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Carbonaceous materials used for the production of aluminium — Cathode blocks and prebacked anodes — Determination of the density in xylene by a pycnometric method

*Produits carbonés utilisés pour la production de l'aluminium — Blocs
cathodiques et anodes précuites — Détermination par pycnométrie de la
masse volumique en xylène*



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Foreword

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Carbonaceous materials used for the production of aluminium — Cathode blocks and prebaked anodes — Determination of the density in xylene by pycnometric method

1 Scope

This International Standard specifies a pycnometric method for the determination of the true density in xylene of cathode blocks and prebaked anodes used for the production of aluminium.

2 Normative references

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 3507:1976, *Pyknometers*.

ISO 8007:1985, *Carbonaceous materials used in the production of aluminium — Sampling from cathodic blocks and prebaked anodes — General*.

3 Principle

The true density of cathode blocks and prebaked anodes is measured in xylene in a pycnometer after degassing under a 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.

4.1 Ethanol, 95 % (V/V).

4.2 Acetone.

4.3 Sulfuric acid, density approx. 1,84 g/ml, about 98 % (m/m) solution.

4.4 Xylene, commercial grade, density about 0,86 g/ml.

WARNING — Xylene burns the skin and can also be absorbed into the system through the skin. In addition, inhalation of the vapour from hot material is to be avoided.

5 Apparatus

5.1 Pyknometer, type 3 as defined in ISO 3507 (Gay-Lussac), capacity 25 ml.

5.2 Degassing apparatus (see figure 1), comprising the following items:

5.2.1 Container (1) for the pyknometer, consisting of a glass beaker (2) with removable lid (3) and O-ring (4), capable of containing the pyknometer without its stopper. The container outlet (5) is connected to a pump (not shown).

5.2.2 Filling device (6), fitted to the container by a ground-glass joint (7). A tube (8) extends down into the pyknometer. A reservoir (9) with a ground-glass stopper (10) contains the pyknometer liquid which is allowed to flow into the pyknometer through a teflon valve (11).

5.2.3 Stand (12), to support the beaker when no vacuum is applied to the degassing apparatus. A rod (13) with a spring (14) allows the beaker (2), with the pyknometer in it, to be shaken to facilitate the evolution of a gas bubbles during degassing.

The apparatus is made of glass. A rotary pump is connected to the outlet of the apparatus via an oil trap (15). A manometer (16) is connected to the vacuum system between the pump and the oil trap. The vacuum is adjusted so that the manometer, which is about 600 mm from the joint (7) between the container and the filling device, registers $1,3 \text{ kPa} \pm 0,3 \text{ kPa}$. A valve (17) is fitted to allow air back into the apparatus. This has to be done slowly and with due care.

NOTE — At a pressure of $1,3 \text{ kPa} \pm 0,3 \text{ kPa}$ and an ambient temperature of $25 \text{ }^{\circ}\text{C}$, slight vapourization of xylene may occur until equilibrium is reached, but this is of no consequence.

The apparatus described above is only an example; other apparatus with the same characteristics may be used.

5.3 Drying oven, capable of being maintained at $120 \text{ }^{\circ}\text{C} \pm 2 \text{ }^{\circ}\text{C}$.

5.4 Thermostatically controlled bath, capable of being maintained at $25 \text{ }^{\circ}\text{C} \pm 0,05 \text{ }^{\circ}\text{C}$.

5.5 Grinder, capable of grinding the sample to a particle size of less than $63 \text{ }\mu\text{m}$. The parts which come into contact with the sample shall be made of hardmetal to avoid contamination.

5.6 Filter paper.

5.7 Jaw-type crusher.

6 Sampling

Sample in accordance with ISO 8007.