



NSAI
Standards

Irish Standard
I.S. EN ISO 15971:2014

Natural gas - Measurement of properties - Calorific value and Wobbe index (ISO 15971:2008)

I.S. EN ISO 15971:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN ISO 15971:2014

Published:

2014-03-19

*This document was published
under the authority of the NSAI
and comes into effect on:*

2014-03-29

ICS number:

75.060

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN ISO 15971

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2014

ICS 75.060

English Version

Natural gas - Measurement of properties - Calorific value and Wobbe index (ISO 15971:2008)

Gaz naturel - Mesurage des propriétés - Pouvoir calorifique et indice de Wobbe (ISO 15971:2008)

Erdgas - Messung der Eigenschaften - Wärmewerte und Wobbe-Index (ISO 15971:2008)

This European Standard was approved by CEN on 16 February 2014.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
----------------------	----------

Foreword

The text of ISO 15971:2008 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 15971:2014.

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.

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.

Endorsement notice

The text of ISO 15971:2008 has been approved by CEN as EN ISO 15971:2014 without any modification.

This page is intentionally left blank

INTERNATIONAL STANDARD

**ISO
15971**

First edition
2008-12-15

Natural gas — Measurement of properties — Calorific value and Wobbe index

*Gaz naturel — Mesurage des propriétés — Pouvoir calorifique et indice
de Wobbe*



Reference number
ISO 15971:2008(E)

© ISO 2008

ISO 15971:2008(E)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	1
3.1 Calorific value and Wobbe index	1
3.2 Water content of gas	2
3.3 Performance classification	2
3.4 Terms from metrology	3
4 Principles of measurement.....	4
4.1 Introduction	4
4.2 Direct combustion calorimetry	5
4.3 Indirect methods	5
4.4 Inferential methods.....	6
5 Performance assessment and acceptance tests.....	7
5.1 Performance assessment for instrument selection	7
5.2 Factory and site acceptance tests	20
6 Sampling and installation guidelines	21
6.1 Sampling.....	21
6.2 Installation guidelines	22
7 Calibration	25
7.1 Calibration procedures.....	25
7.2 Calibration gases	26
8 Verification	27
8.1 Verification procedures.....	27
8.2 Verification gases	28
9 Maintenance	29
9.1 Preventive maintenance.....	29
9.2 Corrective maintenance	29
10 Quality control.....	29
10.1 General.....	29
10.2 Environmental parameters and ancillary equipment	31
10.3 Instrumental factors	32
Annex A (normative) Symbols and units	33
Annex B (informative) Examples of type-approval and technical specifications	34
Annex C (informative) Class 0 mass-basis calorimetry	36
Annex D (informative) Direct combustion calorimetry	40
Annex E (informative) Stoichiometric combustion devices.....	43
Annex F (informative) Effect of non-alkane gases on stoichiometric combustion devices	47
Annex G (informative) Measurement of Wobbe index.....	48
Bibliography	49

ISO 15971:2008(E)

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 15971 was prepared by Technical Committee ISO/TC 193, *Natural gas*.

Introduction

The amount of energy delivered by a flowing natural gas is often determined as the product of the volume delivered and the calorific value per unit volume of the gas. It is, therefore, important to have available standardized methods of determining the calorific value. In many cases, it is possible to calculate the calorific value of natural gas, with sufficient accuracy, given the composition (see ISO 6976). However, it is also possible, and sometimes a preferred alternative, to measure calorific value using any one of several techniques that do not require a compositional analysis. The methods currently in use, and the many factors that it is necessary to address in the selection, evaluation, performance assessment, installation and operation of a suitable instrument, are detailed herein. The measurement of the Wobbe index, a property closely related to calorific value, is discussed briefly in an informative annex, but is not considered in detail in the normative parts of this International Standard.

Natural gas — Measurement of properties — Calorific value and Wobbe index

1 Scope

This International Standard concerns the measurement of calorific value of natural gas and natural gas substitutes by non-separative methods, i.e. methods that do not involve the determination of the gas composition nor calculation from it. It describes the principles of operation of a variety of instruments in use for this purpose, and provides guidelines for the selection, evaluation, performance assessment, installation and operation of these.

Calorific values can be expressed on a mass basis, a molar basis or, more commonly, a volume basis. The working range for superior calorific value of natural gas, on the volume basis, is usually between 30 MJ/m³ and 45 MJ/m³ at standard reference conditions (see ISO 13443). The corresponding range for the Wobbe index is usually between 40 MJ/m³ and 60 MJ/m³.

This International Standard neither endorses nor disputes the claims of any commercial manufacturer for the performance of an instrument. Its central thesis is that fitness-for-purpose in any particular application (defined in terms of a set of specific operational requirements) can be assessed only by means of a well-designed programme of experimental tests. Guidelines are provided for the proper content of these tests.

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*

ISO 14532: 2001, *Natural gas — Vocabulary*

3 Terms and definitions

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

3.1 Calorific value and Wobbe index

3.1.1

superior calorific value

amount of heat that would be released by the complete combustion in air of a specified quantity of gas (on a molar, mass or volume basis), in such a way that the pressure, p , at which the reaction takes place remains constant and all the products of combustion are returned to the same specified temperature, T , as that of the reactants, all of these products being in the gaseous state, except for water formed by combustion, which is condensed to the liquid state at T

See ISO 6976.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-