



SLOVENSKI STANDARD
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Infrastruktura za plin - Postaje za injiciranje - 1. del. Splošne zahteve

Gas infrastructure - Injection stations - Part 1: General requirements

Gasinfrastruktur - Einspeiseanlagen - Teil 1: Allgemeine Anforderungen

Infrastructure de gaz - Installation pour l'injection de gaz renouvelable dans les reseaux de gaz naturel - Partie 1: Exigences fonctionnelles générales

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Gas infrastructure - Injection stations - Part 1: General requirements

Infrastructure de gaz - Installation pour l'injection de gaz renouvelable dans les réseaux de gaz naturel - Partie 1: Exigences fonctionnelles générales

Gasinfrastruktur - Einspeiseanlagen - Teil 1: Allgemeine Anforderungen

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

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prEN 17928-1:2023 (E)**European foreword**

This document (prEN 17928-1:2023) has been prepared by Technical Committee CEN/TC 234 “Gas infrastructure”, the secretariat of which is held by DIN.

This document is a currently submitted to the CEN Enquiry.

This document is part of the EN 17928 series, *Gas infrastructure — Injection stations*, which includes the following parts:

- *Part 1: General requirements*
- *Part 2: Specific requirements regarding the injection of biomethane*
- *Part 3: Specific requirements regarding the injection of hydrogen fuel gas*

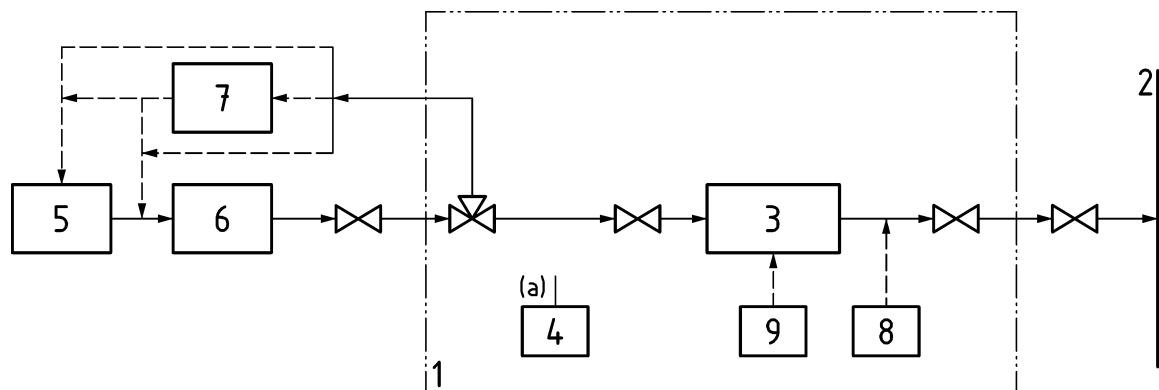
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1 Scope

This document establishes the functional requirements for stations for the injection of biomethane, substitute natural gas (SNG) and hydrogen fuel gas into gas transmission and distribution systems operated with fuel gases (natural gas, biomethane, SNG, hydrogen fuel gas, fuel gas mixtures) in accordance with European technical rules that ensure the interoperability of systems.

Figure 1 describes the general approach including all the relevant functions that can be installed in different configurations.

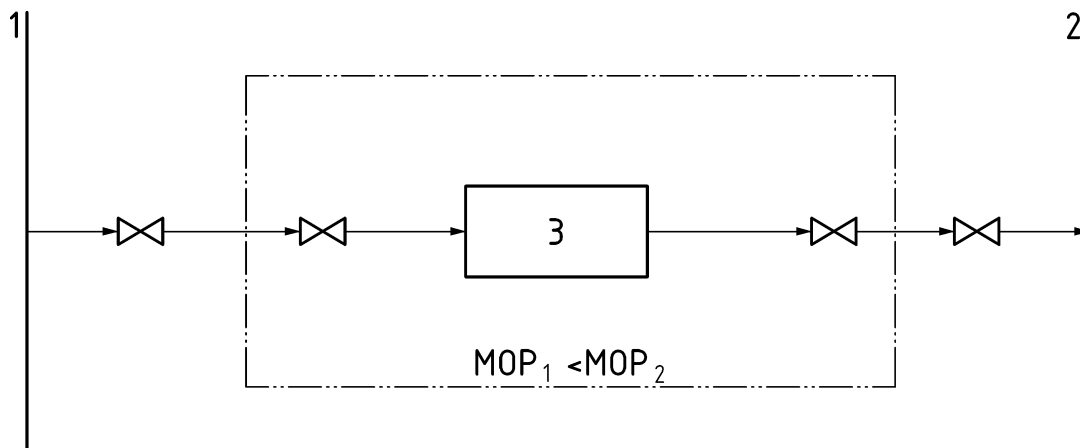


Key

- 1 injection station – scope of this document
- 2 gas transmission or distribution system
- 3 measuring and control station – pressure regulation/ compression/gas mixing / flow control
- 4 gas analysis and sampling system
- 5 gas production
- 6 gas purification/upgrading
- 7 storage
- 8 odorization (optional)
- 9 adjusting gases (optional) (see 7.3)
- (a) sampling unit to be connected to process line

Figure 1 — Example of an injection station with gas purification

This document also applies to refeeding stations that feed such gases back into upstream gas supply networks; see Figure 2.

**Key**

- 1 downstream gas transmission or distribution network
- 2 upstream gas transmission or distribution network
- 3 refeeding station

Figure 2 — Refeeding station

This document represents the state of the art at the time of its preparation.

This document does not apply to injection stations operating 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 more detailed national standards and/or codes 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 terms of additional requirements in national legislation/regulation than in this document, CEN/TR 13737 (all parts) illustrates these terms.

CEN/TR 13737 (all parts) gives:

- 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 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 1081, *Resilient, laminate and modular multilayer floor coverings - Determination of the electrical resistance*

EN 1594, *Gas infrastructure - Pipelines for maximum operating pressure over 16 bar - Functional requirements*

EN 1776, *Gas infrastructure - Gas measuring systems - Functional requirements*

EN 1998 (all parts), *Eurocode 8: Design of structures for earthquake resistance*

- EN 10204, *Metallic products - Types of inspection documents*
- EN 12007-1, *Gas infrastructure - Pipelines for maximum operating pressure up to and including 16 bar - Part 1: General functional requirements*
- EN 12186, *Gas infrastructure - Gas pressure regulating stations for transmission and distribution - Functional requirements*
- EN 12405-1, *Gas meters - Conversion devices - Part 1: Volume conversion*
- EN 12327, *Gas infrastructure - Pressure testing, commissioning and decommissioning procedures - Functional requirements*
- EN 12732, *Gas infrastructure - Welding steel pipework - Functional requirements*
- EN 13774, *Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements*
- EN 14141, *Valves for natural gas transportation in pipelines - Performance requirements and tests*
- EN 14382, *Gas safety shut-off devices for inlet pressure up to 10 MPa (100 bar)*
- EN 16723-1, *Natural gas and biomethane for use in transport and biomethane for injection in the natural gas network - Part 1: Specifications for biomethane for injection in the natural gas network*
- EN 16726, *Gas infrastructure - Quality of gas - Group H*
- EN 17649:2022, *Gas infrastructure - Safety Management System (SMS) and Pipeline Integrity Management System (PIMS) - Functional requirements*
- EN ISO 17659, *Welding - Multilingual terms for welded joints with illustrations (ISO 17659)*
- EN 60034-1, *Rotating electrical machines - Part 1: Rating and performance*
- EN 60079-10-1, *Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres*
- EN 60079-14, *Explosive atmospheres - Part 14: Electrical installations design, selection and erection*
- EN 60947-5-1, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices*
- EN 61511 (all parts), *Functional safety - Safety instrumented systems for the process industry sector*
- EN 62305 (all parts), *Protection against lightning*
- prEN 17928-2, *Gas infrastructure - Injection stations - Part 2: Specific requirements regarding the injection of biomethane*
- prEN 17928-3, *Gas infrastructure - Injection station - Part 3: Specific requirements regarding the injection of hydrogen fuel gas*
- EN ISO 6974 (all parts), *Natural gas - Determination of composition and associated uncertainty by gas chromatography (ISO 6974 (all parts))*

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EN ISO 9001, *Quality management systems - Requirements (ISO 9001)*

EN ISO 10715, *Natural gas - Sampling guidelines (ISO 10715)*

EN ISO 12213 (all parts), *Natural gas - Calculation of compression factor (ISO 12213 (all parts))*

EN ISO 12944 (all parts), *Paints and varnishes - Corrosion protection of steel structures by protective paint systems (ISO 12944 (all parts))*

EN ISO 13849-1, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1)*

IEC 60364 (all parts), *Low-voltage electrical installations*

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 injection station

umbrella term covering all necessary equipment for the injection of biomethane, substitute natural gas (SNG) and hydrogen fuel gas into gas transmission and distribution systems, including the site and the housing

Note 1 to entry: See Figure 1. <https://standards.iteh.ai/catalog/standards/sist/86dd6296-35d4-4bc3-90cb-41ba9088063c/osist-pren-17928-1-2023>

3.2 hydrogen fuel gas

gas comprising mainly hydrogen for the injection in gas transmission and distribution networks

Note 1 to entry: For gas properties, reference can be made to ISO 14687.

3.3 biomethane

gas comprising principally methane, obtained from either upgrading of biogas or methanation of bio-syngas

Note 1 to entry: Composition given in EN 16723-1.

[SOURCE: EN 16723-1:2016]

3.4**bio-syngas**

gas, comprising principally carbon monoxide and hydrogen, obtained from gasification of biomass

[SOURCE: EN 16723-1:2016]

3.5**substitute natural gas****SNG**

gas which is interchangeable in its properties with natural gas

Note 1 to entry: Substitute natural gas is also called synthetic natural gas.

3.6**gas mixture**

blend of two or more gases, e.g. natural gas and hydrogen

3.7**refeeding station**

station for feeding of gas back into upstream gas supply networks

3.8**monitoring and control devices**

process measuring and control technology devices designed for the operation of the station as intended

Note 1 to entry: Such equipment is used for automation functions such as instrumentation and control, signalling, recording, etc.

3.9**gas infrastructure**

pipeline system including pipework and their associated stations for the transmission and distribution of gas

Note 1 to entry: An injection station is part of the gas infrastructure.

3.10**odorization**

addition of odorants to gas (normally odourless) to allow gas leaks to be recognized by smell at trace levels (before accumulating to dangerous concentrations in air)

[SOURCE: EN 16723-1:2016]

3.11**protective measure**

means used to reduce risk

Note 1 to entry: Protective measures include risk reduction by inherently safe design, protective devices, personal protective.

[SOURCE: ISO/IEC Guide 51:2014, 3.8]

prEN 17928-1:2023 (E)**3.12****risk**

product of the damage which will be caused by a potential accident and its probability

[SOURCE: ISO/TR 15916]

3.13**hazard**

anything which is a source of potential loss of inventory or damage of the gas infrastructure

[SOURCE: EN 17649:2022, 3.5]

3.14**safety**

condition of the gas infrastructure being acceptable for the population, for the environment and for the continuity of supply ensured by the adoption of adequate measures in the design, construction, operation, maintenance and abandonment of the gas infrastructure

[SOURCE: EN 17649:2022, 3.8]

3.15**leak**

hole or crack through which a liquid or gas can flow out of a container, or the liquid or gas that comes out

3.16**safety function**

function to be implemented by an electrical/electronic/programmable electronic system E/E/PE or mechanical/pneumatic safety-related system or other risk reduction measures, that is intended to achieve or maintain a safe state for the Equipment Under Control (EUC), in respect of a specific hazardous event

EXAMPLE Examples of safety functions include:

- functions that are required to be carried out as positive actions to avoid hazardous situations (for example switching off a motor); and
- functions that prevent actions being taken (for example preventing a motor starting).

[SOURCE: EN 61508-4:2010, 3.5.1]

3.17**Equipment Under Control****EUC**

machinery, apparatus or plant used for processing, transportation or other activities which Parameter Under Control (PUC) are regularly supervised

Note 1 to entry: In the case of this document, the EUC is the complete downstream system.

Note 2 to entry: For further details, see EN 61508-4:2010, 3.2.3.

3.18**Parameter Under Control****PUC**

parameter which is continuously controlled and necessary to ensure safety and operation of the Equipment Under Control (EUC)

Note 1 to entry: For further details, see EN 61508.

3.19**safety system**

designated system that:

- implements the required safety functions necessary to achieve or maintain a safe state for the Equipment Under Control (EUC); and
- safely prevents any process parameters to exceed the permissible tolerances; and
- is intended to achieve, on its own or with other safety-related systems and other risk reduction measures, the necessary safety integrity for the required safety function

Note 1 to entry: For further details, see EN 61508-4:2010, 3.4.1.

Note 2 to entry: The term refers to those systems, designated as safety-related systems, that are intended to achieve, together with the other risk reduction measures.

3.20**Safety Instrumented System****SIS**

instrumented system used to implement one or more safety instrumented functions

Note 1 to entry: An SIS is composed of any combination of sensor(s), logic solver(s), and final element(s) (see EN 61511-1:2017, 3.2.67).

Note 2 to entry: A Safety Instrumented System is equivalent to a safety-related system, which is defined under EN 61508-4.

[SOURCE: EN 50495:2010, 3.5]

3.21**mechanical safety system**

system used to implement one or more safety-related functions

Note 1 to entry: Such devices operate without energy from external sources (e.g. safety shut-off valves, spring-loaded safety relief valves).

3.22**limiter**

protection device that switches off processes that influence the corresponding limiting value if they exceed or fall short of a fixed limit value and locks these processes against automatic switching on

prEN 17928-1:2023 (E)**3.23****gas compression system**

system designed to boost the pressure of gaseous media

Note 1 to entry: The system comprises all types such as fans, compressors, etc., including relevant control and safety systems.

3.24**competent person**

person who is trained and experienced to perform activities related to injection stations

Note 1 to entry: National regulations can apply regarding the qualification of the person.

3.25**authorized person**

competent person who is appointed to fulfil a given task on injection stations

Note 1 to entry: The appointment procedure is defined in each member country.

3.26**gas mixer**

blender

device used to mix two or more technical gases which is available in various versions for different gas combinations and different flow rates; depending on the requirements, mechanical, diffusion-mixing or mass flow-controlled mixing systems are used

3.27**adjusting gases**

gases additionally injected in order to adjust gas properties

Note 1 to entry: E.g. for gas billing according to national regulations.

4 General requirements**4.1 General**

The design, manufacture, construction, testing, commissioning, and operation of stations shall be in accordance with the acknowledged rules of technology and the applicable regulatory requirements and stipulations. Stations shall be designed and constructed to have a clear layout and shall be accessible and easy to operate, always taking into account operational and maintenance requirements.

The appropriate specifications for gases injected into the gas network shall be observed:

- for the injection of SNG, EN 16726 shall apply;
- for the injection of biomethane, EN 16723-1 shall apply.

NOTE There is currently no specification for hydrogen to be injected into the gas infrastructure, whether as a blend with natural gas or into a hydrogen fuel gas network.

The applicable requirements on refeeding stations are given in Annex E.

4.2 Quality and management system

The life of a station can be divided into four phases:

- 1) design;
- 2) construction, testing and commissioning;
- 3) operation and maintenance;
- 4) decommissioning and disposal.

The full life expectancy of the consequences of each of the four phases shall be considered. The full life expectancy of a component shall be used to determine the relevant timeframes to be assessing climate change aspects that could affect it.

A quality and management system shall be applied in accordance with this document, which includes these four phases. Reference shall be made to EN 17649 or EN ISO 9001 or equivalent quality system standards.

Standardized safety design rules on pressure regulation stations shall be incorporated and documented in the quality or management system.

4.3 Environmental constraints

4.3.1 General requirements

Energy conserving approaches should also be considered in order to reduce emissions.

Consideration should be given to the requirements of EN ISO 14001, EN ISO 14090 and EN ISO 50001.

NOTE 1 Requirements for the mitigation of environmental issues are detailed in the relevant specific system standards (e.g. EN 12186, EN 1776).

It should be verified if the site is a protected area in terms of noise, ground water, proximity of dwellings and other relevant aspects specific to minimizing the impact on the surroundings.

The compatibility of the materials should be considered to minimize the environmental impact of the building.

Particular measures are to be taken to minimize emissions to air at the commissioning stage and during maintenance/repair operations. Furthermore, the gas used for purging (air, nitrogen or other) should be chosen with regard to the possible impact around the site.

At the stage of planning and designing, adequate procedure for assembling/commissioning/decommissioning should be foreseen for a proper waste disposal, taking into account the different materials (e.g. lubrication, electrical elements).

NOTE 2 There can be legislation describing the separation of waste materials (e.g. used oil, filter cartridges, liquids from drains, chemical waste, packing materials, etc.) and its disposal, for example by certified waste disposal companies or organizations. Information is provided by the manufacturers for dealing with the disposal of replaceable parts.

NOTE 3 National and local laws and regulations can apply.