International Standard 8005

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Carbonaceous materials used in the production of aluminium — Green and calcined coke — Determination of ash content

Produits carbonés utilisés pour la production de l'aluminium — Coke cru et coke calciné — Détermination du taux de cendres

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Foreword

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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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Carbonaceous materials used in the production of aluminium — Green and calcined coke — Determination of ash content

1 Scope and field of application

This International Standard specifies a method for the determination of ash of green and calcined coke used in the production of aluminium.

2 Reference

ISO 6375, *Carbonaceous materials for the production of aluminium — Cokes for electrodes — Sampling.*

3 Principle

Heating of a test portion of a dry, finely ground sample in a tared platinum dish in a furnace at 700 °C, to constant mass.

4 Apparatus

Ordinary laboratory apparatus and

4.1 Platinum dish, capacity 50 to 60 ml, diameter about 65 to 72 mm, height about 15 mm.

4.2 Electric furnace, capable of being controlled at 700 ± 10 °C, with an adequate air circulation.

5 Sampling and sample

Sample in accordance with ISO 6375.

6 Procedure

6.1 Preparation of the test sample

Crush a representative portion of the material to approximately 25 mm or smaller size and dry at 105 ± 5 °C for 3 h. Further crush, by means of a jaw crusher, to approximately 6 mm or smaller size. The jaw crusher shall be faced with a very hard alloy which will not be abraded and thereby will not contaminate the sample.

Thoroughly mix the crushed material; reduce it by quartering to a test sample of at least 50 g.

Grind the entire 50 g sample with a pestle and mortar to a fineness that all passes through a 750 µm sieve. Use a mortar of hard material which will not add impurities to the sample.

NOTE — Suitable materials are agate, tungsten or silicon carbide. Porcelain should not be used.

6.2 Test portion

Heat the platinum dish (4.1) for 1 h in the furnace (4.2), controlled at 700 ± 10 °C, allow it to cool to ambient temperature in a desiccator containing phosphorus pentoxide and weigh to the nearest 0,000 2 g.

Weigh, to the nearest 0,000 2 g, about 20 g of the dry sample of correct particle size (6.1), or a quantity sufficient to provide a minimum of 0,020 g of ash, in the previously tared dish.

6.3 Determination

Place the dish containing the test portion (6.2) into the cold furnace (4.2), set the furnace to 700 °C and allow to heat to this temperature.

Gradually heat to redness at such a rate as to avoid mechanical loss (in the case of green coke this prevents a too rapid expulsion of volatile matter).

Maintain at 700 ± 10 °C overnight or for an adequate time to completely burn off the carbonaceous matter in the sample. Remove the dish containing the ash from the furnace and cool it to room temperature in a desiccator containing phosphorus pentoxide.

Weigh the dish and ash as rapidly as possible; replace them in the furnace and continue heating, cooling and weighing until the mass of the dish and contents does not differ by more than 0,000 2 g for two consecutive weighings.

7 Expression of results

7.1 Method of calculation

The ash, expressed as a percentage by mass, is given by the formula

$$(m_2 - m_1) \times \frac{100}{m_0}$$

where

m_0 is the mass, in grams, of the test portion (6.2);

m_1 is the mass, in grams, of the empty dish (4.1);

m_2 is the mass, in grams, of the dish containing the ash (6.3).

Report the result to the nearest 0,01 % (m/m).

7.2 Precision (see ISO 5725, sub-clause 3.1)

Repeatability, r: ±0,05 % (m/m)

Reproducibility, R: ±0,12 % (m/m)

8 Test report

The test report shall include the following particulars:

a) an identification of the sample;

b) the reference of the method used;

c) the results and the method of expression used;

d) any unusual features noted during the determination;

e) any operation not included in this International Standard or in the International Standards to which reference is made, or regarded as optional;

f) date of the test.