

Methods of test for

Aluminium oxide —

Part 10: Determination of untamped density

[ISO title: Aluminium oxide primarily used for the production of aluminium — Determination of untamped density]

NOTE It is recommended that this Part be read in conjunction with the general information given in BS 4140-0 "*General introduction*" which is issued separately.

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The committees responsible for this British Standard are shown in Part 0

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National foreword

This Part of BS 4140 is identical with ISO 903:1976 “*Aluminium oxide primarily used for the production of aluminium — Determination of untamped density*” published by the International Organization for Standardization (ISO).

This method supersedes clause 10 of Addendum No. 1 (1970) to BS 4140:1967. Parts 8 to 10 of this standard collectively supersede Addendum No. 1 (1970) to BS 4140:1967, which is withdrawn.

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.

In British Standards it is current practice to use the symbol “L” for litre (and its submultiples) rather than “l”.

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

Cross-references

International Standard	Corresponding British Standard
	BS 4140 <i>Methods of test for aluminium oxide</i>
ISO 802:1976	Part 1:1986 <i>Preparation and storage of test samples</i> (Identical)
ISO 2927:1973	Part 20:1980 <i>Sampling</i> (Identical)

NOTE The other International Standards listed in the Annex are for information only. Their correspondence with British Standards is summarized in BS 4140-0 “*General information*”.

This standard prescribes methods of test only, and should not be used or quoted as a specification defining limits of purity. Reference to this Part should indicate that the method of test used complies with BS 4140-10:1986.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 and 2, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope and field of application

This International Standard specifies a method for the determination of the untamped density of aluminium oxide primarily used for the production of aluminium.

2 References

ISO 802, *Aluminium oxide primarily used for the production of aluminium — Preparation and storage of test samples*.

ISO 2927, *Aluminium oxide primarily used for the production of aluminium — Sampling*.

3 Principle

Determination of the mass of a known volume of aluminium oxide collected after allowing it to fall freely into a stationary container, avoiding vibration.

Expression of the untamped density by division of this mass by the mass of an equal volume of water.

4 Apparatus

4.1 Funnel, of diameter 10 cm and angle 60°, with a stem of length 8 mm and aperture diameter of 6 mm.

4.2 Cylindrical container, of capacity approximately 200 ml, with a ratio of internal diameter to internal length 1/6 approximately.

4.3 Suitable stand and ring support, to allow the funnel (4.1) to be set to a predetermined height above the top level of the cylindrical container (4.2).

5 Procedure

5.1 Sample

Use the crude sample (see 3.2 of ISO 802).

5.2 Determination

Set the cylindrical container (4.2) on a flat base. Adjust the funnel (4.1) so that its axis coincides approximately with that of the cylinder, with the tip of the funnel at a height of 10 cm above the cylindrical container top.

Feed the aluminium oxide into the centre of the funnel at about 40 mm above the funnel so as not to communicate any vibration to the apparatus, at about 20 to 60 g/min. If blocking occurs at the stem, facilitate the passage of the aluminium oxide with a piece of wire, taking care not to vibrate the cylindrical container.

Stop the feed when the aluminium oxide has formed a cone above the top level of the cylindrical container and is spilling over.

Remove the cone of surplus aluminium oxide by gently drawing a straight edge across the top rim of the cylindrical container, without communicating any vibration to the latter.

Weigh the cylindrical container and its contents.

6 Expression of results

The untamped density is given by the formula

$$\frac{m_2 - m_0}{m_1 - m_0}$$

where

m_0 is the mass, in grams, of the empty cylindrical container (4.2);

m_1 is the mass, in grams, of the cylindrical container full of distilled water;

m_2 is the mass, in grams, of the cylindrical container full of aluminium oxide;

If the cylindrical container used has a capacity of exactly 200 ml, the formula for the calculation of untamped density becomes

$$\frac{m_2 - m_0}{200}$$

It will usually be more convenient to use one particular cylindrical container of capacity approximately 200 ml and determine the value of ($m_1 - m_0$) to be used in all determinations.

7 Test report

The test report shall include the following particulars:

- 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 in the International Standards to which reference is made, or regarded as optional.

Annex ISO publications relating to aluminium oxide primarily used for the production of aluminium

ISO 802, *Preparation and storage of test samples.*

ISO 803, *Determination of loss of mass at 300 °C (conventional moisture).*

ISO 804, *Preparation of solution for analysis — Method by alkaline fusion.*

ISO 805, *Determination of iron content — 1,10-Phenanthroline photometric method.*

ISO 806, *Determination of loss of mass at 1 000 and 1 200 °C.*

ISO 900, *Determination of titanium content — Diantipyrilmethane photometric method.*

ISO 901, *Determination of absolute density — Pyknometer method.*

ISO 902, *Measurement of the angle of repose.*

ISO 903, *Determination of untamped density.*

ISO 1232, *Determination of silica content — Reduced molybdosilicate spectrophotometric method.*

ISO 1617, *Determination of sodium content — Flame emission spectrophotometric method.*

ISO 1618, *Determination of vanadium content — N-Benzoyl-N-phenylhydroxylamine photometric method.*

ISO 2069, *Determination of calcium content — Flame atomic absorption method.*

ISO/R 2070, *Determination of calcium content — Spectrophotometric method using naphthalhydroxamic acid.*

ISO 2071, *Determination of zinc content — Flame atomic absorption method.*

ISO/R 2072, *Determination of zinc content — PAN photometric method.*

ISO 2073, *Preparation of solution for analysis — Method by hydrochloric acid attack under pressure.*

ISO 2828, *Determination of fluorine content — Alizarin complexone and lanthanum chloride spectrophotometric method.*

ISO 2829, *Determination of phosphorus content — Reduced phosphomolybdate spectrophotometric method.*

ISO 2865, *Determination of boron content — Curcumin spectrophotometric method.*

ISO 2926, *Particle size analysis — Sieving method.*

ISO 2927, *Sampling.*

ISO 2961, *Determination of an adsorption index.*

ISO 3390, *Determination of manganese content — Flame atomic absorption method.*

Publications referred to

See national foreword.

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