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International Standard



579

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Coke — Determination of total moisture content

Coke — Détermination de l'humidité totale

Second edition — 1981-11-01

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Ref. No. ISO 579-1981 (E)

Descriptors : coke, chemical analysis, determination of content, moisture content, tests, physical tests.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 579 was developed by Technical Committee ISO/TC 27, *Solid mineral fuels*.

This second edition was submitted directly to the ISO Council, in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 579-1974), which had been approved by the member bodies of the following countries:

Australia	Denmark	Philippines
Austria	Egypt, Arab Rep. of	Poland
Belgium	France	Romania
Brazil	Germany, F. R.	Switzerland
Canada	India	Turkey
Chile	Italy	United Kingdom
Colombia	Korea, Rep. of	USA
Czechoslovakia	New Zealand	USSR

The member body of the following country had expressed disapproval of the document on technical grounds :

South Africa, Rep. of

Coke – Determination of total moisture content

1 Scope and field of application

This International Standard specifies a method for determining the total moisture content of coke.

2 Reference

ISO 2309, *Coke – Sampling*.

3 Principle

A sample is heated in air at 200 °C (see 9.1) and maintained at this temperature until constant mass is obtained. The percentage moisture content is calculated from the loss in mass of the sample. Coke is not liable to oxidation under the conditions stated.

4 Apparatus

4.1 Air oven, capable of maintaining a substantially uniform temperature zone at 200 °C (see 9.1) and in which the rate of atmosphere change is sufficiently rapid for the test (see 9.2).

4.2 Tray, approximately 0,1 m² in area and 25 mm deep, made of non-corrodible material such as stainless steel, tinned steel or aluminium.

4.3 Balance, accurate to 1 g (see 9.3).

5 Sample

The sample shall consist of 1 kg of coke (see 9.3), prepared in accordance with the rules prescribed in ISO 2039, and shall be kept in a sealed, air-tight container. During the course of its preparation, the sample may have been air-dried, in which case a formula shall be used to calculate the total moisture content (see 9.4).

6 Procedure

Weigh, to the nearest 0,1 %, the sample and container as received (see clause 5). Weigh the dry, empty tray (4.2), transfer the sample as completely as possible to the tray and spread evenly. Place the charged tray in the oven (4.1) at a temperature of 200 °C (see 9.1). Dry the wet container with any sample adhering to it by warming, transfer the remaining sample to the tray and weigh the dry, empty container (see 9.5). Heat the tray and its contents until constant mass is obtained (see 9.6), weighing the tray hot to avoid absorption of moisture during cooling.

7 Expression of results

The moisture content M of the coke as analysed, expressed as a percentage by mass, is given by the formula

$$\frac{(m_1 - m_4) - (m_3 - m_2)}{(m_1 - m_4)} \times 100$$

where

m_1 is the mass, in grams, of the container plus sample as received;

m_2 is the mass, in grams, of the dry, empty tray;

m_3 is the mass, in grams, of the tray plus sample after heating;

m_4 is the mass, in grams, of the dry, empty container.

If the sample was air-dried during the course of its preparation, calculate the total moisture content by means of the formula given in 9.4.

The result (preferably the mean of duplicate determinations – see clause 8) shall be reported to the nearest 0,1 %.

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8 Precision of the method

Total moisture content	Maximum acceptable differences between results obtained	
	In the same laboratory (Repeatability)	In different laboratories (Reproducibility)
	0,5 % absolute	0,7 % absolute

8.1 Repeatability

The results of duplicate determinations, carried out at different times in the same laboratory by the same operator using the same apparatus on duplicate moisture samples taken from the same gross sample at the last stage of sample preparation, shall not differ by more than the above value.

8.2 Reproducibility

The means of the results of duplicate determinations, carried out in each of two different laboratories on representative portions taken from the same gross sample at the final stage of sample preparation, shall not differ by more than the above value.

9 Notes on procedure

9.1 The time taken for the determination can be considerably shortened if drying is carried out at 320 °C in an atmosphere of nitrogen, when heating for 1 h will usually suffice. The coke may be dried at temperatures between 105 and 200 °C but at the lower limit of temperature, drying times of up to 24 h may then be required and the results are likely to be systematically lower than those obtained at 200 °C (see also 9.6).

9.2 A rapid rate of atmosphere change, for example 3 to 5 times per minute, can be obtained, for example by using a thermostatically-controlled gas oven, fitted with a flue 1,8 m tall, or by using an electrically-heated oven fitted with a suitable fan.

9.3 If the sample is not required subsequently for the preparation of the general analysis sample, 250 g is sufficient, provided that a balance accurate to 0,25 g is used.

9.4 The air-drying procedure for the preparation of the moisture sample is described in ISO 2309; the air-drying of visibly wet samples shall be carried out in the same laboratory in which the determination of residual moisture is carried out.

In this case, the total humidity content, expressed as a percentage by mass, is given by the formula

$$X + M \left(1 - \frac{X}{100} \right)$$

where

X is the air-drying loss, as a percentage by mass, of the original sample;

M is the residual moisture, as a percentage by mass, determined on the air-dried sample.

9.5 If the sample can be removed completely leaving a dry, empty container, the drying of the container is unnecessary.

9.6 For a particular oven, the times required to ensure constancy in mass shall be verified by experiments; for the concentration of coke used (i.e. approximately 1 g/cm²), the usual times are 45, 100 and 180 min at a temperature of 200, 150 and 105 °C respectively. At 200 °C the first weighing shall be carried out after 45 min, and subsequent weighings at intervals of 10 min. Constancy in mass is defined as a change not exceeding 0,1 % during a further period of heating of not less than 10 min.

10 Test report

The test report shall include the following particulars :

- an identification of the product tested;
- the reference of the method used;
- the results and the method of expression used;
- any unusual features noted during the determination;
- any operation not included in this International Standard, or regarded as optional.