

GAASITARISTU. TORUSTIKUD MAKSIMAALSE
TÖÖRÕHUGA ÜLE 16 BAR. TALITLUSLIKUD NÕUDED

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN 1594:2024 sisaldab Euroopa standardi EN 1594:2024 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 06.03.2024.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN 1594:2024 consists of the English text of the European standard EN 1594:2024.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 06.03.2024.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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ICS 23.040.01, 75.200

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EUROPEAN STANDARD

EN 1594

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

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 1 October 2023.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 1594:2024) 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 September 2024, and conflicting national standards shall be withdrawn at the latest by September 2024.

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 1594:2013.

The main changes between this document and the previous edition EN 1594:2013 are as follows:

- addition of supplements with respect to available technologies, like aspects of pipeline inspection, corrosion protection, aspects of gases with low ignition energy considered such as hydrogen;
- restructuring and rephrasing of scope to improve understanding (Clause 1);
- update of references to other documents (Clause 2 and Bibliography);
- revision of terms and definitions including clarification of substance ‘gas’ (Clause 3).
- addition of arrangements for venting, recompression and flaring (Clause 7);
- adjustment of minimum impact energy values to appropriate safety values (Clause 8);
- removal of all annexes, because they were outdated and considered covered in other European standards;
- addition of new normative annex with requirements for fracture arrest of line pipe (Annex A), adopted from EN ISO 3183:2012 as they were taken out in the current edition of EN ISO 3183 (published in 2019);
- addition of new informative with recommendations related to hydrogen pipelines (Annex B).

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

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.

Conformance to this document 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 and Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources are also in the scope of CEN/TC 234 standardization. In this respect, CEN/TC 234 evaluated the indicated EU legislation and amended this document accordingly, where required and appropriate.

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

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 describes the general functional requirements for gas supply through pipe systems and covers the pressure range greater than 16 bar maximum operating pressure 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 document 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 document.

Managers with responsibilities for the design, construction and operation of gas infrastructure will have regard to the guidance given in this document 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 document 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 document.

In preparing this document it was recognized that the suite of relevant European standards is incomplete. Where appropriate, reference is made to international, national or other standards until relevant European standards are available.

In preparing this document, 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 recognized standards of gas engineering and specific requirements imposed by legal structures of these member countries.

1 Scope

This document describes the functional requirements for pipelines for maximum operating pressure over 16 bar. This document also describes the mechanical requirements for pipework in stations with a maximum operating pressure greater than 16 bar.

NOTE 1 Welding requirements are described in EN 12732. Functional requirements for stations are given in EN 1776, EN 1918-5, EN 12186, and EN 12583.

This document is applicable for transporting gas via onshore high-pressure steel pipeline infrastructures, where the following applies:

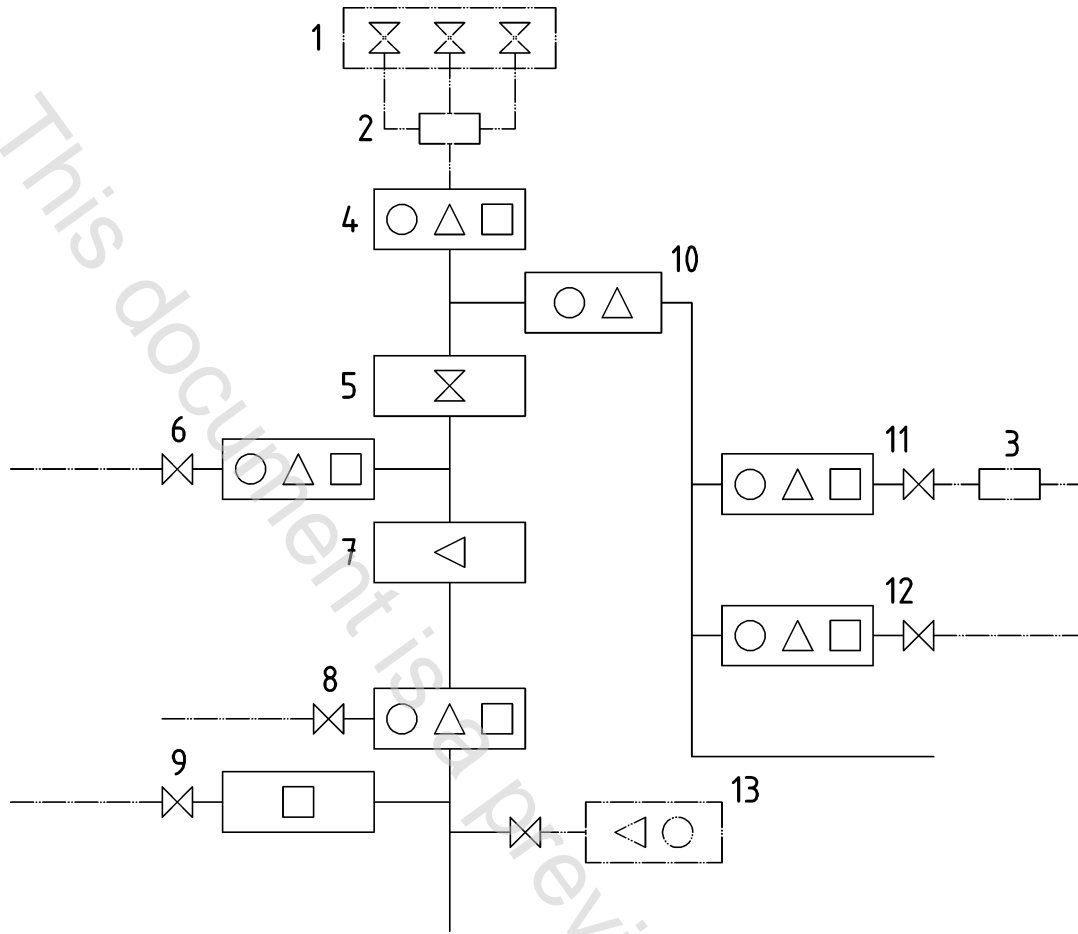
- onshore:
 - from the point where the pipeline first crosses what is normally accepted as battery limit between onshore and offshore, and that is not located within commercial or industrial premises as an integral part of the industrial process on these premises except for any pipelines and facilities supplying such premises;
 - pipeline system with a starting point onshore, also when parts of the pipeline system on the mainland subsequently cross fjords, lakes, etc.;
- high pressure: gas with a maximum operating pressure over 16 bar and a design temperature between -40 °C and 120 °C ;
- steel pipeline infrastructure: infrastructure consisting of pipeline components, such as pipes, valves, couplings and other equipment, restricted to components made of unalloyed or low alloyed carbon steel and joined by welds, flanges or mechanical couplings;
- gas: non-corrosive natural gas, biomethane gas, hydrogen gas and mixtures of these gases where technical evaluation has ensured that operating conditions or constituents or properties of the gas do not affect the safe operation of the pipeline.

Gas infrastructures covered by this document begin after the gas producer's metering station.

NOTE 2 The functional demarcation of the pipeline system is usually directly after an isolating valve of the installation, but can differ in particular situations. The functional demarcation of the pipeline system is usually located on an isolating valve of the installation, but can differ in particular situations.

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

This document can also be applied to the repurposing of existing pipelines.



Key

Symbols

- pipelines covered by this document
- - - pipelines not covered by this document
- pressure regulation
- △ pressure safety system
- metering, gas analysis and sampling system
- ◁ compression
- ⊗ valve
- ⊗ isolation device

Stations

- 1 P - well, production
- 2 T - treatment
- 3 D - odorization
- 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 (e.g. storage and neighbouring network)
- 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

This document specifies common basic principles for gas infrastructure. Users of this standard are expected to be aware that more detailed national standards and/or code 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 above-mentioned basic 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 takes precedence as illustrated in CEN/TR 13737.

CEN/TR 13737 gives:

- clarification of all legislations/regulations applicable in a member state;
- if appropriate, more restrictive national requirements;
- a national contact point for the latest information.

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 1092-1, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 1514 (all parts), *Flanges and their joints — Dimensions of gaskets for PN-designated flanges*

EN 1515-2, *Flanges and their joints — Bolting — Part 2: Classification of bolt materials for steel flanges, PN designated*

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

EN 1515-4, *Flanges and their joints — Bolting — Part 4: Selection of bolting for equipment subject to the Pressure Equipment Directive 2014/68/EU*

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 1998-4, *Eurocode 8 — Design of structures for earthquake resistance — Part 4: Silos, tanks and pipelines*

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

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 12186, *Gas infrastructure — 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 — Dimensions of 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 12560-5, *Flanges and their joints — Gaskets for Class-designated flanges — Part 5: Metallic ring joint gaskets for use with steel flanges*

EN 12560-6, *Flanges and their joints — Gaskets for Class-designated flanges — Part 6: Covered serrated metal gaskets for use with steel flanges*

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

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

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

EN ISO 3183:2019, *Petroleum and natural gas industries — Steel pipe for pipeline transportation systems (ISO 3183:2019)*

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

EN ISO 12944-1, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 1: General introduction (ISO 12944-1)*

EN ISO 12944-2, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 2: Classification of environments (ISO 12944-2)*

EN ISO 12944-3, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 3: Design considerations (ISO 12944-3)*

EN ISO 12944-4, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 4: Types of surface and surface preparation (ISO 12944-4)*

EN ISO 12944-5, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 5: Protective paint systems (ISO 12944-5)*

EN ISO 12944-6, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 6: Laboratory performance test methods (ISO 12944-6)*

EN ISO 12944-7, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 7: Execution and supervision of paint work (ISO 12944-7)*

EN ISO 12944-8, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 8: Development of specifications for new work and maintenance (ISO 12944-8)*

EN ISO 15741, *Paints and varnishes — Friction-reduction coatings for the interior of on- and offshore steel pipelines for non-corrosive gases (ISO 15741)*

EN ISO 15589-1, *Petroleum, petrochemical and natural gas industries — Cathodic protection of pipeline systems — Part 1: On-land pipelines (ISO 15589-1)*

EN ISO 21809-1, *Petroleum and natural gas industries — External coatings for buried or submerged pipelines used in pipeline transportation systems — Part 1: Polyolefin coatings (3-layer PE and 3-layer PP) (ISO 21809-1)*

EN ISO 21809-2, *Petroleum and natural gas industries — External coatings for buried or submerged pipelines used in pipeline transportation systems — Part 2: Single layer fusion-bonded epoxy coatings (ISO 21809-2)*

EN ISO 21809-3, *Petroleum and natural gas industries — External coatings for buried or submerged pipelines used in pipeline transportation systems — Part 3: Field joint coatings (ISO 21809-3)*

ASME B16.20, *Metallic gaskets for pipe flanges*

ASME B16.47, *Large Diameter Steel Flanges: NPS 26 through NPS 60, Metric/Inch Standard*

3 Terms and definitions

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

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>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

abandonment

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

3.2

battery limit

defined boundary between two areas of responsibility, which can be physical or represented by a map coordinate

Note 1 to entry: Physical boundary can be an isolating valve, a flange on a pipe or a geographic point on a pipeline.

3.3

casing

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

3.4

commissioning

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

3.5

control zone

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