



**SLOVENSKI STANDARD
SIST EN 12732:2022**

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Nadomešča:

SIST EN 12732:2013+A1:2014

Infrastruktura za plin - Varjenje jeklenih cevovodov - Funkcionalne zahteve

Gas infrastructure - Welding steel pipework - Functional requirements

Gasinfrastruktur - Schweißen an Rohrleitungen aus Stahl - Funktionale Anforderungen

Infrastructures gazières - Soudage des tuyauteries en acier - Prescriptions fonctionnelles

Ta slovenski standard je istoveten z: EN 12732:2021

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EUROPEAN STANDARD

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Gas infrastructure - Welding steel pipework - Functional requirements

Infrastructures gazières - Soudage des tuyauteries en acier - Prescriptions fonctionnelles

Gasinfrastruktur - Schweißen an Rohrleitungen aus Stahl - Funktionale Anforderungen

This European Standard was approved by CEN on 3 October 2021.

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
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European foreword

This document (EN 12732:2021) 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of an identical text or by endorsement, at the latest by May 2022, and conflicting national standards shall be withdrawn at the latest by May 2022.

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 12732:2013+A1:2014.

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

Annex L provides details of significant technical changes between this document and the previous edition.

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 document, 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 recognized standards of gas engineering and the specific requirements imposed by the legal structures of the member countries.

CEN/TC 234 will continue its work updating this standard 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, Turkey and the United Kingdom.

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1 Scope

This document contains requirements for the production and testing of weld joints for the installation and modification, including in-service welding, of onshore steel pipelines and pipework used in gas infrastructure. This includes all pressure ranges and processed, non-toxic and non-corrosive natural gas according to EN ISO 13686 and non-conventional gases such as (injected) biomethane and hydrogen, where:

- the pipeline elements are made of unalloyed or low-alloyed carbon steel;
- the pipeline is not located within commercial or industrial premises as integral part of the industrial process on those premises except for any pipelines and facilities delivering gas to such premises;
- the pipework is not located within households or industrial installations according to EN 1775 or EN 15001;
- the design temperature of the system is between -40 °C up to and including 120 °C .

For injected biomethane or hydrogen a detailed technical evaluation of the functional requirements is required, ensuring there are no other constituents or properties of the gases that can affect the integrity of the pipeline.

This document is not applicable to welds produced prior to the publication of this document.

This document specifies common basic principles for gas infrastructure. Users of this document are expected to be aware that there can exist more detailed national standards and/or codes of practice 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 document, 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.

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 1708-1, *Welding - Basic welded joint details in steel - Part 1: Pressurized components*

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

EN ISO 636, *Welding consumables - Rods, wires and deposits for tungsten inert gas welding of non-alloy and fine-grain steels - Classification (ISO 636)*

EN ISO 2560, *Welding consumables - Covered electrodes for manual metal arc welding of non-alloy and fine grain steels - Classification (ISO 2560)*

EN ISO 3834-2, *Quality requirements for fusion welding of metallic materials - Part 2: Comprehensive quality requirements (ISO 3834-2)*

EN ISO 5817, *Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections (ISO 5817)*

EN ISO 6520-1, *Welding and allied processes - Classification of geometric imperfections in metallic materials - Part 1: Fusion welding (ISO 6520-1)*

EN ISO 9606-1:2017, *Qualification testing of welders - Fusion welding - Part 1: Steels (ISO 9606-1:2017)*

EN ISO 9692-1, *Welding and allied processes - Types of joint preparation - Part 1: Manual metal arc welding, gas-shielded metal arc welding, gas welding, TIG welding and beam welding of steels (ISO 9692-1)*

EN ISO 9712, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712)*

EN ISO 10675-1:2016, *Non-destructive testing of welds - Acceptance levels for radiographic testing - Part 1: Steel, nickel, titanium and their alloys (ISO 10675-1:2016)*

EN ISO 10863:2011, *Non-destructive testing of welds - Ultrasonic testing - Use of time-of-flight diffraction technique (TOFD) (ISO 10863:2011)*

EN ISO 10893-8, *Non-destructive testing of steel tubes - Part 8: Automated ultrasonic testing of seamless and welded steel tubes for the detection of laminar imperfections (ISO 10893-8)*

EN ISO 11666, *Non-destructive testing of welds - Ultrasonic testing - Acceptance levels (ISO 11666)*

EN ISO 13588, *Non-destructive testing of welds - Ultrasonic testing - Use of automated phased array technology (ISO 13588)*

EN ISO 14171, *Welding consumables - Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non alloy and fine grain steels - Classification (ISO 14171)*

EN ISO 14174, *Welding consumables - Fluxes for submerged arc welding and electroslag welding - Classification (ISO 14174)*

EN ISO 14175, *Welding consumables - Gases and gas mixtures for fusion welding and allied processes (ISO 14175)*

EN ISO 14341, *Welding consumables - Wire electrodes and weld deposits for gas shielded metal arc welding of non alloy and fine grain steels - Classification (ISO 14341)*

EN ISO 14732:2013, *Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732:2013)*

EN ISO 15609-1, *Specification and qualification of welding procedures for metallic materials - Welding procedure specification - Part 1: Arc welding (ISO 15609-1)*

EN ISO 15614-1, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1)*

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EN ISO 17636-1, *Non-destructive testing of welds - Radiographic testing - Part 1: X- and gamma-ray techniques with film (ISO 17636-1)*

EN ISO 17636-2, *Non-destructive testing of welds - Radiographic testing - Part 2: X- and gamma-ray techniques with digital detectors (ISO 17636-2)*

EN ISO 17637, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637)*

EN ISO 17638, *Non-destructive testing of welds - Magnetic particle testing (ISO 17638)*

EN ISO 17640, *Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels, and assessment (ISO 17640)*

EN ISO 18275, *Welding consumables - Covered electrodes for manual metal arc welding of high-strength steels - Classification (ISO 18275)*

EN ISO 19285, *Non-destructive testing of welds - Phased array ultrasonic testing (PAUT) - Acceptance levels (ISO 19285)*

EN ISO 20378, *Welding consumables - Rods for gas welding of non-alloy and creep-resisting steels - Classification (ISO 20378)*

EN ISO 23279, *Non-destructive testing of welds - Ultrasonic testing - Characterization of discontinuities in welds (ISO 23279)*

3 Terms and definitions

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

ISO and IEC maintain terminological 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 design pressure

DP
pressure on which design calculations are based

3.2 design temperature

DT
temperature on which the design calculations are based

3.3 round porosity

gas pore in a weld where the length is less as three times the width

3.4 elongated porosity

gas pore in a weld where the length is more than three times the width

3.5**gas**

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

3.6**gas infrastructure**

all pipelines, stations and installations 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

3.7**gas compressor station**

installation used for:

- transporting gas in pipelines;
- compressing gas from a pipeline to a gas storage facility or vice versa

Note 1 to entry: More than one of the above functions could be performed simultaneously or alternately.

3.8**gas distribution system**

pipeline system including piping above and below ground and all other equipment necessary to deliver the gas to the consumer

3.9**gas transmission**

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

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3.10**hot pass**

second pass for a cellulosic welded pipe girth weld

3.11**installation**

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

3.12**national requirements**

requirements following from applicable national legislation or national standards

3.13**onshore pipeline**

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

3.14**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.

EN 12732:2021 (E)**3.15****pipeline components**

elements from which a pipeline is constructed. The following are distinct pipeline elements: pipe including cold-formed bends, fittings

Note 1 to entry: Reducers, tees, factory-made elbows and bends, flanges, caps, welding stubs, mechanical joints, fabrications, manufactured from elements referred above.

Note 2 to entry: Manifolds, slug catchers, pig launching/receiving stations, metering and control runs, equipment.

Note 3 to entry: Valves, expansion joints, insulating joints, pressure regulators, pumps, compressors, dedicated pressure vessels.

3.16**pipeline operator**

private or public organisation authorised to design, construct, and/or operate and maintain the gas infrastructure, i.e. gas transmission operators (TSO) and gas distribution operators (DSO)

3.17**pipework**

assembly of pipes and fittings

3.18**pressure**

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

3.19**root pass**

first pass in a single sided pipe girth weld

3.20**station**

plant or facility for the operation and/or processing of gas infrastructure

3.21**test pressure****TP**

pressure to which a part of the gas infrastructure is subjected to, to ensure safe operation

Note 1 to entry: The test pressure can be different for the different parts of the infrastructure to be tested.

3.22**weld repair**

process of repairing a defect that is discovered after the weld has been completed, by additional welding

Note 1 to entry: The repair can involve complete removal of a cylinder of pipe or removal of a localized area by grinding or other means followed by additional welding.

3.23**welder**

person who holds and manipulates the electrode holder, welding torch or blow pipe by hand

3.24**weld operator**

person who operates a mechanized welding system

3.25**welding procedure specification****WPS**

document that has been qualified and provides the required variables of the welding procedure to ensure repeatability during production welding

3.26**temper bead method**

weld sequence where the heat-affected zone of the base material is softened as much as possible

3.27**hydrogen dissolved in metal, HDM**

amount in ml of diffusible hydrogen in 100 mg of weld metal

4 General requirements**4.1 General**

Table 1 assigns the application areas to quality requirement categories as a function of the design pressure and pipe materials used.

When using this document the following shall be defined by the pipeline operator, the applicable paragraph is given in brackets:

- a) applicable quality requirement category. (scope);
- b) applicable quality requirements as defined in Table 2 (4.2);
- c) are there specific requirements on visual testing (VT) personnel, and/or qualification (4.2);
- d) applicable welding qualification standards (4.2);
- e) are all weld metal tensile tests required (4.4);
- f) for category B and C, are batch certificates required for welding consumables, when required the pipeline operator has to define the contents of the certificate (4.4.2);
- g) for filler materials not in accordance with listed European standards, is batch qualification with WPQR allowed (4.4.2);
- h) if overmatching weld material is required (4.4.2);
- i) if hot deformation for misalignment compensation is allowed for materials of $R_{t0,5} \leq 360$ MPa (6.2);
- j) is the weld always to be covered after completion of welding (5.9);
- k) for category D, requirements for repair welding procedures (5.10);
- l) extent of NDT techniques (7.2);
- m) choice of acceptance criteria (7.3);

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- n) if the data of NDT need to be delivered to the pipeline operator (7.7);
- o) for in-service welds, method, extend and acceptance criteria (D.12).

Additional requirements can be specified when, for example:

- the strain on pipelines and systems;
- the materials;
- the line routing;
- the design or the welding technique;
- local regulations, are considered critical.

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Table 1 — Allocation to quality requirement categories

Quality requirement category	Area of activity applies to
B	<p>≤ 5 bar</p> <p>Materials ^a used from group 1.1, 1.2 and 1.4 according to CEN ISO/TR 15608 Yield strength of materials used, $R_{t0,5} \leq 360$ MPa</p> <p>Examples of use: Mains and service pipes in gas distribution systems, pipework in stations</p>
C	<p>> 5 bar ≤ 16 bar</p> <p>Materials ^a used from group 1.1, 1.2 and 1.4 according to CEN ISO/TR 15608 Yield strength of materials used, $R_{t0,5} \leq 360$ MPa</p> <p>Examples of use: Pipelines including pipework in stations and gas distribution systems</p>
D	<p>> 16 bar ^b</p> <p>Materials used from group 1, 2 and 3 according to CEN ISO/TR 15608</p> <p>Examples of use: Pipelines including pipework in stations and gas transmission systems</p>
<p>Key</p> <p>$R_{t0,5}$ is the specified minimum yield strength according to EN ISO 3183</p>	
<p>NOTE 1 “Category A” for pipework up to and including 100 mbar, as mentioned in the previous version EN 12732:2000, has been incorporated in the pressure range of “Category B” and has been deleted from this table.</p>	
<p>NOTE 2 Gas infrastructure with a MOP up to and including 16 bar is generally dedicated to gas distribution.</p>	
<p>^a When the materials used are outside this range the operator shall review the applicability of the requirements of this standard or apply Quality requirement category D.</p>	
<p>^b Pipelines having hoop stresses at design pressure up to 30 % of specified minimum yield strength ($R_{t0,5}$) and operated at a pressure up to 24 bar can be allocated to quality requirement Category C by the pipeline operator.</p>	

4.2 Quality system requirements

If required by the pipeline operator, a quality system shall be applied to pipeline welding. A set of recommended quality requirements according to EN ISO 3834 (all parts) is provided in Table 2, which specifies the requirements of EN ISO 3834 (all parts) for the different categories as defined in Table 1.