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# British Standard Methods of sampling and test for Carbonaceous materials used in aluminium manufacture

98年7月2日  
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Part 2. Electrode coke

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## Section 2.6 Determination of the density in xylene of calcined cokes

[ISO title: Carbonaceous materials for the production of aluminium – Calcined coke and calcined carbon products – Determination of the density in xylene – Pyknetric method]

Méthodes d'échantillonnage et d'essai des produits carbonés utilisés pour la production de l'aluminium  
Partie 2. Coke pour électrodes  
Section 2.6 Détermination de la masse volumique au xylène des cokes calcinés

Verfahren zur Probenahme und Prüfung von kohlehaltigen Stoffen bei der Herstellung von Aluminium  
Teil 2. Koks für Elektroden  
Abschnitt 2.6 Bestimmung der Xyloldichte in kalziniertem Koks



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## National foreword

This British Standard has been prepared under the direction of the Chemical Standards Committee to provide methods of sampling and test for carbonaceous materials used in the production of aluminium. The standard will be published in two Parts, each Part being divided into Sections. The two Parts are:

Part 1 Electrode pitch;

Part 2 Electrode coke.

Initially, it is proposed that Part 2 will comprise the following Sections applicable to green and/or calcined coke as indicated:

Section	Subject	Identical with
2.1	Sampling* †	ISO 6375
2.2	Ash content* †	ISO 8005
2.3	Ash analysis (AAS)* †	ISO . . . ‡
2.4	Ash analysis (XRF)* †	ISO . . . ‡
2.5	Apparent density and porosity* †	ISO . . . ‡
2.6	Density (xylene method) †	ISO 8004
2.7	Oil content (gravimetric method) †	ISO 6997
2.8	Oil content (extraction method) †	ISO . . . ‡
2.9	Sieve analysis †	ISO . . . ‡
2.10	Electrical resistivity †	ISO . . . ‡
2.11	Volatile matter content*	ISO . . . ‡

Other international methods of test for electrode coke are under consideration and, subject to approval by the United Kingdom, will be published as they become available.

This Section is identical with ISO 8004-1985 'Carbonaceous materials for the production of aluminium — Calcined coke and calcined carbon products — Determination of the density in xylene — Pyknometric method', published by the International Organization for Standardization (ISO).

**Terminology and conventions.** The text of the international standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'British Standard'.

In British Standards it is current practice to use the symbol 'L' for litre (and its submultiples) rather than 'l' and to use the spelling 'sulphur', etc., instead of 'sulfur', etc.

## Cross-references

International standard	Corresponding British Standard
ISO 3507-1977	BS 733 Pyknometers Part 1 : 1983 Specification (Identical)
ISO 6375-1980	BS 6043 Methods of sampling and test for carbonaceous materials used in aluminium manufacture Part 2 Electrode coke Section 2.1 : 1985 Sampling (Identical)

The Technical Committee has reviewed the provisions of ISO 5725-1981, to which reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard. A related British Standard for ISO 5725-1981 is BS 5497 'Precision of test methods' Part 1 : 1979 'Guide for the determination of repeatability for a standard test method'.

The reference to ISO 8723 is for reference only and does not form part of the standard.

**Additional information.** This standard describes methods of test only, and should not be used or quoted as a specification defining limits of purity. Reference to this Section should state that the method of test used is in accordance with BS 6043 : Part 2 : Section 2.6 : 1986.

In clause 5 and the figure, the numerical references to parts of the apparatus have omitted numbers 1 to 4 inclusive and number 9.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

\*Applicable to green coke.

†Applicable to calcined coke.

‡In preparation.

British Standard Methods of sampling and test for

# Carbonaceous materials used in aluminium manufacture

Part 2. Electrode coke

Section 2.6 Determination of the density in xylene of calcined cokes

## 0 Introduction

Calcined coke may be treated with different types of oil in order to avoid the formation of dust during loading and transportation.

The present method does not provide for the elimination of traces of oil which may be present in the sample.

An oil-free sample of coke may be derived from the coke obtained after the determination of oil by the extraction method specified in ISO 8723.

## 1 Scope and field of application

This International Standard specifies a pycnometric method for the determination of the density in xylene of calcined coke and calcined carbon products used for the production of aluminium.

## 2 References

ISO 3507, *Pyknometers*.

ISO 5725, *Precision of test methods — Determination of repeatability and reproducibility by inter-laboratory tests*.

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

ISO 8723, *Carbonaceous materials for the production of aluminium-calcined coke — Determination of oil content — Extraction method*.<sup>1)</sup>

## 3 Principle

Measurement of the density at 25 °C of calcined coke and calcined carbon products by a pycnometric method after degassing under vacuum.

## 4 Reagents and materials

During the determination, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity degassed by boiling for 1 h. Use this water immediately after degassing.

4.1 Ethanol, 95 % (V/V).

4.2 Acetone.

4.3 Xylene, commercial grade,  $\rho$  about 0,860 g/ml.

**WARNING** — This product burns the skin and can be absorbed into the system through the skin. Inhalation of the vapour from hot material is to be avoided.

4.4 Sulfuric acid,  $\rho$  approximately 1,84 g/ml, about 96 % (m/m) solution.

## 5 Apparatus

Ordinary laboratory apparatus, and

5.1 **Pyknometer**, Gay-Lussac, type 3, capacity 25 ml (see ISO 3507).

5.2 **Degassing apparatus** (see the figure), comprising the following items:

a) **Container** (5) for the pyknometer (5.1), consisting of a glass beaker (6) with removable lid (7) and O-ring (8), capable of containing the pyknometer without stopper. The outlet (10) is connected to the pumping device.

b) **Filling device** (11), fitted to the container by the conical ground joint (12). A tube (13) reaches into the pyknometer bottle. The reservoir (14) with ground stopper (15) contains the pyknometer liquid which is allowed to flow into the pyknometer bottle by the teflon valve (16).

c) **Support** (17), to maintain the beaker in place when no vacuum is applied to the degassing apparatus. The rod (18) with spring (19) allows the beaker (6) to be shaken with the pyknometer to facilitate the evolution of gas bubbles during evacuation.

The apparatus is made of glass. A rotary pump is connected via the outlet and the oil trap (20) to the apparatus. Between the pump and oil trap, a manometer (21) is connected to the vacuum system. The vacuum is adjusted so that the manometer, which is about 600 mm from the joint (12),

1) At present at the stage of draft.