the following groups of components:

– ancillaries;

EXAMPLE 1: Pressure regulators, valves, safety devices, expansion joints, insulating joints

– pipes including bends made from pipe;

– instrumentation pipework;

– fittings.

EXAMPLE 2: Reducers, tees, factory-made elbows, flanges, dome ends, welding stubs, mechanical joints.

3.2.6 inlet pipework: The connecting pipework through which gas enters the station.

3.2.7 main:The pipework in a gas supply system to which service lines are connected.

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3.2.8 outlet pipework: The connecting pipework through which gas leaves the station.

3.2.9 pressure regulating station: An installation comprising all the equipment including the inlet and outlet pipework as far as the isolating valves and any structure within which the equipment is housed, used for gas pressure regulation and over-pressure protection.

3.2.10 service line: The pipework from the main to the point of delivery of the gas into the installation pipework.

3.3 Pressure, design and testing

3.3.1 design factor (f_o): A factor applied when calculating the wall thickness or design pressure.

3.3.2 design flowrate: Flowrate on which the design calculations are based.

3.3.3 design pressure (DP): The pressure on which design calculations are based.

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

3.3.5 operating pressure (OP): The pressure which occurs within a system under normal operating conditions.

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3.3.6 maximum operating pressure (MOP): The maximum pressure at which a system can be operated continuously under normal operating conditions.

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NOTE : Normal operating conditions are: no fault in any device or stream.

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3.3.7 temporary operating pressure (TOP): The pressure at which a system can be operated temporarily under control of regulating devices.

3.3.8 maximum incidental pressure (MIP): The maximum pressure which a system can experience during a short time, limited by the safety devices.

3.3.9 strength test: A specific procedure to verify that the pipework and/or station meets the requirements for mechanical strength.

3.3.10 tightness test: A specific procedure to verify that the pipework and/or station meets the requirements for tightness.

3.3.11 combined test: A specific procedure to verify that the pipework and/or station meets the requirements for mechanical strength and tightness.

3.4 Pressure control

3.4.1 alarm: A signal of a situation in which manual intervention may be needed or in which the system itself may perform a safety action.

3.4.2 direct-acting: Requiring no auxiliary power for operation.

3.4.3 indirect-acting: Requiring auxiliary power for operation.

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3.4.4 instrumentation: Any system or combination of equipment for measurement and control.

3.4.5 instrumentation pipework : The pipework required for the proper functioning of the ancillaries installed within the pressure regulating station

EXAMPLE: Sensing, auxiliary and sampling lines.

3.4.6 monitor: A 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.

3.4.7 safety slam-shut device: A device designed to quickly shut off the gasflow in the event of an unacceptable pressure being detected within the system it protects.

3.4.8 safety cut-off device: A device designed to shut off the gasflow which responds slower dynamically than a slam shut device in the event of an unacceptable pressure being detected within the system it protects.

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

3.4.10 pressure regulating system: The system which ensures that a pressure is maintained in the outlet system within required limits.

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3.4.11 pressure safety system: The system which, independent of the pressure regulating system, ensures that the outlet pressure of that system does not exceed the safety limits.

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3.4.12 pressure alarm system: The system which alerts the operator in the case of an undesired pressure.

3.4.13 pressure control system: The combined system including pressure regulating, pressure safety and possibly pressure recording and alarm systems.

4 Quality system

The life of a pressure regulating station can be divided into three phases:

- the design;
- the construction and testing;
- the operation and maintenance.

A quality system should be applied to the design, construction, testing, operation and maintenance activities in accordance with this standard.

Reference may be made to the EN ISO 9000 series of standards or to equivalent quality system standards.

After the station has been commissioned, the integrity should be maintained by a precisely defined programme of operation, maintenance and condition monitoring.

5 Layout of the gas pressure regulating station

5.1 General

Gas pressure regulating stations shall be designed, constructed, located and operated taking into consideration the safety and environmental requirements of the applicable regulations.

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During the early planning stage of the station, careful consideration shall also be given to the layout of the site, the need for security of the site and the possible housing of the installation.

Locations susceptible to impact damage should be avoided or suitable precautions against impact damage should be considered.

5.2 Layout of the site

The area of the site shall be adequate to accommodate the equipment and provide access for maintenance purposes and/or the location of emergency material.

An access with a hard surface should be provided up to and within the site to accommodate maintenance and emergency service vehicles.

Consideration shall be given to emergency exits and where appropriate they should be installed.

Where necessary, components shall be protected from damage.

The extent of a hazardous area shall be determined according to EN 60079-10. The possible hazardous area should be taken into account when fixing the site boundary.

The combustion air intake of any gas heater or other burner equipment shall be located so as to minimise any hazard arising from sources of gas leakage or emission.

EXAMPLE: Filters, relief devices.

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5.3 Site security

Gas pressure regulating stations shall be secured against entry by unauthorized persons.

If a site security fence is used, equipment shall be sited at a sufficient distance from the fence to prevent interference from outside.

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Consideration should be given to the provision, wherever possible, of locking devices for valves, including auxiliary valves located external to a housing.

In an area which is susceptible to a higher risk of interference, consideration should be given to an increased level of security inspection visits to the station or intruder detection devices.

Prominent signs prohibiting smoking and other ignition sources shall be displayed.

Signs showing an emergency telephone number should be clearly displayed.

6 Housings

6.1 General

The pressure regulating and/or safety system or parts of it may be installed in the open air, under a canopy or in an enclosed space. Enclosed installations are divided into the following categories:

- separate building;
- cabinet station;
- part of/or inside another building;
- underground station.

The maximum upstream operating pressure (MOP_u) of gas pressure regulating stations installed as part of, or inside another building owned by a third party should not exceed 5 bar. A higher MOP_u is acceptable if the station is installed as part of an industrial or equivalent building and operations are carried out by competent persons. For MOP_u higher than 5 bar an isolated space shall be used.