



SLOVENSKI STANDARD

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Infrastruktura za plin - Cevovodni sistemi za najvišji delovni tlak do vključno 16 bar - 1. del: Splošna funkcionalna priporočila

Gas infrastructure - Pipelines for maximum operating pressure up to and including 16 bar
- Part 1: General functional recommendations

Gasinfrastruktur - Rohrleitungen mit einem maximal zulässigen Betriebsdruck bis
einschließlich 16 bar - Teil 1: Allgemeine funktionale Empfehlungen

Infrastructures gazières - Canalisation pour pression maximale de service inférieure ou
égale à 16 bar - Partie 1: Recommandations fonctionnelles générales

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Gas infrastructure - Pipelines for maximum operating pressure up to and including 16 bar - Part 1: General functional recommendations

Infrastructures gazières - Canalisation pour pression
maximale de service inférieure ou égale à 16 bar - Partie 1:
Recommandations fonctionnelles générales

Gasinfrastruktur - Rohrleitungen mit einem maximal
zulässigen Betriebsdruck bis einschließlich 16 bar - Teil 1:
Allgemeine funktionale Empfehlungen

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prEN 12007-1:2010 (E)

Foreword

This document (prEN 12007-1:2010) has been prepared by Technical Committee CEN/TC 234 “Gas infrastructure”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12007-1:2000.

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1 Scope

This European Standard describes the general functional recommendations for pipelines up to the point of delivery, and also for buried sections of pipework after the point of delivery, for maximum operating pressures up to and including 16 bar for gaseous fuels in accordance with Table 1 of EN 437:1993. It applies to their design, construction, commissioning, decommissioning, operation, maintenance, renovation, extension and other associated works.

This European Standard does not apply to the materials, design, construction, testing and commissioning of gas supply systems in use prior to the publication of this standard. However, this European Standard does apply to the operation, maintenance, renovation and extension of all gas supply systems.

Specific functional recommendations for polyethylene pipelines are given in prEN 12007-2, for steel pipelines in EN 12007-3 and for the renovation of pipelines in prEN 12007-4. Functional recommendations for pipework for buildings are given in EN 1775.

Functional requirements for pressure testing, commissioning and decommissioning are given in prEN 12327. Functional requirements for measuring systems are given in EN 1776.

Functional requirements for pressure regulating stations are given in EN 12186. Functional requirements for pressure regulating installations are given in EN 12279.

Functional requirements for gas transmission are given in EN 1594.

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 basic principles.

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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 437:1993, *Test gases — Test pressures — Appliance categories*.

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

EN 1775, *Gas supply — Gas pipework for buildings — Maximum operating pressure 5 bar — Functional recommendations*

EN 1776, *Gas supply — Natural gas measuring stations — Functional requirements*

prEN 12007-2, *Gas infrastructure — Pipelines for maximum operating pressure up to and including 16 bar — Part 2: Specific functional recommendations for polyethylene (MOP up to and including 10 bar)*

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

prEN 12007-4, *Gas infrastructure — Pipelines for maximum operating pressure up to and including 16 bar — Part 4: Specific functional recommendations for renovation*

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EN 12186, *Gas supply systems — Gas pressure regulating stations for transmission and distribution*

EN 12279, *Gas supply systems — Gas pressure regulating installations for service lines*

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

3 Terms, definitions and abbreviations

For the purposes of this document, the following terms, definitions and abbreviations apply.

3.1 gas supply system
pipeline systems including pipework and their associated stations or plants for the transmission and distribution of gas

3.2 pipeline
system of pipework with all associated equipment and stations up to the point of delivery

NOTE This pipework is mainly below ground but includes also above ground parts.

3.3 pipeline components
elements from which the pipeline is constructed

NOTE The following are distinct pipeline elements:

- pipes, including cold formed bends;
- fittings;
EXAMPLE 1 Reducers, tees, factory-made elbows and bends, flanges, caps, welding stubs, mechanical joints.
- ancillaries;
EXAMPLE 2 Valves, expansion joints, insulating joints, pressure regulators, pumps, compressors.
- pressure vessels.

3.4 main
pipework in a gas supply system to which service lines are connected

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

3.6 installation pipework
pipework downstream of the point of delivery terminating at the appliance inlet connection

NOTE This pipework is normally the property of the customer.

3.7**point of delivery**

point of transfer of ownership of gas from the supplier to the customer

NOTE This can be at a means of isolation or at the meter outlet connection.

3.8**competent authority**

body authorized by the member country to ensure that the pipeline operator fulfils the requirements of this and other relevant standards

3.9**pipeline operator**

private or public organization authorized to design, construct and or operate and maintain the gas supply system

3.10**competent person**

person who is trained, experienced and approved to perform activities relating to gas supply systems

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

3.11**gas**

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

3.12**pressure**

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

3.13**design pressure****DP**

pressure on which design calculations are based

3.14**maximum operating pressure****MOP**

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

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

3.15**temporary operating pressure****TOP**

pressure at which a system can be operated temporarily under control of the regulating devices

3.16**maximum incidental pressure****MIP**

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

3.17**strength test pressure****STP**

pressure applied to a system during strength testing

prEN 12007-1:2010 (E)**3.18
combined test pressure
CTP**

pressure applied to a system during combined testing

**3.19
lower explosive limit
LEL**

concentration of flammable gas or vapour in air, below which the gas atmosphere is not explosive

**3.20
Flow limiting device**

purpose manufactured self-actuating device which can limit uncontrolled excess flow of gas

4 Quality**4.1 Quality and safety management**

To provide a consistent and appropriate standard of quality management the pipeline operator shall have organizational, operational and administrative procedures to ensure that activities can be undertaken in a safe and technically sound manner. The pipeline operator shall have suitable systems for technical audit, safety audit and performance review to ensure that established procedures and training programmes continue to meet the obligations of the pipeline operator to users. These should take into account experiences gained.

EXAMPLE 1 Operational incidents or other relevant dangerous occurrences.

This system should include, for each activity:

- adequate numbers of competent persons;
- adequate other resources.

EXAMPLE 2 Vehicles, communication systems and appropriate tools.

4.2 Competence

The qualification of competent persons involved in the design, construction, operation and maintenance of a gas supply system, or parts of it, shall be in accordance with the characteristics of the pipeline system they are working on. These characteristics include, but are not limited to the following:

- family of gas;
- local conditions;
- design or operating pressure;
- materials used in the system;
- jointing techniques;
- emergency procedures.

5 Gas characteristics

5.1 Gas quality and family

The quality and family of gas supplied through a gas supply system shall be specified so that its characteristics are known to system designers, and pipeline operators. This specification includes all relevant characteristics which contribute to safe operation and combustion. Changes in the properties of the gas which fall outside pre-determined operating limits shall be notified to pipeline operators in advance.

Gas may also be treated or conditioned for operational and maintenance reasons.

EXAMPLE 1 For the control of leakage.

EXAMPLE 2 For the control of icing conditions at pressure regulating stations and installations.

Safe operating procedures for systems supplying gases heavier than air shall recognize the tendency for these gases to settle downwards should they escape from the system.

5.2 Odorization

Gas supplied to end users should possess a distinctive odour.

Where gas is to possess a distinctive odour its presence in the atmosphere shall be readily detectable at all gas concentrations of one fifth of the lower explosive limit and above. Where the gas does not possess a natural distinctive odour one shall be added for the purpose.

The odorant, where added, shall be non-toxic and harmless for the concentrations employed in normal applications, and the odour shall disappear after combustion.

An odorant may be omitted in gas delivered specifically for further processing or other special purposes. In this case alternative means shall be available to detect leaks.

5.3 Toxicity and lack of oxygen

The potential toxic effects of gas constituents and the potential lack of oxygen shall be considered to ensure safety in all work practices undertaken on the gas supply system, in using the gas and in dealing with escaping gas.

6 Materials

The characteristics of materials of pipes, fittings and components and the mode of construction of pipelines shall be appropriate to the types of gas being supplied and the conditions under which they are operated.

Materials and products shall conform to the relevant European Standards or, in their absence, to the national or other established standards and shall be of a quality fit for purpose. Consideration shall be given to the effects of climatic conditions on material behaviour and its consequential influence on performance. Materials can give a different technical performance in risk or long term behaviour when exposed to or stored under extreme climatic conditions. For further information reference should be made to the specific standards for the materials concerned.

EXAMPLE 1 The critical pressure for rapid crack propagation in polyethylene pipe is reduced at lower temperatures.

EXAMPLE 2 Loss of resilience can occur in steel pipes at low temperatures, or disbondment of coatings at high temperatures.

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7 Design

7.1 General

Gas supply systems are designed to provide a safe and continuous supply of gas. This design considers technical aspects and procedures together with environmental and safety aspects.

The gas supply system consists of pipeline components arranged in networks or single lines, with associated pressure regulating stations or installations and connections to consumers via service lines.

NOTE During the design phase these parts of the system can be considered separately.

Basic data and design principles should be documented together with the actual data as the gas supply system is built. Data such as the diameter, material, design pressure, family of gas and routing maps should be available as long as the gas supply system is in operation (see 13.2).

7.2 Basic design data

The design of any gas supply system, or part thereof, should commence with a study collecting relevant basic data for the part of the gas supply system to be installed. This basic data include, but are not limited to the following:

- the family of gas;
- anticipated gas flow;
- design pressure;
- diameter(s);
- construction materials;
- layout of the existing gas supply system;
- the need for pressure regulation;
- provisional routing of pipeline sections.

The design of the gas supply system for flow rate capacity shall as a minimum take account of, but not be limited to the following:

- a) the family of the gas;
- b) the location and number of actual or anticipated customers, the predicted customer type, consumption patterns and climatic conditions in the area to be served. Due account should be taken of the diversity of demand in establishing design flow rates;
- c) the technical operating values to be applied such as:
 - 1) the pressure, which is required to be maintained within values that permit correct functioning of pressure regulators and specific user appliances, at all parts of the system;
 - 2) the requirement to maintain a minimum pressure in the supply system according to the rules of the member countries and the normal pressure range for the system concerned to ensure the safe use of gas;