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**Carbonaceous materials for the production  
of aluminium — Calcined coke —  
Determination of water content**

*Produits carbonés utilisés pour la production de l'aluminium — Coke  
calciné — Dosage de l'eau*

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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.

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.

International Standard ISO 11412 was prepared by Technical Committee ISO/TC 47, *Chemistry*, Subcommittee SC 7, *Aluminium oxide, cryolite, aluminium fluoride, sodium fluoride, carbonaceous products for the aluminium industry*.

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# Carbonaceous materials for the production of aluminium — Calcined coke — Determination of water content

## 1 Scope

This International Standard specifies a method for the determination of the water content of calcined coke as a percentage by mass of the fragmented, granular carbon and graphite material (solid matter).

The method is based on that described in DIN 51904:1981, *Prüfung von Kohlenstoffmaterialien – Bestimmung des Wassergehaltes – Feststoffe*.

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## 2 Normative references

ISO 11412:1998

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions*.

ISO 6375:1980, *Carbonaceous materials for the production of aluminium – Coke for electrodes – Sampling*.

## 3 Principle

A test portion is heated at  $(110 \pm 5)$  °C. The percentage water content is then calculated from the difference between the masses before and after heating.

## 4 Apparatus

**4.1 Drying oven**, capable of being maintained at  $(110 \pm 5)$  °C.

**4.2 Analytical balance**, capable of weighing to an accuracy of 0,1 g.

**4.3 Drying tray**, made of aluminium sheet, measuring approximately 300 mm by 500 mm, with a raised edge of approximately 30 mm.

## 5 Sampling and sample preparation

Take the sample in accordance with ISO 6375, but ensure that the sample passes completely through a sieve of aperture 30 mm. Store the sample in an airtight container such as a tin.

## 6 Procedure

Carry out the determination in duplicate.

Heat the drying tray (4.3) in the oven (4.1), set at  $(110 \pm 5) ^\circ\text{C}$ , for  $1 \text{ h} \pm 5 \text{ min}$ . Allow to cool to ambient temperature in a desiccator and weigh to the nearest 0,1 g.

Weigh 500 g to 1 000 g of the sample into the drying tray to the nearest 0,1 g, and dry in the oven at  $(110 \pm 5) ^\circ\text{C}$ . Weigh at hourly intervals until consecutive weighings show a difference of less than 0,1 g. Before each weighing, let the test portion cool for approximately 30 min at a temperature of  $18 ^\circ\text{C}$  to  $28 ^\circ\text{C}$ .

## 7 Expression of results

Calculate the water content  $w$ , expressed as percentage by mass, to the nearest 0,1 %, using the following equation:

$$w = \frac{m_1 - m_2}{m_0} \times 100$$

where

$m_0$  is the mass, in grams, of the test portion;

$m_1$  is the mass, in grams, of the drying tray plus test portion before drying;

$m_2$  is the mass, in grams, of the drying tray plus test portion after drying.

Express the result as the arithmetic mean of the two determinations.

## 8 Precision

The following data shall be used to determine the reliability of the results (see ISO 5725-1):

### 8.1 Repeatability

The results of duplicate determinations, carried out in the same laboratory by the same operator with the same apparatus but at different times on representative test portions taken from the test sample, shall not differ by more than the values indicated in table 1.

### 8.2 Reproducibility

The means of the results of duplicate determinations, carried out in each of two laboratories on representative test portions taken from the same sample after the last stage of sample preparation, shall not differ by more than the values indicated in table 1.

Table 1 — Repeatability and Reproducibility

Water content %	Repeatability % absolute	Reproducibility % absolute
<1	0,1	0,2
1 to 10	0,4	0,9
>10	0,6	1,3

## 9 Test report

The test report shall include the following information:

- a) all details necessary for the complete identification of the sample;
- b) a reference to this International Standard;
- c) the results, expressed in accordance with clause 7;
- d) the date of the test;
- e) details of any unusual features noted during the determination;
- f) details of any operation not included in this International Standard or in the International Standards to which reference is made, as well as any operation regarded as optional.

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