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Coal and coke — Determination of gross calorific value

Charbon et coke — Détermination du pouvoir calorifique supérieur

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Contents

Foreword iv
1 Scope 1
2 Normative references 1
3 Terms, definitions and symbols 2
4 Principle 6
5 Reagents 7
6 Apparatus 8
7 Preparation of test sample 14
8 Calorimetric procedure 14
9 Calibration 21
10 Gross calorific value 26
11 Precision 30
12 Calculation of net calorific value 30
13 Test report 34
Annex A (informative) Adiabatic calorimeters 35
Annex B (informative) Isoperibol and static-jacket calorimeters 39
Annex C (informative) Automated calorimeters 45
Annex D (informative) Checklists for the design of combustion tests and their procedures 48
Annex E (informative) Examples to illustrate some of the calculations used in this document 54
Annex F (informative) Safe use, maintenance and testing of calorimeter combustion vessels 61
Bibliography 68

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https://standards.iteh.ai/catalog/standards/iso/f5fb43e9-3e3e-4054-857e-413a44755ea2/iso-fdis-1928

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Foreword

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This document was prepared by Technical Committee ISO/TC 27, *Coal and coke*, Subcommittee SC 5, *Methods of analysis*.

This fifth edition cancels and replaces the ~~third~~fourth edition (ISO 1928:~~2009~~2020), which has been technically revised.

The main changes are as follows:

- ~~change the document~~ title ~~within the scope of TC 27;~~
- ~~title change~~changed from solid mineral fuels to coal and coke~~; editorially update~~;
- updated symbols within formulae;
- ~~editorial update of Forward; update references, including the year of publication to withdrawn standards listed in normative references;~~
- ~~~~allowance for alternative material for calorimeter can~~; expand~~;
- expanded on some derivations and added units of measure to some equations;
- ~~remove~~removed ambiguity around crucible masses;
- ~~specify~~specified the analysis sample;
- ~~~~more concise wording around the use of a combustion aid and determining a correction value;

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— warnings now included in body of text;

— the addition of alternate ignition methods.

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Coal and coke — Determination of gross calorific value

WARNING — Strict adherence to all of the provisions specified in this document ~~need~~is needed to ensure against explosive rupture of the combustion vessel, or a blow-out, provided that the combustion vessel is of proper design and construction and in good mechanical condition.

1 Scope

This document specifies a method for the determination of the gross calorific value of coal and coke at constant volume and at the reference temperature of 25 °C in a combustion vessel calorimeter calibrated by combustion of certified benzoic acid.

The result obtained is the gross calorific value of the analysis sample at constant volume with all the water of the combustion products as liquid water. In practice, fuel is burned at constant (atmospheric) pressure and the water is not condensed but is removed as vapour with the flue gases. Under these conditions, the operative heat of combustion is the net calorific value of the fuel at constant pressure. The net calorific value at constant volume can also be used; formulae are given for calculating both values.

General principles and procedures for the calibrations and the fuel tests are specified in the main text, whereas those pertaining to the use of a particular type of calorimetric instrument are described in Annexes A~~Annexes A~~ to C~~C~~ ~~Annex D~~. Annex D contains checklists for performing calibration and fuel tests using specified types of calorimeters. Annex E~~Annex E~~ gives examples illustrating some of the calculations. Annex F~~Annex F~~ provides guidance around safe use, maintenance and testing of the calorimeter combustion vessel.

NOTE Descriptors: solid fuels, coal, coke, tests, determination, calorific value, rules of calculation, calorimetry.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

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ISO 651~~:~~1975~~)~~, *Solid-stem calorimeter thermometers*[1)]

ISO 652~~:~~1975~~)~~, *Enclosed-scale calorimeter thermometers*[1)]

ISO 687, *Coke — Determination of moisture in the general analysis test sample*

ISO 1770~~:~~1981~~)~~, *Solid-stem general purpose thermometers*[1)]

ISO 1771~~:~~1981~~)~~, *Enclosed-scale general purpose thermometers*[1)]

ISO 5068~~-~~2, *Brown coals and lignites — Determination of moisture ~~content~~ — Part 2: Indirect gravimetric method for moisture in the analysis sample*

ISO 11722, *Solid mineral fuels — Hard coal — Determination of moisture in the general analysis test sample by drying in nitrogen*

ISO 13909~~-~~4, *Hard coal and coke — Mechanical sampling — Part 4: ~~Coal —~~Preparation of test samples of coal*

[1)] Withdrawn.

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