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Infrastruktura za plin - Sistem varnega upravljanja (SMS), sistem celostnega upravljanja plinovodnih sistemov (PIMS) in kompresorskih postaj (CIMS) - Funkcionalne zahteve (vključno z dopolnilom A1)

Gas infrastructure - Safety Management System (SMS), Pipeline Integrity Management System (PIMS) and Compressor station integrity management system (CIMS) - Functional requirements

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Gasinfrastruktur - Sicherheitsmanagementsystem (SMS), Pipeline-Integritätsmanagementsystem (PIMS) und Integritätsmanagementsystem für Verdichterstationen (CIMS) - Funktionale Anforderungen

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Infrastructures gazières - Système de management de la sécurité (SMS), système de management de l'intégrité des canalisations (PIMS) et systèmes de management de l'intégrité des stations de compression (CIMS) - Exigences fonctionnelles

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European foreword

This document (EN 17649:2022+A1:2026) 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of an identical text or by endorsement, at the latest by March 2027, and conflicting national standards shall be withdrawn at the latest by March 2027.

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 A1 EN 17649:2022 A1.

This document includes Amendment 1 approved by CEN on 28 March 2026.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

New points for attention in this document are adaptations to climate change and the injection of hydrogen and other gases into natural gas networks. As gases other than natural gas will be more often injected into existing natural gas networks in the future, Management of Change has been introduced in this document to ensure that all relevant safety aspects are taken into account when this occurs.

There is a complete suite of functional standards prepared by CEN/TC 234 “Gas infrastructure” to cover all parts of the gas infrastructure system from the point of entry into the gas infrastructure up to the point of delivery of the customers, whether domestic, commercial or industrial.

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In preparing this document, a basic understanding of Management Systems and gas infrastructure by the user has been assumed.

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

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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Introduction

This document provides guidance on the establishment, implementation and maintenance of a safety management system, all in order to provide an efficient gas transmission and distribution infrastructure for the safe and secure conveyance of gas.

This document supports a System Operator (SO) in the implementation of a management system following the Plan-Do-Check-Act (PDCA) methodology, described in Annex A. It can be used in conjunction with ISO Management Systems such as EN ISO 9001, EN ISO 14001, ISO 31000 and also in case of assessment or certification by a third party.

The main objectives of this document are to provide the necessary requirements:

— to be included in a management system related to safety and efficiency of the main processes being the life cycle stages of gas infrastructure (design, construction and testing, commissioning/ decommissioning, operation, maintenance and permanently taken out of service) for all of the SO's gas conveying assets. In practice, this is expressed on methods and organisational features as well as technical aspects;

— in demonstrating the competencies required for employees and any contractors involved in the processes mentioned above.

It is at the SO's discretion to include other objects and structures in his own management system.

The structure of this document is based on the ISO High Level Structure of standard on Management Systems (ISO/IEC Directives, Part 1, Consolidated ISO Supplement, 2015, Annex SL (normative) Proposals for management system standards).

[A1] The technical contents are in line with EN 12007 (all parts), EN 1594 and EN 12583. [A1]

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1 Scope

〈A1〉 This document specifies requirements on the development and implementation of a Safety Management System (SMS), a Pipeline Integrity Management System (PIMS) and a Compressor station integrity management system (CIMS). 〈A1〉 The SMS is applicable for system operators of a gas infrastructure. The PIMS is applicable for system operators of gas infrastructure with a maximum operating pressure (MOP) over 16 bar.

This document refers to all activities and processes related to safety aspects and performed by system operators of a gas infrastructure, including those activities entrusted to contractors. It includes safety-related provisions on operation of the gas infrastructure.

This document is applicable to infrastructure for the conveyance of processed, non-toxic and non-corrosive natural gas according to EN ISO 13686 and gases such as biomethane and hydrogen and to mixtures of these gases with natural gas.

This document covers also gases classified as group H, that are to be transmitted, injected into and from storages, distributed and utilized, as specified in EN 16726. For the requirements and test methods for biomethane at the point of entry into a natural gas network, reference is made to EN 16723-1.

This document can be applied for gas infrastructure conveying gases of the 3rd gas family as classified in EN 437 or for other gases such as carbon dioxide.

Specific requirements for occupational health and safety are excluded from this document. For these, other European and/or international standards, e.g. ISO 45001, apply.

This document specifies common basic principles for gas infrastructure. It is important that users of this document are expected to be aware that more detailed national standards and/or codes of practice 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.

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

EN 12007 (all parts), *Gas infrastructure - Pipelines for maximum operating pressure up to and including 16 bar*

EN 12186, *Gas infrastructure - Gas pressure control stations for transmission and distribution - Functional requirements*

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

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〉A1〈 EN 12583, *Gas Infrastructure - Compressor stations - Functional requirements* 〉A1〈

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
climate change
change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer

Note 1 to entry: The definition of climate change is based on the IPCC definition.

Note 2 to entry: Both natural processes and human activity can cause climate change.

3.2
climate change adaption
process of adjustment to actual or expected climate change and its effects

Note 1 to entry: The definition of climate change adaption is based on the IPCC definition.

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3.3
system operator
private or public organisation authorised to design, construct and/or operate and maintain the gas infrastructure

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Note 1 to entry: Synonyms are: pipeline operator (see EN 1594), gas network operator.

[SOURCE: EN 1594:2013, 3.31, modified - Term 'pipeline operator' has been changed in 'system operator' and Note 1 to entry has been added]

3.4
gas infrastructure
pipeline system including pipework and their associated stations or plants for the transmission and distribution of gas

Note 1 to entry: Synonym is: gas network.

3.5
hazard
anything which is a source of potential loss of inventory or damage of the gas infrastructure

3.6
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

[SOURCE: EN 1594:2013, 3.18]

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3.7
integrity
condition in which an asset is safe and reliable for its purpose

3.8
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

[SOURCE: EN 1594:2013, 3.21]

3.9
operational integrity
condition in which an asset is safe and reliable by means of a set of appropriate operational activities and practices

3.10
pipeline integrity management system
PIMS
set of appropriate activities and practices by which a transmission system operator preserves the integrity of the gas transmission pipeline to ensure safe and reliable transportation of natural gas

3.11
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

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3.12
safety aspect
element or event that, if not properly managed, can cause a potential hazard for the population, the environment and for the gas infrastructure

EXAMPLE Examples of safety aspects:

— design and modifications;
— operating procedures;
— workforce competence;
— human factors;
— emergency arrangements;
— protective devices, instrumentation and alarms;
— inspection and maintenance;
— defects and subsequent repair activities;
— permit to work;
— asset records and data quality;
— third party activities;
— climate change effects;
— changes in the type of gas;
— identification of pipelines.

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3.13
Safety Management System
SMS
set of appropriate activities and practices by which a SO preserves a safe and reliable gas transmission or distribution system and mitigates the consequences of incidents

〈A1〉 3.14
compressor station integrity management system
CIMS
set of appropriate activities and practices by which a transmission system operator preserves the integrity of the compressor station to ensure safe and reliable compression of gas 〈A1〉

4 Context of the organization

4.1 Understanding the organization and its context

The System Operator (SO) shall establish, implement and maintain a (written) procedure-based safety management system (SMS) for its gas infrastructure, by fulfilling the requirements of this Clause 4. The safety management system shall form a part of the overall company management systems.

The organization shall determine external and internal issues that are relevant to the purpose of the SMS and that affect its ability to achieve the intended outcome(s). Such issues can include environmental, societal and organisational conditions being affected by or capable of affecting the organization.

4.2 Understanding the needs and expectations of stakeholders

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The organization shall determine:

— the stakeholders that are relevant to the SMS;

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— the relevant requirements of these stakeholders.

4.3 Safety management system (SMS)

4.3.1 General

The SO shall specify the policy, the objectives and the organization of its safety management system. They shall include the following:

— safety of the public;

— safety of personnel;

— protection of urban, natural or industrial environment;

— operational life and reliability of the gas infrastructure.

4.3.2 Determining the scope of the SMS

To enable the SO to achieve the required safety and reliability of the gas transmission and distribution infrastructure, the SMS shall consider the safety aspects of gas conveyance activities in:

a) the main processes being the life cycle stages of gas infrastructure:

   1) design;

   2) construction (including testing);

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3) commissioning/decommissioning;

4) operation (including emergency plans, see 8.1.8);

5) maintenance;

6) permanently taken out of service.

b) the enabling processes which support the main processes and which can comprise the following:

— training;

— purchasing;

— communication;

— documentation;

— regulatory compliance;

— (monitoring developments in) innovation.

Provisions shall be incorporated into the safety management system to:

— ensure the safe operation of the gas infrastructure;

— monitor its condition;

— ensure safe and effective maintenance;

— deal effectively and responsibly with incidents and emergencies;

— develop and maintain all required competencies.

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5 Leadership

5.1 Leadership and commitment

The top management of the SO shall provide visible and active leadership in developing and maintaining a culture that supports the management of safety.

The top management shall specify a safety policy in which overall objectives and a commitment to maintain and improve safety performance are clearly stated.

5.2 Policy

The safety policy shall:

— be appropriate to the nature, scale and safety impacts of its activities;

— include commitments to:

— the prevention of incidents;

— ensure safe and reliable conveying of gas;

— the mitigation of consequences for the public and the environment;

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— include a commitment to comply with relevant legislation, regulations, company policies and procedures related to the safety policy;

— include a framework for setting and reviewing safety objectives and targets;

— be documented, implemented, maintained and communicated to all employees and to contractors carrying out activities that can have safety implications;

— be made available to stakeholders, e.g. on a website.

To implement the safety policy the SO shall specify, document and maintain objectives that take into account the safety aspects of the gas infrastructure (6.1.1), the legal and other requirements (6.1.6), technological developments, operational and business requirements. The objectives shall be measurable and associated to qualitative or quantitative targets.

5.3 Organizational roles, responsibilities and authorities

The SO's top management shall appoint in writing specific management representatives who, irrespective of other responsibilities, shall have specified roles, responsibilities and authority for:

— ensuring that the safety management system is established, implemented and maintained in accordance with this document;

— reporting on the performance of the safety management system to top management for review (see 8.4) and as a basis for continuous improvement of the safety management system.

This appointment of the specific management representatives shall be communicated to the employees.

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6 Planning of the SMS

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6.1 Management of safety aspects and legal requirements

6.1.1 Identification and assessment of safety aspects

The SO shall systematically identify and assess all reasonably foreseeable safety aspects in order to determine the likelihood and consequence of the actual hazard that they present to the public, the employees, the environment and gas infrastructure at each stage of the asset lifecycle.

The SO shall describe how these aspects are managed by the SMS through appropriate controls, including the procedures, services and equipment that are safety critical.

NOTE 1 The safety aspects are usually similar for large parts of the infrastructure. In some cases, there are local safety aspects which must also be considered.

The SO shall consider possible future safety aspects related to climate change effects and conveying of natural gases from different sources and gases other than natural gas. These new safety aspects shall be taken into account in the design of new gas infrastructure and in the operation of existing gas infrastructure.

NOTE 2 For a list of climate change effects see: CEN-CENELEC-NEN, Tailored guidance for standardization technical committees: How to include climate change adaptation in European infrastructure standards, Annex 2 [13].

The assessment shall be carried out using qualitative and/or quantitative techniques as considered appropriate by the SO.

Safety management strategies shall include prevention, protection and mitigation activities.

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NOTE 3 Following his company policy the SO can apply a risk management approach to prevent, protect and mitigate safety aspects and actual hazards. ISO 31000 can give guidance on risk management.

6.1.2 Recording of safety aspects

The results of the safety aspects and assessment process shall be recorded in a specified register that record details of:

— identified hazards and their causes;

— existing safety controls that are in place to manage the safety;

— a description of any additional control measures that are required to bring safety aspects to an acceptable level;

— how responsibility for the day-to-day management of the safety aspect(s) is considered.

6.1.3 Monitoring of safety aspects

The SO shall have processes to ensure that any new safety aspects, especially climate change effects and injection of hydrogen, are identified and that existing safety aspects are regularly monitored to ensure that they are still valued correctly.

6.1.4 Gathering and analysis of incidents

The safety management system shall have appropriate arrangements for investigating gas safety and/or climate change related incidents, which should ascertain not only the immediate cause but also the 'root cause' of such incidents.

The processes for carrying out accident investigation should also describe how recommendations to prevent recurrence are made and how follow-up actions are managed.

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6.1.5 Safety aspect review

The SO shall review the safety aspects register at a prescribed frequency. The review shall include the following:

— analysis of incidents which can have occurred;

— a review of safety aspects;

— safety aspects ranking and evaluation;

— setting safety level objectives and targets;

— a review of the results of mitigating actions.

6.1.6 Legal and permit requirements

The SO shall have a procedure to identify the legal requirements and other requirements that are applicable to the safety aspects of its activities.

The SO can decide to specify and adopt internal company standards based on legal requirements, national standards, European and/or international standards, adapted to its own skills and knowledge.

The SO shall ensure that these requirements are taken into account when establishing, implementing and maintaining its SMS.

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6.2 SMS objectives and planning to achieve them

The SO shall specify a plan for achieving the objectives of the SMS.

The plan shall ensure that:

— there is compliance with the safety policy;

— the identification, recording and follow-up of corrective or improvement actions are carried out;

— there is provision for the control of abnormal situations including emergencies;

— the identification of training needs, their provision and the evaluation of their effectiveness are carried out;

— the SMS is audited.

The plan shall include:

— designation of individual responsibility and authority for achieving the objectives (objectives owners);

— the means and the time-frame by which the objectives are to be achieved;

— procedures to monitor on a regular basis the achievement of the objectives through indicators.

The plan shall be reviewed on a regular basis and at specified intervals and adjusted when necessary.

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6.3 Management of change

6.3.1 General

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The introduction of other gases such as hydrogen, biomethane or change in odorization in an existing natural gas infrastructure shall be preceded by a management of change process. In case of a hydrogen – natural gas mixture the SO shall determine the percentage hydrogen above which the gas cannot be treated anymore as natural gas and therefore management of change is necessary.

〚A1〉 Depending on the changes to the composition of the gas introduced into a natural gas infrastructure, the SO shall conduct a revision of the SMS and, if applicable, the PIMS and CIMS to assess all safety aspects affected by the changes. 〈A1〛

6.3.2 Awareness of the type of medium

All personnel involved in the operation or maintenance of the infrastructure shall be made aware of any gas composition different from natural gas being present in the infrastructure or in designated parts of the infrastructure. Safety and operational procedures that have been changed shall be made available and explained to the involved personnel.

6.3.3 Competence

The involved personnel shall be trained for operational tasks, maintenance tasks and emergency response in relation to different gases introduced in the natural gas infrastructure.

6.3.4 Gas (mixture) identification

Pipeline systems conveying gas mixtures that will change the safety aspects such as hydrogen mixtures shall be clearly distinguishable by for example geographical information system (GIS) documentation. In any case the operator shall be able to identify the type of gas in each pipeline in operation.

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