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Brown coals and lignites — Determination of the volatile matter in the analysis sample: one furnace method

Charbons bruns et lignites — Détermination des matières volatiles dans l'échantillon pour analyse : méthode avec utilisation d'un four

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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.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The volatile matter is determined as the loss in mass, corrected for moisture, when an analysis sample of brown coals or lignites is heated out of contact with air under specified conditions. Due to the nature of brown coals and lignites, the sample being pressed and cut into small pellets is necessary to minimize the possibility of ejection of sample from the test crucible when the sample is heated at 900 °C, which has been demonstrated for its good precision and accuracy, and applied in GB/T 212 for many years. Results obtained by this method agree with measurements of volatile matter content by ISO 5071-1.

The test of volatile matter is empirical and, in order to obtain reproducible results, it is essential that the rate of heating, the final temperature and the overall duration of the test are carefully controlled. It is also essential to exclude air from the coal during heating to prevent oxidation. The fit of the crucible lid is, therefore, critical. The moisture content of the sample is determined at the same time as the volatile matter so that the appropriate correction can be made.

To arrive at a valid comparison of volatile matter results conducted in different laboratories, it is essential that the moisture condition of the test samples in the two laboratories is within the expected variance of the moisture test. If a sample is re-equilibrated with the laboratory atmosphere or partially dried in one laboratory and not the other then oxidation can and will most definitely occur for brown coals and lignites. Oxidation will alter the, as-determined, volatile matter of a test sample.

The dry basis precision for volatile matter includes a variance contribution from the moisture determination and potentially a covariance component, both of which can influence the precision statistics for volatile matter on a dry basis.

Mineral matter associated with the sample may also lose mass under the conditions of the test, the magnitude of the loss being dependent on both the nature and the quantity of the minerals present.

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Brown coals and lignites — Determination of the volatile matter in the analysis sample: one furnace method

1 Scope

This document specifies a method of determining the volatile matter of brown coals and lignites by the one furnace method.

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.

ISO 1170, *Coal and coke — Calculation of analyses to different bases*

ISO 1213-2, *Solid mineral fuels — Vocabulary — Part 2: Terms relating to sampling, testing and analysis*

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

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

ISO 18283, *Hard coal and coke — Manual sampling*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1213-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
total volatile matter
$w_{V,T}$
fractional loss in mass, without correction for moisture, when a solid mineral fuel is heated out of contact with air under specified conditions

3.2
volatile matter
loss in mass, corrected for moisture, when a solid mineral fuel is heated out of contact with air under specified conditions

[SOURCE: ISO 1213-2:2016, 3.239]

4 Principle

A portion of the general analysis sample which is pressed and cut into pellets with the side length of about 3 mm is heated out of contact with air at 900 °C for 7 min. The percentage mass fraction of volatile matter is calculated from the loss in mass of the test portion after deducting the loss in mass due to moisture.

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