SLOVENSKI STANDARD
SIST EN 12583:2014

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Nadomešča:
SIST EN 12583:2003

Infrastruktura za plin - Kompresorske postaje - Funkcionalne zahteve

Gas infrastructure - Compressor stations - Functional requirements

Gasinfrastruktur - Verdichterstationen - Funktionale Anforderungen

Infrastructures gazières - Stations de compression - Prescriptions fonctionnelles

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ICS:

23.140	Kompresorji in pnevmatični stroji	Compressors and pneumatic machines
75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment

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EUROPEAN STANDARD

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English Version

Gas Infrastructure - Compressor stations - Functional requirements

Infrastructures gazières - Stations de compression - Prescriptions fonctionnelles

Gasinfrastruktur - Verdichterstationen - Funktionale Anforderungen

This European Standard was approved by CEN on 20 December 2013.

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

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Foreword

This document (EN 12583:2014) 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of an identical text or by endorsement, at the latest by September 2014, and conflicting national standards shall be withdrawn at the latest by September 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12583:2000.

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

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

There is a complete suite of functional standards prepared by CEN/TC 234 "Gas infrastructure" to cover all parts of the gas infrastructure from the input of gas into the on-shore transmission network up to the inlet connection of gas appliances, including transmission, distribution, storage, compression, pressure regulation and metering, installation, injection of non-conventional gases, gas quality issues and others. In preparing this standard a basic understanding of gas infrastructure by the user has been assumed.

The 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.

Directive 2009/73/EC concerning common rules for the internal market in natural gas and the related Regulation (EC) No 715/2009 on conditions for access to the natural gas transmission networks also aim at technical safety (security) including technical reliability of the European gas system. These aspects are also in the scope of CEN/TC 234 standardisation. In this respect CEN/TC 234 evaluated the indicated EU legislation and amended this technical standard accordingly, where required and appropriate.

In this edition of EN 12583 environmental aspects relevant to the design, construction and testing, operation and maintenance, decommissioning and disposal of compressor stations in the scope of this standard are covered in accordance with CEN Guide 4 and CEN/TR 16388.

This European Standard supersedes all other European Standards for gas compressor stations in the gas infrastructure above 16 bar and with a total shaft power over 1 MW.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard describes the specific functional requirements for the design, construction, operation, maintenance and disposal activities for safe and secure gas compressor stations.

This European Standard applies to new gas compressor stations with a Maximum Operating Pressure (MOP) over 16 bar and with a total shaft power over 1 MW. For existing compressor stations, this European Standard applies to new compressor units. Where changes/modifications to existing installations take place, due account may be taken of the requirements of this European Standard.

This European Standard does not apply to gas compressor stations operating prior to the publication of this European Standard.

The purpose of this European Standard is intended to:

— ensure the health and safety of the public and all site personnel,

— to cover environmental issues and

— to avoid incidental damage to nearby property.

This European Standard specifies common basic principles for the gas infrastructure. Users of this European 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 European Standard, the national legislation/regulation takes precedence as illustrated in CEN/TR 13737 (all parts). CEN/TR 13737 (all parts) gives:

— clarification of all legislations/regulations applicable in a member state;

— if appropriate, more restrictive national requirements;

— a national contact point for the latest information.

This European Standard does not apply to:

— off-shore gas compressor stations;

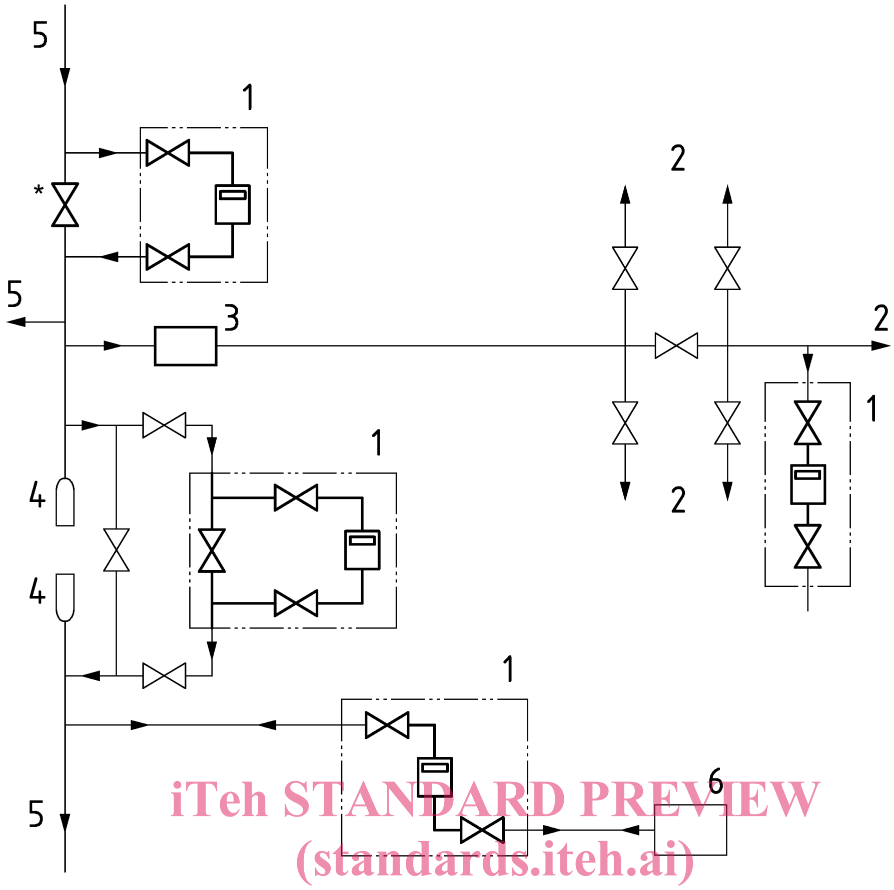
— gas compressor stations for compressed natural gas filling-stations;

— customer installations downstream of the point of custody transfer;

— design and construction of driver packages (see Annex C).

For supplies to utility services such as small central heating boilers reference should be made to EN 1775.

Figure 1 shows a schematic representation of compressor stations in a gas infrastructure.



Key

1 compressor station

2 distribution system

3 metering and/or pressure limiting or regulation station

4 pig traps

5 transmission line

6 storage facility

NOTE Parts indicated in frames by thick lines are within the scope of this European Standard (* part of pipeline but operated by SCS).

Figure 1 — Schematic representation of compressor stations in the gas infrastructure

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 1012-3, *Compressors and vacuum pumps — Safety requirements — Part 3: Process compressors*

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

EN 12186, *Gas supply systems — Gas pressure regulating stations for transmission and distribution — Functional requirements*

EN 12732, *Gas infrastructure — Welding steel pipework — Functional requirements*

EN 14505, *Cathodic protection of complex structures*

EN 60079-10-1, *Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres (IEC 60079-10-1)*

EN 60079-20-1, *Explosive atmospheres — Part 20-1: Material characteristics for gas and vapour classification — Test methods and data (IEC 60079-20-1)*

EN 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2)*

EN 61000-6-4, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments (IEC 61000-6-4)*

EN 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems (IEC 61508 (all parts))*

EN 61511 (all parts), *Functional safety — Safety instrumented systems for the process industry sector (IEC 61511 (all parts))*

EN ISO 10437, *Petroleum, petrochemical and natural gas industries — Steam turbines — Special-purpose applications (ISO 10437)*

EN ISO 10439, *Petroleum, chemical and gas service industries — Centrifugal compressors (ISO 10439)*

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

ISO 3977-1, *Gas turbines — Procurement — Part 1: General introduction and definitions*

ISO 3977-2, *Gas turbines — Procurement — Part 2: Standard reference conditions and ratings*

ISO 13707, *Petroleum and natural gas industries — Reciprocating compressors*

3 Terms and definitions

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

3.1
alarm
signal provided to an operator which indicates the approach or the presence of an unwanted event

3.2
availability
ability to be in a state to perform as and when required under given, assuming that the required external resources are provided

Note 1 to entry: This ability depends on the combined aspects of the reliability, the maintainability and recoverability of the item and the maintenance supportability.

Note 2 to entry: Required external resources, other than maintenance resources, do not affect the availability of the item although the item may not be available from the user's viewpoint.

[SOURCE: EN 13306:2010, 4.1, modified − definition altered and original Note 3 not quoted here]

3.3
commissioning
activities required to fill pipework, equipment and assemblies with gas for the first time and to perform test runs to check the system‘s integrity

3.4
compressor surge
flow and/or pressure instability including reverse flow inside a compressor

3.5
compressor unit
set of driver package, gas compressor, control system and their auxiliary equipment which includes unit valves and associated pipework to compress gas

Note 1 to entry: Boundary compressor unit / compressor, see Annex D.

3.6
compressor unit building
structure where one or more drivers with compressors and auxiliary equipment are installed

Note 1 to entry: Operation and maintenance are normally carried out inside the building.

Note 2 to entry: Temporary partitions could be installed to isolate a compressor unit during maintenance (see Figure 2).

3.7
compressor unit housing
structure to contain the compressor unit which can consist of compressor unit building, enclosure or a combination of both

3.8
control room
room housing the control system from which the station personnel can, when necessary, take action on the process

3.9
decommissioning
activities required to take out of service any pipework, stations, equipment or assemblies filled with gas and to disconnect them from the system

3.10
design pressure
DP
pressure on which design calculations are based

3.11
design temperature
DT
temperature on which design calculations are based

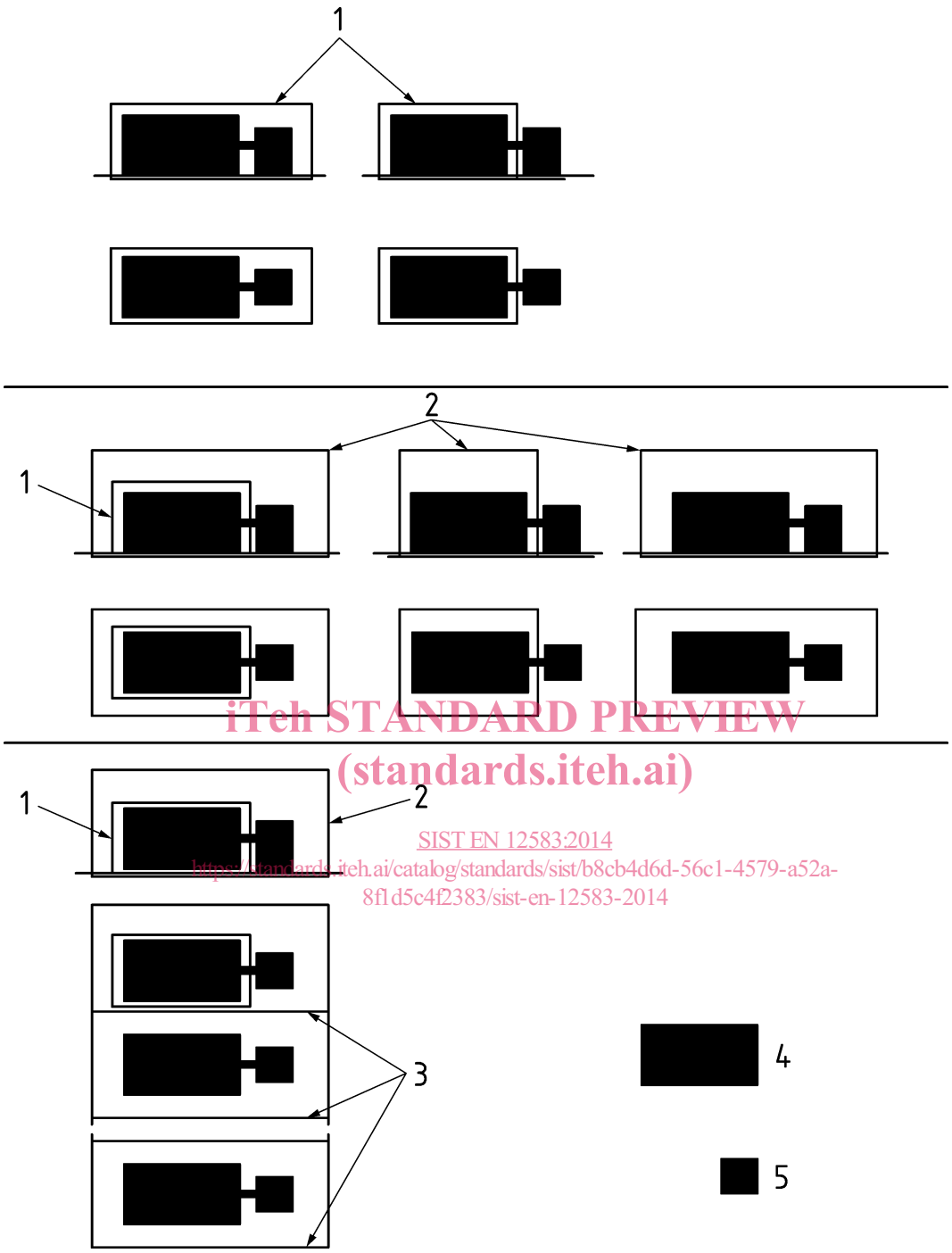
3.12
disposal
activities to be performed after components of a decommissioned gas compressor station have been dismantled

3.13
emergency
situation which could affect the safe operation of the gas infrastructure and/or the safety of the surrounding area, requiring urgent action

3.14
emergency shut down
ESD
actions, in the event of an emergency, to bring the station and/or the compressor unit(s) into a safe condition which requires local manual resetting

3.15
enclosure
structure (a close framework) to surround a driver and/or a compressor and some of their auxiliary equipment in order to protect them from outside influence and avoid possible hazards to personnel

Note 1 to entry: Enclosures could be installed inside the compressor unit building to confine part of a compressor unit (see Figure 2).



Key

1 enclosure
2 building
3 walls or temporary partitions
4 driver
5 compressor

Figure 2 — Compressor unit housing

3.16
fail-safe system
system where loss of power or actuating fluid to any control element, for example an individual relay, valve, actuator, etc. or any failure of these to operate when energized, leads to a safe condition

Note 1 to entry: In particular, all fault shut-down systems operate by de-energizing and not energizing components.

3.17
fuel gas system
system which conditions the fuel gas prior to it entering a gas turbine or gas engine driver package

Note 1 to entry: It can consist of gas filtration, scrubbing, heating, pressure regulating, metering and compression.

3.18
gas
gaseous fuel which is in gaseous state at a temperature of 15 °C under atmospheric pressure (1,013 25 bar absolute)

3.19
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.

3.20
gas infrastructure
pipeline system including pipework and associated stations or plants for the transmission and distribution of gas

3.21
hazardous area
area in which an explosive gas atmosphere is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment

[SOURCE: EN 60079-10-1:2008]

3.22
incident
unexpected occurrence which could lead to an emergency situation

3.23
isolation valves
valves which permit isolation of a part or the complete gas compressor station

3.24
maximum incidental pressure
MIP
maximum pressure which a gas system can experience during a short time, limited by the safety devices

3.25
maximum incidental temperature
MIT
maximum temperature which a system can experience during a short time, limited by the safety devices

3.26
maximum operating pressure
MOP
maximum pressure at which a system can be operated continuously under normal conditions

Note 1 to entry: Normal conditions are: no fault in any device or stream.

3.27
maximum operating temperature
MOT
maximum temperature at which a system can be operated continuously under normal conditions

Note 1 to entry: Normal conditions are: no fault in any device or stream.

3.28
occupier
person who manages and controls the work in a compressor station

Note 1 to entry: That person may be a company, an individual manager or the owner.

3.29
operating pressure
OP
pressure which occurs within a system under normal operating conditions

3.30
recycle line
portion of piping to convey gas from the discharge to the suction side of a station or a compressor unit

3.31
redundancy
in an item, existence of more than one means at a given instant of time for performing a required function

[SOURCE: EN 13306:2010, 4.8, modified − second half of the definition altered]

3.32
reliability
ability of an item to perform a required function under given conditions for a given time interval

Note 1 to entry: It is assumed that the item is in a state to perform as required at the beginning of the time interval.

Note 2 to entry: Reliability may be quantified as a probability or performance indicators by using appropriate measures and is then referred to as reliability performance.

[SOURCE: EN 13306:2010, 4.2]

3.33
remote control centre
RCC
continuously manned (24 h) operating centre, from which the gas infrastructure, including stations, are remotely supervised and/or controlled

3.34
services pipework
pipework in which fluids other than the gas are conveyed

EXAMPLE Air, oil, water or steam.

3.35
settling out pressure
SOP
resulting pressure in the pipework and equipment after the compressor station or the compressor unit(s) are turned off or isolated without depressurization

3.36
station auxiliary equipment
plant and equipment which supports the driver package and gas compressor

EXAMPLE Electrical power, lighting, gas treatment systems.

3.37
station control system
SCS
system to monitor, control and protect the compressor station and supervises the Unit Control System (UCS)

Note 1 to entry: In addition it can interface with the Remote Control Centre (RCC).

3.38
shut down
sequence to put out of operation and isolate

Note 1 to entry: System venting may follow.

3.39
shut off
action to put out of operation and isolate devices or parts of a compressor unit or of a compressor station

3.40
suction pipework
pipework upstream of the compressor

3.41
temporary operating pressure
TOP
pressure at which a system can be operated temporarily under control of the regulating devices

3.42
test pressure
TP
pressure at which pressure tests are conducted

3.43
unit control system
UCS
system to start, stop, monitor, control and protect the compressor unit

3.44
vent system
system including pipework, valves, silencer, if any, and stack to convey venting gas to a safe location

4 Safety

The occupier shall have a Safety Management System (SMS) for its gas infrastructure and a Pipeline Integrity Management System (PIMS) for its gas transmission pipelines. Reference should be made to EN 16348.