



SLOVENSKI STANDARD
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Infrastruktura za plin - Cevovodni sistemi za največji delovni tlak do vključno 16 bar - 3. del: Posebne funkcionalne zahteve za jekla

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

Gasinfrastruktur - Rohrleitungen mit einem maximal zulässigen Betriebsdruck bis einschließlich 16 bar - Teil 3: Besondere funktionale Anforderungen für Stahl

Infrastructures gazières - Canalisations pour pression maximale de service inférieure ou égale à 16 bar - Partie 3: Exigences fonctionnelles spécifiques pour l'acier

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

Infrastructures gazières - Canalisations pour pression
maximale de service inférieure ou égale à 16 bar - Partie 3:
Exigences fonctionnelles spécifiques pour l'acier

Gasinfrastruktur - Rohrleitungen mit einem maximal
zulässigen Betriebsdruck bis einschließlich 16 bar - Teil 3:
Besondere funktionale Anforderungen für Stahl

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 234.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (prEN 12007-3:2013) 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 12007-3:2000.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

There is a complete suite of functional standards prepared by CEN/TC 234 "Gas infrastructure" to cover all parts 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.

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

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 recognised standards of gas engineering and the specific requirements imposed by the legal structures of the member countries.

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1 Scope

This European Standard describes the specific functional requirements for steel pipelines in addition to the general functional requirements of EN 12007-1 for maximum operating pressures up to and including 16 bar. 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 specifies common basic principles for gas infrastructure. Users of this standard should be aware that more detailed national standards and/or codes of practice may 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.

In the event of conflicts in terms of more restrictive requirements in national legislation/regulation with the requirements of this standard, national legislation/regulation takes precedence as illustrated in CEN/TR 13737 (all parts).

CEN/TR 13737 (all parts) gives:

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

EN 1514-1, *Flanges and their joints — Dimensions of gaskets for PN-designated flanges — Part 1: Non-metallic flat gaskets with or without inserts*

EN 1514-2, *Flanges and their joints — Dimensions of gaskets for PN-designated flanges — Part 2: Spiral wound gaskets for use with steel flanges*

EN 1514-3, *Flanges and their joints — Dimensions of gaskets for PN-designated flanges — Part 3: Non-metallic PTFE envelope gaskets*

EN 1514-4, *Flanges and their joints — Dimensions of gaskets for PN-designated flanges — Part 4: Corrugated flat or grooved metallic and filled metallic gaskets for use with steel flanges*

EN 1515-1, *Flanges and their joints — Bolting — Part 1: Selection of bolting*

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

EN 1591, *Flanges and their joints — Design rules for gasketed circular flange connections — Calculation method*

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prEN 1594, *Gas infrastructure — Pipelines — Maximum operating pressure over 16 bar — Functional requirements*

EN 1759, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, class designated*

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

EN 10208-1, *Steel pipes for pipelines for combustible fluids — Technical delivery conditions — Part 1: Pipes of requirement class A*

EN 10208-2, *Steel pipes for pipelines for combustible fluids — Technical delivery conditions — Part 2: Pipes of requirement class B*

EN 10226-1, *Pipe threads where pressure tight joints are made on the threads — Part 1: Designation, dimensions and tolerances*

EN 10255, *Non-Alloy steel tubes suitable for welding and threading — Technical delivery conditions*

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

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

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

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

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 12560-1, *Flanges and their joints — Dimensions of 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 — Dimensions of gaskets for Class-designated flanges — Part 3: Non-metallic PTFE envelope gaskets*

EN 12560-4, *Flanges and their joints — Dimensions of 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 — Dimensions of gaskets for Class-designated flanges — Part 5: Metallic ring-joint gaskets for use with steel flanges*

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 13774, *Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar — Performance requirements*

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

3 Design

3.1 General requirements for selection of steel materials

3.1.1 General

Pipes and other pipeline components shall conform to the relevant European or International Standards. Where such standards are incomplete, characteristics such as chemical and mechanical properties or dimensions of the final product or manufacturing or test procedures shall be subject of agreement between pipeline operator and manufacturer.

3.1.2 Base material

3.1.3 Pipes and other pipeline components shall be manufactured from fully killed steel. Quality level

The quality level as defined by the relevant standards for other pipeline components shall be compatible with the quality level of the pipes.

EXAMPLE for welding and jointing purposes

Steel pipes shall be qualified with respect to their strength, fracture toughness and weldability.

3.1.4 Weldability

Pipes and other pipeline components shall be capable of being welded reliably under site conditions. To meet the weldability criteria the value of the carbon equivalent CE of pipes and other pipeline components shall be less than or equal to 0,45 for grades with specified minimum yield strength SMYS not exceeding 360 MPa unless otherwise agreed between pipeline operator and manufacturer. This value shall be guaranteed by the manufacturer. For all grades of steel the maximum carbon content shall not exceed 0,22 % and the maximum guaranteed values of sulphur and phosphorus contents shall not exceed 0,035 % for each element or 0,05 % in total on the ladle analysis.

NOTE Carbon equivalent is given by the formula:

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

where

CE is the carbon equivalent,

C is the weight percentage of carbon content,

Mn is the weight percentage of manganese content,

Cr is the weight percentage of chromium content,

Mo is the weight percentage of molybdenum content,

V is the weight percentage of vanadium content,

Cu is the weight percentage of copper content,

Ni is the weight percentage of nickel content.

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If in exceptional cases grades of steel are used which do not fulfil these requirements, the manufacturer shall give detailed data concerning the weldability of the material. The pipeline operator may fix a test of weldability, if the provided data are not sufficient.

3.1.5 Impact energy

Where climatic conditions require materials with proven impact properties reference shall be made to EN ISO 3183.

3.1.6 Inspection documents for components

The minimum level of conformity of components for the use with maximum operating pressures up to and including 5 bar shall be certified by an inspection document 2.2 in accordance with EN 10204. The minimum level of conformity of components for the use with maximum operating pressures over 5 bar shall be certified by an inspection document 3.1 in accordance with EN 10204.

3.1.7 Other steels

Steel types or grades other than those listed in EN 10208-1 may also be used when their suitability has been demonstrated. The requirements of EN 10208-1 shall be used for guidance in establishing material properties.

3.2 Pipes and fittings

3.2.1 Steel pipes

Steel pipes shall conform to EN 10208-1.

The criteria for steel pipes of external diameter greater than mentioned in EN 10208-1 shall be agreed between the pipeline operator and manufacturer.

Where the nominal wall thickness is greater than or equal to the value given in Table 1 it is not necessary to carry out any stress calculations to take account of internal pressure.

Table 1 — Nominal wall thickness

Nominal diameter DN	10	15	20	25	40	50	65	80	100
External diameter D	17,2	21,3	26,9	33,7	48,3	60,3	76,1	88,9	114,3
Nominal wall thickness s	2,3	2,3	2,3	2,6	2,6	2,9	2,9	3,2	3,2

Nominal diameter DN	125	150	200	250	300	350	400	500	600	>600
External diameter D	139,7	168,3	219,1	273	323,9	355,6	406,4	508	610	>610
Nominal wall thickness s	3,6	4	4,5	5	5,6	5,6	6,3	6,3	6,3	1% D

Consideration should be given to using pipes of greater wall thickness than given in Table 1 in certain situations.

EXAMPLE Horizontal drilled sections, crossings with major public works (dykes, waterways, roads), areas with great soil settlement differences, pipes being subjected to abnormal ground loading.

Where wall thicknesses less than those given in Table 1 are being considered, design calculations shall be undertaken. Guidance on wall thickness calculation is given in Annex C.

The minimum pipe wall thicknesses shall be as given in Table 2.

Table 2 — Minimum wall thickness

Nominal diameter DN	10-20	25-50	65-125	150-300	350-400	≥450
Minimum wall thickness s_{min}	2,3	2,3	2,6	3,5	4,5	1% D

3.2.2 Fittings

Fittings shall comply with the appropriate European Standards.

Safety factors of fittings shall be at least equal to the safety factor of the pipes.

3.3 Insulating joints

3.3.1 Type test

Insulating joints shall be type tested.

Insulating joints can be designed as insulating couplings or insulating flanges.

3.3.2 Strength test

Any insulating coupling shall be hydrostatically tested at a test pressure of at least 1,5 times the design pressure of the component. End sealing methods which subject the coupling to axial compression shall not be used.

The hydrostatic cycle test sequence should be agreed upon between pipeline operator and manufacturer.

3.3.3 Tightness test

Following a successful hydrostatic test, any insulating coupling shall be tested with air at 5 bar. There shall be no leakage.

3.3.4 Electrical test

Any insulating joint shall be tested in dry condition for 1 min at a minimum voltage of 5 000 V a.c. (50 Hz).as foreseen in EN 1594. This shall not give rise to any corona effects or an insulation breakdown.

Following a successful hydrostatic test, where applicable, the resistance in the dry condition shall not be less than 0,1 MΩ when tested with a minimum voltage of 500 V d.c.

3.3.5 Inspection documents

Conformity of insulating joints shall be certified by an inspection document 3.1 in accordance with EN 10204.

3.4 Valves

Valves shall comply with the appropriate European Standards. In the absence of a European Standard the appropriate standard of a member country may be used. Metallic valves shall be in accordance to EN 13774.