SLOVENSKI STANDARD

SIST EN ISO 15403-1:2008

01-marec-2008

Zemeljski plin - Zemeljski plin, ki se uporablja za komprimirano gorivo za vozila - 1. del: Oznaļevanje kakovosti (ISO 15403-1:2006)

Natural gas - Natural gas for use as a compressed fuel for vehicles - Part 1: Designation of the quality (ISO 15403-1:2006)

Gaz naturel - Gaz naturel pour usage comme carburant comprimé pour véhicules - Partie 1: Désignation de la qualité (ISO 15403-1:2006)

Ta slovenski standard je istoveten z: EN ISO 15403-1:2008

ICS:

75.060

SIST EN ISO 15403-1:2008 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 15403-1

January 2008

ICS 75.060

English Version

Natural gas - Natural gas for use as a compressed fuel for vehicles - Part 1: Designation of the quality (ISO 15403-1:2006)

Gaz naturel - Gaz naturel pour usage comme carburant comprimé pour véhicules - Partie 1: Désignation de la qualité (ISO 15403-1:2006)

This European Standard was approved by CEN on 15 December 2007.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN ISO 15403-1:2008: E

Foreword

The text of ISO 15403-1:2006 has been prepared by Technical Committee ISO/TC 193 "Natural gas" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 15403-1:2008 by Technical Committee CEN/SS N21 "Gaseous fuels and combustible gas", the secretariat of which is held by CMC.

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of an identical text or by endorsement, at the latest by July 2008, and conflicting national standards shall be withdrawn at the latest by July 2008.

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.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 15403-1:2006 has been approved by CEN as EN ISO 15403-1:2008 without any modifications.

INTERNATIONAL STANDARD

ISO 15403-1

First edition
2006-10-15

Natural gas — Natural gas for use as a compressed fuel for vehicles —

Part 1: Designation of the quality

Gaz naturel — Gaz naturel pour usage comme carburant comprimé pour véhicules —

Partie 1: Désignation de la qualité

Reference number
ISO 15403-1:2006(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 15403-1 was prepared by Technical Committee ISO/TC 193, *Natural gas.*

This first edition of ISO 15403-1 cancels and replaces ISO 15403:2000, of which it constitutes a minor revision including the following changes:

— correction of the title to reflect that ISO 15403 is now formed of two parts;

— reformat the document in accordance with the ISO/IEC Directives, Part 2, Fifth edition, 2004;

— reformat the references cited in Clause 2 and in the Bibliography, in accordance with the ISO/IEC Directives, Part 2, Fifth edition, 2004.

ISO 15403 consists of the following parts, under the general title *Natural gas — Natural gas for use as a compressed fuel for vehicles*:

— *Part 1: Designation of the quality*

— *Part 2: Specification of the quality* (Technical Report)

Introduction

Natural gas has been used to some extent as a fuel for internal combustion engines in compressor stations, co-generation systems, and vehicles of various types for many years now. However, the prerequisites for growth, i.e. economic viability and fuel availability, were generally not satisfied. Now, with the natural gas industry well established, supplying 20 % of the world's primary energy, and the need for alternative, low-emission fuels, the situation has improved considerably. During the past decade, natural gas vehicles have become a viable option with some five millions units now in use around the world. Growth is continuing as many governments actively promote this clean-burning fuel with its environmental benefits. Many fleet operators are converting their vehicles, and vehicle manufacturers are developing and marketing dedicated natural gas equipment.

In the context of this International Standard, natural gas vehicles (NGVs) utilize compressed natural gas stored “on-board”. The pressure of the gas stored in multiple containers is up to a maximum 25 000 kPa. Although the pressure has to be reduced before combustion, compression and storage gives NGVs an adequate range. While NGVs were initially equipped with converted gasoline or diesel engines, high-performance, dedicated natural gas engines are now being extensively developed and produced. Liquefied natural gas (LNG) may also be stored in the fuel tanks of natural gas vehicles. This, however, will be the subject of a separate International Standard.

This part of ISO 15403 for the quality designation of compressed natural gas is designed to stipulate the international requirements placed on the natural gas used as a motor fuel. Engine and vehicle manufacturers must know these requirements so they can develop high-performance equipment which runs on compressed natural gas.

A technical report giving detailed data on the gas compositions used in this part of ISO 15403 is being published as ISO/TR 15403-2.

Natural gas — Natural gas for use as a compressed fuel for vehicles —

Part 1: Designation of the quality

1 Scope

The aim of this part of ISO 15403 is to provide manufacturers, vehicle operators, fuelling station operators and others involved in the compressed-natural-gas vehicle industry with information on the fuel quality for natural gas vehicles (NGVs) required to develop and operate compressed-natural-gas vehicle equipment successfully.

Fuel meeting the requirements of this part of ISO 15403 should

a) provide for the safe operation of the vehicle and associated equipment needed for its fuelling and maintenance;

b) protect the fuel system from the detrimental effects of corrosion, poisoning, and liquid or solid deposition;

c) provide satisfactory vehicle performance under any and all conditions of climate and driving demands.

Some aspects of this part of ISO 15403 may also be applicable for the use of natural gas in stationary combustion engines.

2 Normative references

The following referenced documents are indispensable for the application 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 6976:1995, *Natural gas — Calculation of calorific values, density, relative density and Wobbe index from composition*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. Definitions were taken from ISO 14532 whenever possible.

3.1
natural gas
complex mixture of hydrocarbons, primarily methane, but generally also including ethane, propane and higher hydrocarbons in much smaller amounts and some non-combustible gases, such as nitrogen and carbon dioxide

NOTE 1 Natural gas generally also includes minor amounts of trace constituents.

NOTE 2 Natural gas is produced and processed from the raw gas or liquefied natural gas and, if required, blended to the extent suitable for direct use (for example as gaseous fuel).

NOTE 3 Natural gas remains in the gaseous state under the temperature and pressure conditions normally found in service.

NOTE 4 Natural gas consists predominantly of methane (mole fraction greater than 0,70), and has a superior calorific value normally within the range 30 MJ/m^3 to 45 MJ/m^3. It contains also ethane (typically up to 0,10 mole fraction), propane, butanes and higher alkanes in steadily decreasing amounts. Nitrogen and carbon dioxide are the principal non-combustible components, each present at levels which typically vary from less than 0,01 mole fraction to 0,20 mole fraction.

Natural gas is processed from the raw gas so as to be suitable for use as industrial, commercial, residential fuel or as a chemical feedstock. The processing is intended to reduce the contents of potentially corrosive components, such as hydrogen sulfide and carbon dioxide, and of other components, such as water and higher hydrocarbons, potentially condensable in the transmission and distribution of the gas. Hydrogen sulfide, organic sulfur compounds and water are then reduced to trace amounts, and high carbon dioxide contents are likely to be reduced to below 0,05 mole fraction.

Natural gas is normally technically free from aerosol, liquid and particulate matter.

In some circumstances natural gas may be blended with town gas or coke oven gas, in which case hydrogen and carbon monoxide will be present in amounts up to 0,10 mole fraction and 0,03 mole fraction respectively. In this case, small amounts of ethylene may also be present.

Natural gas may also be blended with LPG1)/air mixtures, in which case oxygen will be present, and the levels of propane and butanes will be considerably enhanced.

NOTE 5 Pipeline quality natural gas is one which has been processed so as to be suitable for direct use as industrial, commercial, residential fuel or as a chemical feed stock.

The processing is intended to reduce the corrosive and toxicity effects of certain components, and to avoid condensation of water or hydrocarbons in the transmission and distribution of the gas.

Hydrogen sulfide and water should only be present in trace amounts, and high carbon dioxide content is likely to be reduced.

[ISO 14532:2001, 2.1.1.1]

3.2
substitute natural gas
manufactured or blended gas which is interchangeable in its properties with natural gas

[ISO 14532:2001, 2.1.1.3]

NOTE Manufactured gas is sometimes called synthetic natural gas.

3.3
compressed natural gas
natural gas used as a fuel for vehicles, typically compressed up to 20 000 kPa in the gaseous state

[ISO 14532:2001, 2.1.1.12]

NOTE The maximum pressure for natural gas stored in a container is 25 000 kPa.

3.4
gas quality
attribute of natural gas dependent on its composition and its physical properties

[ISO 14532:2001, 2.1.1.14]

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1) LPG = liquefied petroleum gas.