BS EN 17649:2022

BSI Standards Publication

Gas infrastructure — Safety Management System (SMS) and Pipeline Integrity Management System (PIMS) — Functional requirements

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National foreword

This British Standard is the UK implementation of EN 17649:2022. It supersedes BS EN 16348:2013, which is withdrawn. Together with BS EN 15399, it supersedes BS EN 15399:2018, which will be withdrawn on publication of BS EN 15399.

The UK participation in its preparation was entrusted to Technical Committee GSE/33, Gas supply.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Gasinfrastruktur - Sicherheitsmanagementsystem und Rohrleitungsintegritätsmanagementsystem - Funktionale Anforderungen

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European foreword

This document (EN 17649:2022) 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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.

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 15399:2018, and EN 16348:2013.

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.

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

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).

The technical contents are in line with EN 12007 (all parts) and EN 1594.

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1 Scope

This document specifies requirements on the development and implementation of a Safety Management System (SMS) and a Pipeline Integrity Management System (PIMS). 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.

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 regulating stations for transmission and distribution - Functional requirements*

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

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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.

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

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]

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

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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

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

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

The organization shall determine:

— the stakeholders that are relevant to the SMS;

— 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);

   3) commissioning/decommissioning;

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

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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.

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;

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

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— 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.

6 Planning of the SMS

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.

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.

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