Natural gas - Calculation of calorific values,density,relative density and Wobbe index from composition

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EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN ISO 6976:2005 sisaldab Euroopa standardi EN ISO 6976:2005 ingliskeelset teksti. Käesolev dokument on jõustatud 22.06.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN ISO 6976:2005 consists of the English text of the European standard EN ISO 6976:2005. This document is endorsed on 22.06.2005 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This International Standard specifies methods for the calculation of the superior calorific value,inferior calorific value,density,relative density and Wobbe index of dry natural gases,natural gas substitutes and other combustible gaseous fuels,when the composition of the gas by mole fraction is known.	**Scope:** This International Standard specifies methods for the calculation of the superior calorific value,inferior calorific value,density,relative density and Wobbe index of dry natural gases,natural gas substitutes and other combustible gaseous fuels,when the composition of the gas by mole fraction is known.

ICS 75.060

Võtmesõnad:

EUROPEAN STANDARD

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English version

Natural gas - Calculation of calorific values, density, relative density and Wobbe index from composition (ISO 6976:1995 including Corrigendum 1:1997, Corrigendum 2:1997 and Corrigendum 3:1999)

Gaz naturel - Calcul du pouvoir calorifique, de la masse volumique, de la densité relative et de l'indice de Wobbe à partir de la composition (ISO 6976:1995, Corrigendum 1:1997, Corrigendum 2:1997 et Corrigendum 3:1999 inclus)

Erdgas - Berechnung von Brenn- und Heizwert, Dichte, relativer Dichte und Wobbeindex aus der Zusammensetzung (ISO 6976:1995 + Corigendum 1:1997 + Corigendum 2:1997 + Corigendum 3:1999)

This European Standard was approved by CEN on 17 April 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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 6976:2005: E

Foreword

The text of ISO 6976:1995 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 6976:2005 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 November 2005, and conflicting national standards shall be withdrawn at the latest by November 2005.

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

Endorsement notice

The text of ISO 6976:1995 has been approved by CEN as EN ISO 6976:2005 without any modifications.

INTERNATIONAL STANDARD

ISO 6976

Second edition
1995-12-01

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1996-02-01

Natural gas — Calculation of calorific values, density, relative density and Wobbe index from composition

Gaz naturel — Calcul du pouvoir calorifique, de la masse volumique, de la densité relative et de l'indice de Wobbe à partir de la composition

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Contents

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Annexes

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.

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.

International Standard ISO 6976 was prepared by Technical Committee ISO/TC 193, *Natural gas*, Subcommittee SC 1, *Analysis of natural gas*.

This second edition cancels and replaces the first edition (ISO 6976:1983), of which it constitutes a technical revision.

Annexes A and B form an integral part of this International Standard. Annexes C, D, E, F, G, H, J, K, L and M are for information only.

Natural gas — Calculation of calorific values, density, relative density and Wobbe index from composition

1 Scope

This International Standard specifies methods for the calculation of the superior calorific value, inferior calorific value, density, relative density and Wobbe index of dry natural gases, natural gas substitutes and other combustible gaseous fuels, when the composition of the gas by mole fraction is known. The methods provide a means of calculating the properties of the gas mixture at commonly used metric reference conditions.

The methods of calculation require values for various physical properties of the pure components; these values are provided in tables and their sources are identified.

Methods are given for estimating the precision of calculated properties.

The methods of calculation of the values of properties on either a molar or mass basis are applicable to any dry natural gas, natural gas substitute or other combustible fuel which is normally gaseous. For the calculation of the values of properties on a volumetric basis, the methods are restricted to gases consisting preponderantly of methane (not less than 0,5 mole fraction).

Examples of calculations are given in annex D for the recommended methods of calculation.

NOTES

1 The symbols used in this International Standard, together with their meanings, are given in annex A.

2 The qualifiers "higher", "upper", "total" and "gross" are, for the purposes of this International Standard, synonymous with "superior"; likewise, "lower" and "net" are synonymous with "inferior". The term "heating value" is synonymous with "calorific value"; "specific gravity" is synonymous with "relative density"; "Wobbe number" is synonymous with "Wobbe index"; "compressibility factor" is synonymous with "compression factor".

3 If the composition of the gas is known by volume fractions these must be converted to mole fractions (see annex C). Note, however, that the derived mole fractions will have uncertainties greater than those of the original volume fractions.

4 For the purposes of this International Standard, the sum of the mole fractions used must be unity to the nearest 0,000 1, and all components with mole fractions greater than 0,000 05 must be accounted for.

5 For the calorific value calculated on a volumetric basis, there are limitations on the amounts of components other than methane which may be present. It is impossible to be definitive on this matter, but the following guidelines may be useful:

N_2 should not be present in amounts exceeding 0,3 mole fraction;

CO_2 and C_2H_6 should each not exceed 0,15 mole fraction;

no other component should exceed 0,05 mole fraction.

Given these limits, the expected trueness of the calculation is within 0,1 %.

6 The effects of water vapour on the calorific value, either directly measured or calculated, are discussed in annex F.

7 For the methods of calculation described to be valid, the gas must be above its hydrocarbon dew-point at the prescribed reference conditions.

8 The values of basic physical property data are subject to revision as more accurate values become available from authoritative sources.