SLOVENSKI STANDARD
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Infrastruktura za plin - Cevovodni sistemi za najvišjii delovni tlak nad 16 bar - Funkcionalne zahteve

Gas infrastructure - Pipelines for maximum operating pressure over 16 bar - Functional requirements

Gasversorgungssysteme - Rohrleitungen für einen maximal zulässigen Betriebsdruck über 16 bar - Funktionale Anforderungen

Systèmes d'alimentation en gaz - Canalisations pour pression maximale de service supérieure à 16 bar - Prescriptions fonctionnelles

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Gas infrastructure - Pipelines for maximum operating pressure over 16 bar - Functional requirements

Infrastructures gazières - Canalisation pour pression maximale de service supérieure à 16 bar - Prescriptions fonctionnelles

Gasinfrastruktur - Rohrleitungen für einen maximal zulässigen Betriebsdruck über 16 bar - Funktionale Anforderungen

This European Standard was approved by CEN on 18 July 2013.

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Foreword

This document (EN 1594:2013) 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of an identical text or by endorsement, at the latest by March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.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 1594:2009.

Annex J provides details of significant technical changes between this European Standard and the previous edition.

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 to the transmission system up to the inlet connection of the gas appliances, whether for domestic, commercial or industrial purposes.

Compliance to this standard ensures the interoperability, safety and reliability requirements of pipeline systems.

Directive 2009/73/EC concerning common rules for the internal market in natural gas and the related Regulation (EC) No 715/2009 on conditions for access to the natural gas transmission networks also aim at technical safety (security) including technical reliability of the European gas system. These aspects are also in the scope 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.

A list of the relevant functional standards prepared by CEN/TC 234 is included in Clause 2 and the Bibliography of this document.

CEN/TC 234 will continue its work updating this European Standard to the latest developments at regular intervals.

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

Gas infrastructure is 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 member countries. These detailed statements embrace recognised standards of gas engineering and specific requirements imposed by legal structures of these member countries.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard describes the general functional requirements for gas supply through pipe systems and covers the pressure range greater than 16 bar maximum operating pressure (MOP) for steel systems. It gives normative and informative references for safe and secure gas infrastructure. It applies to their design, construction, operation and the related aspects of safety, environment and public health, all in order to provide a safe and secure supply of gas.

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

Existing industrial safety regulations applying to work areas, safety devices and safe work practices are not intended to be supplanted by this European Standard.

Managers with responsibilities for the design, construction and operation of gas infrastructure will have regard to the guidance given in this European Standard and to other relevant standards. It is the responsibility of these managers and engineers to apply these functional requirements, supplemented with other proven good practice to the particular circumstances of all gas infrastructures.

The designer, constructor or operator of pipeline systems is cautioned that this European Standard is not a design handbook or code of practice. Additional national or company standards describing the details are needed. These detailed standards should be in line with the basic principles of this European Standard.

In preparing this European Standard it was recognised that the suite of relevant European Standards is incomplete. Reference may be made where appropriate to international, national or other standards until relevant European Standards are available.

1 Scope

This European Standard is applicable to pipelines with a maximum operating pressure (MOP) over 16 bar for the carriage of processed, non-toxic and non-corrosive natural gas according to EN ISO 13686 in onland gas infrastructure.

This European Standard is also applicable to pipelines with a maximum operating pressure (MOP) over 16 bar for the carriage of non-conventional gases such as injected biomethane, complying with EN ISO 13686 and for which a detailed technical evaluation of the functional requirements is performed ensuring there are no other constituents or properties of the gases that can affect the integrity of the pipeline.

Onland gas infrastructure is where:

— pipeline elements are made of unalloyed or low-alloyed carbon steel;

— pipeline elements are joined by welds, flanges or mechanical couplings;

— the pipeline is not located within commercial or industrial premises as an integral part of the industrial process on these premises except for any pipelines and facilities supplying such premises;

— the design temperature of the system is between −40 °C and 120 °C inclusive.

This European Standard applies to onshore pipeline systems from the point where the pipeline first crosses what is normally accepted as battery limit between on and offshore, e.g.:

— first isolation valve;

— the base of steep sea shelf;

— above the high water/low water mark onto mainland;

— an island.

This European Standard also applies to a pipeline system with a starting point onshore, also when parts of the pipeline system on the mainland subsequently cross fjords, lakes etc.

This European Standard does not apply to existing pipelines, in use prior to the publication of this European Standard, nor to modifications to existing pipelines.

Gas infrastructures covered by this European Standard begin after the gas producer's metering station. The functional demarcation of the pipeline system within a plant area will be determined from case to case. Generally speaking, this will be directly after the first isolating valve of the installation.

This European Standard also describes the mechanical requirements for pipework in stations with a maximum operating pressure greater than 16 bar. Welding requirements are described in a special application standard on welding for gas infrastructures EN 12732. Functional requirements for stations are given in:

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

— EN 1918-5, *Gas supply systems — Underground gas storage — Part 5: Functional recommendations for surface facilities*

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

— EN 12583, *Gas supply systems — Compressor stations — Functional requirements*

This European Standard specifies common basic principles for gas infrastructures. Users of this European Standard should be aware that there may exist more detailed national standards and codes of practice 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 the national legislation/regulation with the requirements of this European Standard, the national legislation/regulation takes precedence as illustrated in CEN/TR 13737 (all parts).

NOTE CEN/TR 13737 (all parts) contains:

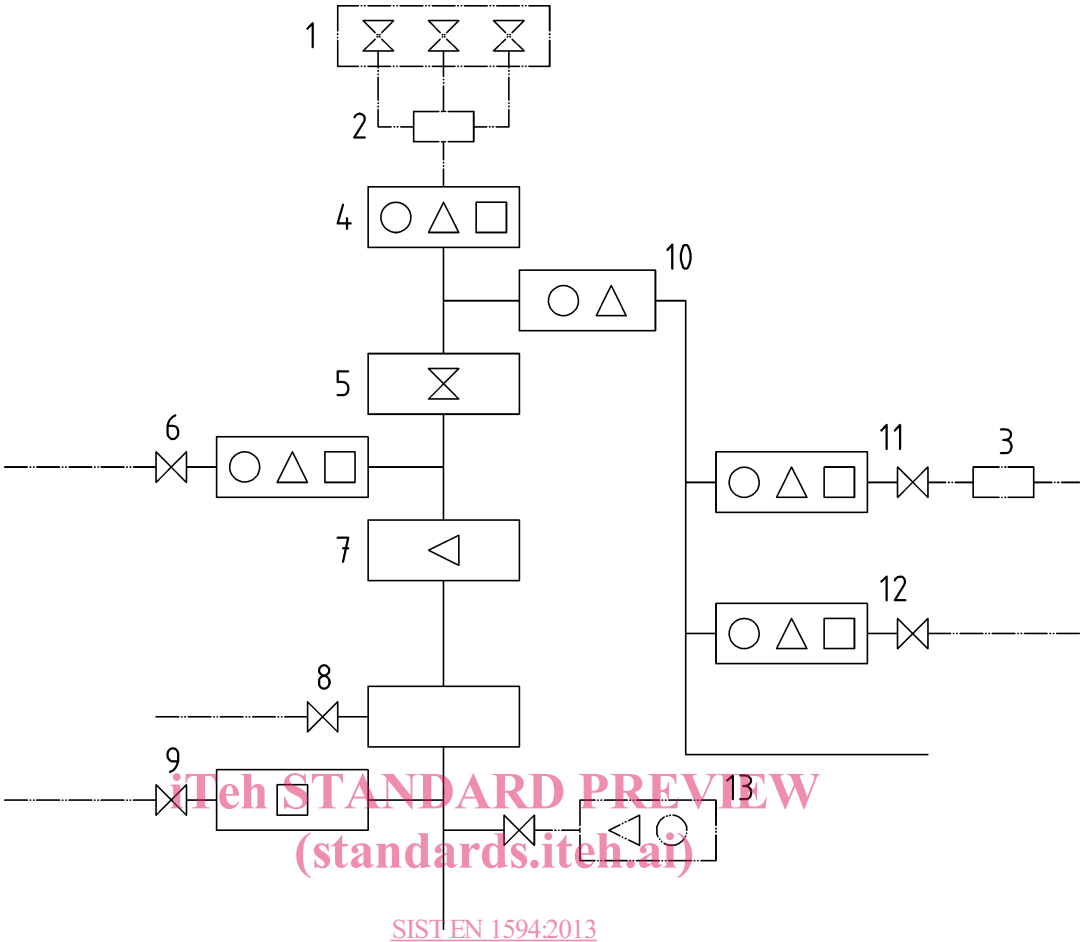
— clarification of relevant legislation/regulations applicable in a country;

— if appropriate, more restrictive national requirements;

— national contact point for the latest information.

Reference is made in this European Standard to relevant European and other recognised standards for products used to construct and operate gas infrastructures.

A schematic representation of pipelines for gas transmission is given in Figure 1.



Key

Symbols	
———	pipelines covered by this standard
— — —	pipelines not covered by this standard
○	pressure regulation
△	pressure safety system
□	metering system
◁	compression
⧖	valve
⋈	isolation device

Stations	
1	P – well, production
2	T – treatment
3	D – odorisation
4	S 1 – gas receiving
5	S 2 – valve station
6	S 3 – delivery station
7	S 4 – compressor station
8	S 5 – other supply (e.g. for blending)
9	S 6 – export or import
10	S 7 – pressure regulating
11	S 8 – domestic distribution
12	S 9 – industrial distribution
13	S 10 – storage

Figure 1 — Schematic representation of pipelines for gas supply over 16 bar

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1515-3, *Flanges and their joints — Bolting — Part 3: Classification of bolt materials for steel flanges, class designated*

EN 1759-1, *Flanges and their joint — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 1: Steel flanges, NPS 1/2 to 24*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

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

EN ISO 3183, *Petroleum and natural gas industries — Steel pipe for pipeline transportation systems (ISO 3183)*

EN 10288, *Steel tubes and fittings for onshore and offshore pipelines — External two layer extruded polyethylene based coatings*

EN 10289, *Steel tubes and fittings for onshore and offshore pipelines — External liquid applied epoxy and epoxy-modified coatings*

EN 10290, *Steel tubes and fittings for onshore and offshore pipelines — External liquid applied polyurethane and polyurethane-modified coatings*

EN 10301, *Steel tubes and fittings for on and offshore pipelines — Internal coating for the reduction of friction for conveyance of non corrosive gas*

EN 12068, *Cathodic protection — External organic coatings for the corrosion protection of buried or immersed steel pipelines used in conjunction with cathodic protection — Tapes and shrinkable materials*

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

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

EN 12560-1, *Flanges and their joints — Gaskets for Class-designated flanges — Part 1: Non-metallic flat gaskets with or without inserts*

EN 12560-2, *Flanges and their joints — Gaskets for Class-designated flanges — Part 2: Spiral wound gaskets for use with steel flanges*

EN 12560-3, *Flanges and their joints — Gaskets for Class-designated flanges — Part 3: Non-metallic PTFE envelope gaskets*

EN 12560-4, *Flanges and their joints — Gaskets for Class-designated flanges — Part 4: Corrugated, flat or grooved metallic and filled metallic gaskets for use with steel flanges*

EN 12583, *Gas infrastructure — Compressor stations — Functional requirements*

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

EN 12954, *Cathodic protection of buried or immersed metallic structures — General principles and application for pipelines*

EN 14141, *Valves for natural gas transportation in pipelines — Performance requirements and tests*

EN 16348, *Gas infrastructure — Safety Management System (SMS) for gas transmission infrastructure and Pipeline Integrity Management System (PIMS) for gas transmission pipelines — Functional requirements*

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the following terms and definitions apply. Symbols used in formulae are defined where they occur.

3.1
abandonment
permanent decommissioning where a pipeline or a pipeline section is physically isolated from the gas pipeline system

3.2
casing
protection by means of a construction around the pipeline in order to prevent external loads, or third party interference

3.3
commissioning
activities required to pressurise pipework, stations, equipment and assemblies with gas and to put them into operation

3.4
control zone
strip of land over which the pipeline operator has a right to control activities

3.5
decommissioning
activities required to take out of service any pipework, station, equipment or assemblies filled with gas and to disconnect them from the system

3.6
design factor
f_o
factor applied when calculating the wall thickness or pressure

3.7
design pressure
DP
pressure on which design calculations are based

3.8
design temperature
temperature on which design calculations are based

3.9
emergency
situation which could affect the safe operation of the gas infrastructure and/or the safety of the surrounding area, requiring urgent action

3.10
gas
gaseous fuel which is in gaseous state at a temperature of 15 °C under atmospheric pressure (1,013 25 bar absolute)

3.11
gas distribution system
pipeline system including piping above and below ground and all other equipment necessary to supply the gas to the consumers

3.12
gas distributor
private or public organisation authorised to distribute gas to consumers through a gas distribution system

3.13
gas transmission
activity intended to convey gas from one place to another through pipelines in order to supply gas to distribution systems or to industrial consumers

3.14
gas transportation system
pipeline system including piping above and below ground and all other equipment necessary to supply the gas to the gas distribution systems and industrial consumers

3.15
golden weld
weld on which a strength test is not performed

EXAMPLE The test sections tie-in welds and the test section-station tie-in welds are considered “golden welds”.

3.16
incident
unexpected occurrence, which could lead to an emergency situation

Note 1 to entry: This includes a leakage of gas or plant failure.

3.17
incidental pressure
IP
pressure which occurs incidentally within a system at which a safety device becomes operative

3.18
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

3.19
installation
equipment and facilities for the extraction, production, chemical treatment, measurement, control, storage, or off-take of the transported gas

3.20
installation temperature
temperature arising from ambient or installation conditions during laying or during construction

3.21
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

3.22
maximum incidental pressure
MIP
maximum pressure which a gas system can experience during a short time, limited by the safety devices

3.23
maximum operating pressure
MOP
maximum pressure at which a system can be operated continuously under normal conditions

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

3.24
national requirements
requirements following from national legislation or more detailed or stringent national standards

3.25
onshore pipeline
buried and/or above ground pipeline including those sections laid in or across inland lakes or water courses

3.26
operating pressure
OP
pressure which occurs within a system under normal operating conditions

3.27
operating temperature
OT
temperature which occurs within a system under normal operating conditions

3.28
pig
device which is driven through a pipeline by the flow of fluid, for performing various internal activities (depending on pig type), such as separating fluids, cleaning or inspecting the pipeline

3.29
pipeline
system of pipework with all associated equipment and stations up to the point of delivery

Note 1 to entry: This pipework is mainly below ground but also includes above ground parts.

3.30
pipeline components
elements from which the pipeline is constructed; these are:

a) specially designed and manufactured elements:

   1) pipe including cold-formed bends;

   2) fittings;

EXAMPLE 1 Reducers, tees, factory-made elbows, flanges, caps, welding stubs, mechanical joints.