



**SLOVENSKI STANDARD**  
**oSIST ISO 16923:2017**  
**01-julij-2017**

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**Polnilne postaje za oskrbo z zemeljskim plinom - Postaje za oskrbo vozil s stisnjanim zemeljskim plinom**

Natural gas fuelling stations - CNG stations for fuelling vehicles

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

Stations-service de gaz naturel - Stations GNC pour le ravitaillement de véhicules

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**Natural gas fuelling stations — CNG  
stations for fuelling vehicles**

*Stations-service de gaz naturel — Stations GNC pour le ravitaillement  
de véhicules*

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# Contents

Page

<b>Foreword</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Symbols and abbreviated terms</b> .....	<b>8</b>
4.1 Symbols.....	8
4.2 Abbreviated terms.....	8
<b>5 Risk management</b> .....	<b>8</b>
<b>6 General design requirements</b> .....	<b>9</b>
6.1 General.....	9
6.2 Site layout.....	10
6.3 Pressure safety relief valves and venting.....	10
<b>7 Fuel supply to the fuelling station</b> .....	<b>11</b>
7.1 Supply by pipeline.....	11
7.2 Supply by mobile storage.....	11
<b>8 Dryer</b> .....	<b>12</b>
<b>9 Compressors</b> .....	<b>12</b>
9.1 General.....	12
9.2 Instrumentation and control.....	13
9.3 Crankcase design.....	13
9.4 Compressor enclosures, buildings and canopies.....	14
9.5 Underground compressor installations.....	16
9.6 Hazardous area classification.....	16
<b>10 Buffer storage</b> .....	<b>16</b>
<b>11 Dispensers</b> .....	<b>17</b>
11.1 General requirements.....	17
11.2 Breakaway devices.....	17
11.3 Fuelling hose assemblies.....	18
11.4 Fuelling hoses.....	19
11.5 Enclosure.....	19
11.6 Fuelling controls and instrumentation.....	20
11.7 Electrical systems and interconnections.....	22
11.8 Documentation.....	22
<b>12 Gas odorization</b> .....	<b>22</b>
<b>13 Pipework</b> .....	<b>23</b>
13.1 General.....	23
13.2 Buried piping.....	23
<b>14 Electrical</b> .....	<b>24</b>
14.1 Labelling.....	24
14.2 Contact with live parts.....	24
14.3 Cables.....	24
14.4 Performance after power fail and restoration.....	24
14.5 Electrical bonding and grounding.....	25
<b>15 Instrumentation and control system</b> .....	<b>25</b>
15.1 Gas detection.....	25
15.2 Emergency shutdown devices.....	25
<b>16 Emergency shutdown</b> .....	<b>26</b>
16.1 Emergency shutdown procedure.....	26

## ISO 16923:2016(E)

16.2	Restoration after emergency shutdown.....	26
<b>17</b>	<b>Indoor fuelling</b> .....	<b>26</b>
17.1	General.....	26
17.2	Ventilation.....	26
17.3	Additional requirements.....	27
<b>18</b>	<b>Testing and commissioning</b> .....	<b>27</b>
<b>19</b>	<b>Operation</b> .....	<b>28</b>
19.1	Fuelling procedures.....	28
19.2	Safety signs.....	28
19.3	Training.....	28
19.4	Emergency response plan.....	29
19.5	Operations manual.....	29
<b>20</b>	<b>Inspection and maintenance</b> .....	<b>29</b>
20.1	Inspection and maintenance program.....	29
20.2	Maintenance and testing frequency of gas detection.....	30
<b>Annex A (informative) Examples of hazardous zone classification</b> .....		<b>31</b>
<b>Annex B (normative) Separation distances</b> .....		<b>38</b>
<b>Annex C (informative) Fuelling procedures</b> .....		<b>39</b>
<b>Annex D (informative) Emergency instructions example</b> .....		<b>40</b>
<b>Annex E (informative) Example of fuelling station periodic inspection and maintenance</b> .....		<b>41</b>
<b>Bibliography</b> .....		<b>43</b>

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SIST ISO 16923:2017

<https://standards.iteh.ai/catalog/standards/sist/f5252b4b-8834-4a6f-b488-8d103425b32e/sist-iso-16923-2017>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/PC 252, *Natural gas fuelling stations for vehicles*.

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# Natural gas fuelling stations — CNG stations for fuelling vehicles

## 1 Scope

This document covers the design, construction, operation, inspection and maintenance of stations for fuelling compressed natural gas (CNG) to vehicles, including equipment, safety and control devices.

This document also applies to portions of a fuelling station where natural gas is in a gaseous state and dispensing CNG derived from liquefied natural gas (LCNG) according to ISO 16924.

This document applies to fuelling stations supplied with natural gas as defined in local applicable gas composition regulations or ISO 13686. It also applies to other gases meeting these requirements including biomethane, upgraded coal-bed methane (CBM) and gas supplies coming from LNG vaporization (on-site or off-site).

This document includes all equipment for downstream gas supply connection (i.e. point of separation between the CNG fuelling station piping and the pipeline network). Fuelling station nozzles are not defined in this document.

This document covers fuelling stations with the following characteristics:

- slow fill;
- fast fill;
- private access;
- public access (self-service or assisted);
- fuelling stations with fixed storage;
- fuelling stations with mobile storage (daughter station);
- multi-fuel stations.

This document is not applicable to domestic CNG fuelling devices without buffer storage.

NOTE This document is based on the condition that the gas entering the fuelling station is odorized. For unodorized gas fuelling stations, additional safety requirements are included in [Clause 10](#).

## 2 Normative references

The following documents are referred to in 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.

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 834-1, *Fire-resistance tests — Elements of building construction — Part 1: General requirements*

ISO 4126-1, *Safety devices for protection against excessive pressure — Part 1: Safety valves*

ISO 8580, *Rubber and plastics hoses — Determination of ultra-violet resistance under static conditions*

**ISO 16923:2016(E)**

ISO 9809-1, *Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa*

ISO 9809-2, *Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa*

ISO 11119-1, *Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l*

ISO 11119-2, *Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners*

ISO 11119-3, *Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450L with non-load-sharing metallic or non-metallic liners*

ISO 11439, *Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles*

ISO 11925-3, *Reaction to fire tests — Ignitability of building products subjected to direct impingement of flame — Part 3: Multi-source test*

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13847, *Petroleum and natural gas industries — Pipeline transportation systems — Welding of pipelines*

ISO 14120, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 15500-2, *Road vehicles — Compressed natural gas (CNG) fuel system components — Part 2: Performance and general test methods*

ISO 15500-17, *Road vehicles — Compressed natural gas (CNG) fuel system components — Part 17: Flexible fuel line*

ISO 15589-1, *Petroleum, petrochemical and natural gas industries — Cathodic protection of pipeline systems — Part 1: On-land pipelines*

ISO 15649, *Petroleum and natural gas industries — Piping*

IEC 31010, *Risk management — Risk assessment techniques*

IEC 60079-0, *Electrical apparatus for explosive gas atmospheres — Part 0: General requirements*

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

IEC 60079-11, *Explosive atmospheres — Part 11: Equipment Protection by Intrinsic Safety “i”*

IEC 60079-14, *Electrical apparatus for explosive gas atmospheres — Part 14: Electrical installations in hazardous areas (other than mines)*

IEC 60079-25, *Explosive atmospheres — Part 25: Intrinsically safe electrical systems*

IEC 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

**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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1

#### **assembly**

sub-system of fuelling stations comprising several components

### 3.2

#### **auto-extinguishing**

feature of a material that ceases combustion upon removal of flame or ignition source

### 3.3

#### **biomethane**

methane rich gas derived from biogas or from gasification of biomass by upgrading with the properties similar to natural gas

[SOURCE: ISO 14532:2014, 2.1.1.15]

### 3.4

#### **bonding**

equipotential zone where potentially live exposed metallic parts are electrically connected with at least one point connected to ground/earth

### 3.5

#### **breakaway device**

coupling which separates at a predetermined section when required and each separated section contains a self-closing shut-off valve which seals automatically

[SOURCE: ISO/TS 18683:2015, 3.1.3] [SIST ISO 16923:2017](https://standards.iteh.ai/catalog/standards/sist/f5252b4b-8834-4a6f-b488-8d103425b32e/sist-iso-16923-2017)

### 3.6

#### **buffer storage**

one or more suitable pressure vessels designed for the purpose of storing compressed natural gas

### 3.7

#### **building**

structures, usually enclosed by walls and a roof, constructed to provide support or shelter for an intended occupancy

### 3.8

#### **burst pressure**

$p_b$

pressure that causes failure and consequential fluid loss through the component envelope

### 3.9

#### **canopy**

roof, overhead shelter, or hood, that affords a degree of weather protection

### 3.10

#### **CNG fuelling station**

facility at which compressed natural gas is dispensed to vehicles

### 3.11

#### **competent person**

person having the ability, appropriate training, knowledge and experience, to supervise or carry out the work being undertaken in a safe and proper manner

**ISO 16923:2016(E)****3.12****compressed natural gas**

CNG

natural gas which has been compressed and stored for use as a vehicle fuel

[SOURCE: ISO 15500-1:2000, 3.2]

**3.13****compressor**

machine that increases the pressure of gas

**3.14****conduit**

casing, tubing or liner, either metallic or non-metallic

[SOURCE: ISO 14310:2008, 3.6]

**3.15****cylinder**

pressure vessel used for the storage of compressed natural gas

**3.16****cylinder working pressure**

settled pressure of a fully filled cylinder at a uniform temperature of 15 °C

**3.17****dispenser**

equipment through which the fuel is supplied to the vehicle

Note 1 to entry: This equipment can include metering.

**3.18****dryer**

equipment which decreases the water vapour content (moisture) of natural gas

**3.19****enclosure**

structure, not being a building or canopy, that encloses a component of the fuelling station

EXAMPLE Housing, container and machine cabinet.

**3.20****explosive gas atmosphere**

mixture of substances with air, under atmospheric conditions, in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture

[SOURCE: IEC 61340-4-4:2014, 11, 3.4]

**3.21****fail-safe**

design feature that ensures that safe conditions are maintained in the event of a malfunction of a control device or an interruption of a supply source

**3.22****fast fill**fuelling operation which has a designed flow rate greater than 100 m<sup>3</sup>(N)/h per nozzle**3.23****field piping**

piping installed for interconnection between equipment at the site

**3.24****fire resistant**

property that prevents or retards the passage of excessive heat, hot gases or flames under specified conditions

**3.25****fire wall**

wall, or separating partition erected to reduce the effects of radiated heat

**3.26****fuelling**

transfer of fuel from dispenser to the vehicle

**3.27****fuelling pressure**

pressure at which the fuel is delivered to the vehicle

**3.28****fuelling station**

facility at which vehicles fuels are dispensed

**3.29****grounding**

electrical connection of potentially live exposed metallic parts to earth

**3.30****hazardous area**

area in which an explosive gas atmosphere is present, or can be expected to be present, in quantities such as to require special precautions for the construction, installation and use of apparatus to prevent ignition

[SOURCE: IEC 60079-10-1:2008, 3.3] [SIST ISO 16923:2017](https://standards.iteh.ai/catalog/standards/sist/f5252b4b-8834-4a6f-b488-8d103425b32e/sist-iso-16923-2017)

**3.31****hose**

pipeline of flexible material with end fittings attached

**3.31.1****vent hose**

pipeline of flexible material through which natural gas is vented from the fuelling connection at a vehicle

**3.31.2****hose assembly**

hose or hoses with ancillary components, such as bend restrictors, breakaways and nozzles, attached

**3.32****intrinsically safe circuit**

circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under specified test conditions

**3.33****lower explosive limit**

LEL

volume concentration of flammable gas or vapour in air, below which the mixture is not flammable

[SOURCE: ISO 19372:2015, 3.7, modified — “explosive” has been changed to “flammable”.]

**ISO 16923:2016(E)****3.34****maximum allowable operating pressure**

MAOP

maximum pressure that the component or system is subjected to during normal operation

Note 1 to entry: MAOP is typically not greater than 90 % of the maximum allowable working pressure of the component or system.

**3.35****maximum allowable working pressure**

MAWP

maximum pressure to which a component or system is designed to be subjected and which is the basis for determining the strength of the component or system

[SOURCE: ISO 12991:2012, 3.10, modified — “or system” has been added and “under consideration” has been removed.]

**3.36****mobile storage**

multi-cylinder or tank fixture mounted on a vehicle or trailer and used for the transportation of natural gas to CNG fuelling stations

**3.37****multi-fuel dispenser**

dispenser delivering CNG and other fuels (liquid or gaseous)

**3.38****multi-fuel station**

fuelling station that can fuel natural gas as well as other fuels, for example diesel, petrol, LPG

**3.39****natural gas**

complex gaseous mixture of hydrocarbons, primarily methane, but generally includes ethane, propane and higher hydrocarbons, and some non-combustible gases such as nitrogen and carbon dioxide

Note 1 to entry: Natural gas can also contain components or containments such as sulfur compounds and/or other chemical species.

[SOURCE: ISO 14532:2014, 2.1.1.1]

**3.40****non-combustible**

not capable of undergoing combustion under specified conditions

[SOURCE: ISO 13943:2008, 4.239]

**3.41****normal operation**

situation when the equipment is operating within its design parameters

[SOURCE: ISO 16110-1:2007, 3.50]

**3.42****non-hazardous area**

area in which an explosive gas is not expected to be present in quantities such as to require special precautions for the construction, installation and use of apparatus

[SOURCE: ISO 16110-1:2007, 3.48]

**3.43****odorant**

intensely smelling organic chemical or combination of chemicals added to natural gas at low concentration and capable of imparting a characteristic and distinctive (usually disagreeable) warning odor so gas leaks can be detected at concentrations below their lower flammability limit

Note 1 to entry: ISO/TR 16922 gives the specifications and guidelines for the methods to be used in the odorization of natural gas under a safety point of view and specifies the principles for the odorization technique (including handling and storage of odorants) and the control of odorization of natural gas.

[SOURCE: ISO 14532:2014, 2.8.1, modified — Note 1 to entry has been added.]

**3.44****odorization**

process of introducing odorant(s) into natural gas

**3.45****overpressure**

condition under which the pressure exceeds the maximum allowable working pressure

**3.46****power failure**

reduction in power such that any electrical component or sub system (such as flow control) are operating outside manufacturers specification

**3.47****refuelling receptacle**

<CNG> device connected to a vehicle or storage system which receives the CNG refuelling nozzle and permits safe transfer of fuel

[SOURCE: ISO 14469-1:2004, 3.7]

**3.48****separation distance**

minimum separation between a hazard source and an object, which is required to mitigate the effect of a likely foreseeable incident and prevent a minor incident escalating into a larger incident

**3.48.1****external separation distance**

separation distance between a hazard source and an object situated outside the boundaries of the fuelling station

**3.48.2****internal separation distance**

separation distance between a hazard source and an object situated within the boundaries of the fuelling station

**3.49****service duct**

enclosed conduit through which gas piping, utility piping, electrical cabling, etc. is routed

**3.50****settled pressure**

gas pressure when a given settled temperature is reached and there is no gas flow

**3.51****settled temperature**

uniform gas temperature in the cylinder after the dissipation of any heat caused by fuelling

**3.52****slow fill**

fuelling operation which has a designed flow rate equal or less than 100 m<sup>3</sup>(N)/h per nozzle