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Natural gas – Calculation of carbon dioxide emission factors from composition

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 12, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 July 2014. It was prepared by Technical Committee, PTI/15, *Natural Gas and Gas Analysis*. A list of organizations represented on this committee can be obtained on request to its secretary.

Relationship with other publications

The methods of calculation in this British Standard require a value of the atomic index for carbon of each component comprising the gas mixture, together with the relevant molar property of the gas mixture. All of these values are either obtained from or calculated according to BS EN ISO 6976.

The method of calculation in this British Standard is applicable to any gas mixture for which BS EN ISO 6976 is applicable.

Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its methods are expressed as a set of instructions, a description, or in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This British Standard gives methods for the calculation of the carbon dioxide emission factor of natural gases, natural gas substitutes and other combustible gaseous fuels, when the composition of the gas by mole fraction is known. The method provides for the calculation of the carbon dioxide emission factor at the commonly used reference conditions of temperature and pressure and on the four common quantity bases:

- mole;
- mass;
- volume (at the reference conditions of temperature and pressure); and
- energy (gross or net).

Annex A provides example calculations for carbon dioxide emission factors on all the above bases and their uncertainties.

This standard requires use of complete compositional data in the form of mole fractions that, by definition, sum to unity. If this is not so then the raw mole fraction data is to be normalized and the normalized mole fractions and their uncertainties recalculated. Guidance on such data processing is provided in BS EN ISO 6974-1 and BS EN ISO 6974-2.

If the compositional data are incomplete, i.e. not all components have been determined, then it is for the user to establish the significance of the error caused by their omission and subsequent normalization.

NOTE One way to establish the significance of any omission is to determine how carbon dioxide emission factor changes when the mole fraction of an undetermined component is estimated to be unity minus the sum of all raw mole fractions.

2 Normative references

The following referenced documents are indispensable for the application of this document. The latest edition of the referenced document applies.

BS EN ISO 6974-1, *Natural gas – Determination of composition and associated uncertainty by gas chromatography – Part 1: General guidelines and calculation of composition*

BS EN ISO 6974-2, *Natural gas – Determination of composition and associated uncertainty by gas chromatography – Part 2: Uncertainty calculations*

BS EN ISO 6976, *Natural Gas – Calculation of calorific values, density, relative density and Wobbe index from composition*

3 Terms, definitions and units

For the purposes of this British Standard, the following terms, definitions and units apply.

3.1 Terms and definitions

3.1.1 carbon dioxide emission factor
mass of carbon dioxide that is produced from complete combustion with oxygen of a specified quantity of gas

3.1.2 coverage factor
numerical factor used as a multiplier of the combined standard uncertainty in order to obtain an expanded uncertainty