SLOVENSKI STANDARD
SIST EN 16723-2:2017

01-september-2017

Zemeljski plin in biometan za uporabo v prometu in biometan za dodajanje v omrežje zemeljskega plina - 2. del: Specifikacije goriv za motorna vozila

Natural gas and biomethane for use in transport and biomethane for injection in the natural gas network - Part 2: Automotive fuels specification

Erdgas und Biomethan zur Verwendung im Transportwesen und Biomethan zur Einspeisung ins Erdgasnetz - Teil 2: Festlegungen für Kraftstoffe für Kraftfahrzeuge

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Gaz naturel et biométhane pour utilisation dans le transport et biométhane pour injection dans les réseaux de gaz naturel - Partie 2 : Spécifications du carburant pour véhicules automobiles

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This European Standard was approved by CEN on 10 April 2017.

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European foreword

This document (EN 16723-2:2017) has been prepared by Technical Committee CEN/TC 408 “Natural gas and biomethane for use in transport and biomethane for injection in the natural gas grid”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by December 2017, and conflicting national standards shall be withdrawn at the latest by December 2017.

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

EN 16723 consists of the following parts, under the general title “*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*

— *Part 2: Automotive fuel specification*

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Introduction

This European Standard was prepared by CEN/TC 408 in response to the European Commission standardization mandate M/475.

The mandate asks for the development of a set of quality specifications for biomethane to be used as a fuel for automotive vehicle engines and to be injected in natural gas pipelines (network).

However, the scope of the standard was widened according to BT decision C109/2012 that redefined the scope of CEN/TC 408: 'Standardization of specifications for natural gas and biomethane as automotive vehicle fuel and of biomethane for injection in the natural gas grid, including any necessary related methods of analysis and testing. Production process, source and the origin of the source are excluded'.

NOTE The CEN Technical Board (CEN/BT) is responsible for coordinating the work between technical bodies in order to achieve a coherent set of standards and to avoid overlaps.

One of the aims of European policy in the field of energy is to increase the security of energy supply in the EU, as well as to contribute to reducing the emission of greenhouse gases accepted by the EU at Kyoto. In this context, special focus is given to the development and use of energy from renewable sources of biological and non-biological origin.

Figure 1 provides a visual representation of some applications of biomethane.

Mandate M/475 indicates that the requirements for natural gas quality for injection in the natural gas network are developed by CEN/TC 234 in answer to Mandate M/400 on natural gas quality. CEN/TC 408 should consider the work of the pending mandate M/400 on gas quality, and should refer to the parameters as defined and specified in EN 16726. This standard should exclude the definition of any parameters or substances that are addressed in EN 16726. However, it may specify more strict limits for parameters or substances unique to biomethane if deemed technically necessary. If needed, additional parameters or substances should be defined.

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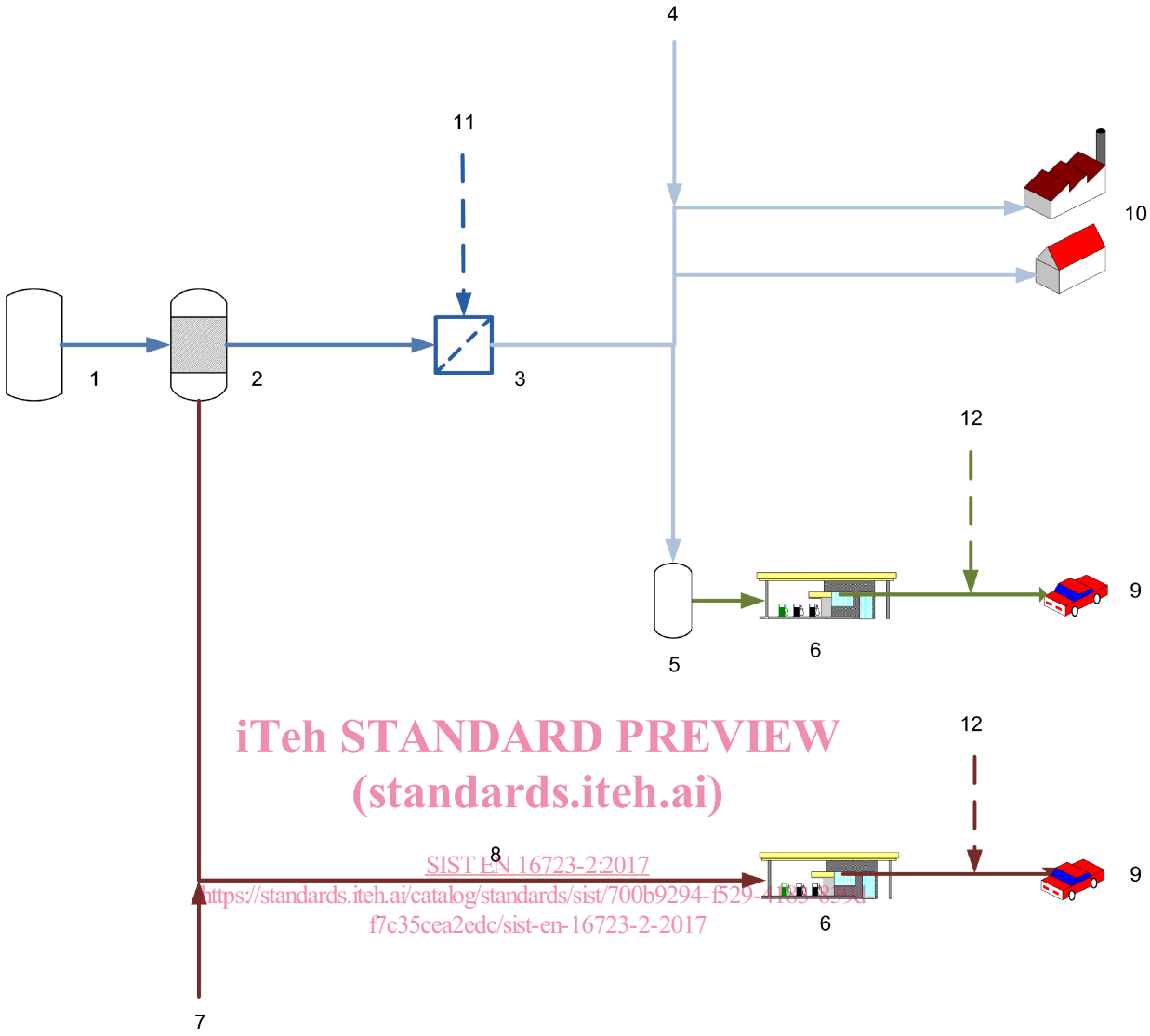

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Key

1	biogas from digestion or thermos-chemical process	7	non-grid sourced natural gas
2	upgrading	8	local dedicated infrastructure
3	injection into the gas grid	9	automotive use
4	natural gas grid	10	domestic and industrial use
5	conditioning	11	Part 1: grid specification
6	refuelling station	12	Part 2: automotive specification

Figure 1 — Representation of some flows and uses of biomethane and natural gas

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1 Scope

This European Standard specifies the requirements and test methods for natural gas (group L and H, as in EN 437), biomethane and blends of both at the point of use as automotive fuels.

This European Standard applies to the previously mentioned fuels irrespective of the storage state (compressed or liquefied).

To check compliance with some requirements set by the standard, LNG or liquefied biomethane should be re-gasified prior to testing.

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 437, *Test gases - Test pressures - Appliance categories*

EN 16726:2015, *Gas infrastructure - Quality of gas - Group H*

EN 16942, *Fuels - Identification of vehicle compatibility - Graphical expression for consumer information*

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

EN ISO 13443, *Natural gas - Standard reference conditions (ISO 13443)*

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3 Terms and definitions

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For the purposes of this document, the terms and definitions given in EN 16726 as well as the following apply.

3.1
biogas
gas, comprising principally methane and carbon dioxide, obtained from the anaerobic digestion of biomass

3.2
biomass
biological material from living, or recently living organisms, typically this may be plants or plant-derived materials

3.3
biomethane
gas comprising principally methane, obtained from either upgrading of biogas or methanation of bio-syngas

3.4
bio-syngas
gas, comprising principally carbon monoxide and hydrogen, obtained from gasification of biomass

3.5
compressed natural gas
CNG
natural gas used as a fuel for automotive vehicles, typically compressed up to 20 000 kPa in the gaseous state

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3.6
compressed biomethane
biomethane used as a fuel for automotive vehicles, typically compressed up to 20 000 kPa in the gaseous state

3.7
gas infrastructure
pipeline systems including pipework, underground gas storages and their associated stations or plants for the transmission and distribution of gas

3.8
hydrocarbon dew point temperature
temperature above which no condensation of hydrocarbons occurs at a specified pressure

3.9
liquefied natural gas
LNG
natural gas which has been liquefied, after processing, for storage or transportation purposes

3.10
liquefied biomethane
biomethane which has been liquefied, after processing, for storage or transportation purposes

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3.11
methane number
MN
rating indicating the knocking characteristics of a gaseous fuel

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Note 1 to entry: MN has a similar use as the octane number for petrol.

Note 2 to entry: MN expresses the volume percentage of methane in a methane/hydrogen mixture which, in a test engine under standard conditions, has the same tendency to knock as the gaseous fuel to be examined.

3.12
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 contaminants such as sulfur compounds and/or other chemical species.

3.13
natural gas network
either transmission network or local distribution system

3.14
net calorific value
amount of heat that would be released by the complete combustion with oxygen of a specified quantity of gas, in such a way that the pressure at which the reaction takes place remains constant, and all the products of combustion are returned to the same specified temperature as that of the reactants, all of these products being in the gaseous states

Note 1 to entry: Equivalent terms used are inferior calorific value and lower heating value.

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3.15
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)

3.16
relative density
quotient of the mass of a gas, contained within an arbitrary volume, and the mass of dry air of standard composition (defined in EN ISO 6976:2016) which would be contained in the same volume at the same reference conditions

3.17
syngas
gas, comprising principally of carbon monoxide and hydrogen, obtained from gasification of fossil fuel

3.18
upgrading of biogas
removal of carbon dioxide and contaminants from biogas

3.19
water dew point temperature
temperature above which no condensation of water occurs at a specified pressure

3.20
Wobbe index
volumetric-basis heating value, at specified reference conditions, divided by the square root of the relative density at the same specified metering reference conditions

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4 Parameters and test methods

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4.1 General

This section deals with the various parameters for which requirements are given.

Natural gas, biomethane, and blends of those shall be free from any other constituents and/or impurities than the ones described in this standard that renders the fuel unacceptable for use as an automotive fuel.

NOTE In the case of such other constituents and/or impurities are present, it may be necessary to obtain an approval from the competent and legitimate authority to define the acceptable risk.

4.2 Standard reference conditions

Unless stated otherwise all volumes are for the real dry gas at ISO Standard Reference conditions of 15 °C and 101,325 kPa.

Unless stated otherwise all calorific values and Wobbe indices are for the real dry gas at ISO Standard Reference conditions of:

- 15 °C (combustion);
- and 15 °C and 101,325 kPa (metering).

In assessing compliance with this European Standard, parameters should be determined directly at ISO Standard Reference conditions. If the properties are only available at other reference conditions and the actual gas composition is not known, then conversion to ISO Standard Reference conditions shall be carried out using the procedure described in EN ISO 13443.

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4.3 Requirements, limit values and related test methods for natural gas and biomethane as automotive fuels

Information on Wobbe index and calorific value can be found in Annex C.

Table 1 — Requirements, limit values and related test methods for natural gas and biomethane as automotive fuels

Parameter	Unit	Limit values[a]		Test method (informative)
		Min	Max	
Total volatile silicon (as Si)	$mgSi/m^3$		0,3[b]	EN ISO 16017-1:2000 TDS-GC-MS
Hydrogen	% mol/mol	–	2	EN ISO 6974-3 EN ISO 6974-6 EN ISO 6975
Hydrocarbon dew point temperature (from 0,1 to 7 MPa absolute pressure)	°C	–	−2 (as in EN 16726)	ISO 23874 ISO/TR 11150 ISO/TR 12148
Oxygen	% mol/mol	–	1	EN ISO 6974- series EN ISO 6975
Hydrogen sulfide + Carbonyl sulfide (as sulfur)	mg/m^3	–	5 (as in EN 16726)	EN ISO 6326-1 EN ISO 6326-3 EN ISO 19739
S total (including odorization)	mgS/m^3		30[c]	EN ISO 6326-5 EN ISO 19739
Methane Number	Index	65[d] (as in EN 16726)		Annex A of EN 16726:2015
Compressor oil			[e]	ISO 8573-2
Dust impurities			[e, f]	ISO 8573-4
Amine	mg/m^3		10	VDI 2467 Blatt 2:1991–08
Water dew point	See 4.4			

[a] Limit values are absolute, the number of the decimal places shall not imply the accuracy of the test methods.

[b] Levels above 0,1 $mgSi/m^3$ can severely harm switching type oxygen sensors of some automotive vehicles (see DNV GL report). However, a limit set at this level would present difficulty in terms of analytical measurement (current quantification limits are at best 0,10 mg Si/m^3, which would imply setting a limit of 0,30 mg Si/m^3). And currently biomethane production processes cannot guarantee a level of siloxanes below 0,5 $mgSi/m^3$.

[c] Currently, there is a difference between the automotive industry needs for sulfur content (10 mgS/m^3 including odorization) and the values the gas industry can provide (30 mg/m^3 including odorization). See Annex B. It is possible to cover this parameter in a national foreword.

[d] The methane number depends on the composition of the distributed natural gas. It should be noted that only a small fraction of the distributed natural gas has a methane number below (MWM) of 70.

[e] The fuel shall be free from impurities other than “de minimis” levels of compressor oil and dust impurities. In the context of this European Standard, “de minimis” means an amount that does not render the fuel unacceptable for use in end user applications.

[f] Fuelling stations providing LNG should ensure a maximum particle contamination of 10 mg/l of LNG to protect the automotive vehicle system from debris, providing performance equivalent to a filter with maximum pore size of 5 µm nominal and 10 µm absolute with 90 % efficiency.

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