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I.S. EN ISO 12213-3:2009

# Natural gas - Calculation of compression factor - Part 3: Calculation using physical properties (ISO 12213 -3:2006)

## I.S. EN ISO 12213-3:2009

*Incorporating amendments/corrigenda issued since publication:*

<i>This document replaces:</i> EN ISO 12213-3:2005	<i>This document is based on:</i> EN ISO 12213-3:2009 EN ISO 12213-3:2005	<i>Published:</i> 9 September, 2009 7 July, 2005	
This document was published under the authority of the NSAI and comes into effect on: 28 September, 2009		ICS number: 75.060	
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English Version

## Natural gas - Calculation of compression factor - Part 3: Calculation using physical properties (ISO 12213-3:2006)

Gaz naturel - Calcul du facteur de compression - Partie 3:  
Calcul à partir des caractéristiques physiques (ISO 12213-3:2006)

Erdgas - Berechnung von Realgasfaktoren - Teil 3:  
Berechnungen basierend auf physikalischen  
Stoffeigenschaften als Eingangsgrößen (ISO 12213-3:2006)

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## **Foreword**

The text of ISO 12213-3:2006 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 12213-3:2009.

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of an identical text or by endorsement, at the latest by March 2010, and conflicting national standards shall be withdrawn at the latest by March 2010.

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.

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### **Endorsement notice**

The text of ISO 12213-3:2006 has been approved by CEN as a EN ISO 12213-3:2009 without any modification.

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I.S. EN ISO 12213-3:2009

# INTERNATIONAL STANDARD

# ISO 12213-3

Second edition  
2006-11-15

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## Natural gas — Calculation of compression factor —

### Part 3: Calculation using physical properties

*Gaz naturel — Calcul du facteur de compression —*

*Partie 3: Calcul à partir des caractéristiques physiques*



Reference number  
ISO 12213-3:2006(E)

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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 12213-3 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 12213-3:1997), which has been technically revised. The revision includes changes to Subclause 4.4.1 and the addition of a new annex, Annex E.

ISO 12213 consists of the following parts, under the general title *Natural gas — Calculation of compression factor*:

- *Part 1: Introduction and guidelines*
- *Part 2: Calculation using molar-composition analysis*
- *Part 3: Calculation using physical properties*

# Natural gas — Calculation of compression factor —

## Part 3: Calculation using physical properties

### 1 Scope

ISO 12213 specifies methods for the calculation of compression factors of natural gases, natural gases containing a synthetic admixture and similar mixtures at conditions under which the mixture can exist only as a gas.

This part of ISO 12213 specifies a method for the calculation of compression factors when the superior calorific value, relative density and carbon dioxide content are known, together with the relevant pressures and temperatures. If hydrogen is present, as is often the case for gases with a synthetic admixture, the hydrogen content also needs to be known.

**NOTE** In principle, it is possible to calculate the compression factor when any three of the parameters superior calorific value, relative density, carbon dioxide content (the usual three) and nitrogen content are known, but subsets including nitrogen content are not recommended.

The method is primarily applicable to pipeline quality gases within the ranges of pressure  $p$  and temperature  $T$  at which transmission and distribution operations normally take place, with an uncertainty of about  $\pm 0,1\%$ . For wider-ranging applications the uncertainty of the results increases (see Annex F).

More detail concerning the scope and field of application of the method is given in ISO 12213-1.

### 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 12213-1, *Natural gas — Calculation of compression factor — Part 1: Introduction and guidelines*

ISO 80000-4, *Quantities and units — Part 4: Mechanics*

ISO 80000-5, *Quantities and units — Part 5: Thermodynamics*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12213-1 apply.

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