

British Standard Methods of test for

## Aluminium oxide

Part 9. Measurement of the angle of repose

[ISO title : Aluminium oxide primarily used for the production of aluminium –  
Measurement of the angle of repose]

Méthodes d'essai de l'oxyde d'aluminium  
Partie 9. Mesurage de l'angle de talus d'éboulement

Verfahren zur Prüfung von Aluminiumoxid  
Teil 9. Bestimmung des Schüttwinkels

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

### National foreword

This Part of BS 4140 is identical with ISO 902-1976 'Aluminium oxide primarily used for the production of aluminium – Measurement of the angle of repose' published by the International Organization for Standardization (ISO).

This method supersedes clause 9 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 Parts 8 to 10 of this standard collectively supersede Addendum No. 1 (1970) to BS 4140 : 1967, which is withdrawn.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.

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'.

### Cross-references

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

NOTE. The other international standards listed in the annex are for information only. Their correspondence with British Standards is summarized in BS 4140 : Part 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 : Part 9 : 1986.**

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

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a conventional method for the measurement of the angle of repose 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

Measurement of the angle at the base of the cone of aluminium oxide obtained by allowing a sample to fall through a fixed distance from a defined funnel onto a horizontal base plate.

## 4 APPARATUS

Only the dimensions given in the text are mandatory.

The apparatus (see the figure) consists of the following items :

**4.1 Funnel**, of stainless steel, having a nozzle of internal diameter 6 mm, fitted with a sieve of 1 mm mesh aperture held in position between two retaining plates. The funnel is screwed into its support (4.3).

**4.2 Base-plate**, of minimum length 270 mm and minimum width 200 mm. It shall be perfectly rigid and made of marble, stainless steel or other corrosion-resistant metal. On the polished surface of the base-plate, four straight lines are engraved at angles of 45° to each other; at their intersection is a locating pin to which the height block (4.4) can be fixed. It is provided with three adjustable levelling feet.

**4.3 Funnel support**, made in stainless steel and of substantial construction. It is designed so that the axis of the funnel is vertically over the central locating pin.

**4.4 Height block**, consisting of a metal cylinder with polished faces of height 40,0 mm. The base has a recess to engage the central locating pin of the base-plate.

## 5 PROCEDURE

### 5.1 Sample

Use the crude sample (see 3.2 of ISO 802), at a temperature of  $22 \pm 4$  °C.

### 5.2 Determination

**5.2.1** Level the base-plate (4.2) by means of the adjustable feet.

**5.2.2** Put the height block (4.4) in position and adjust the funnel (4.1) until the nozzle is just in contact with the block. Secure the funnel in position and remove the height block.

**5.2.3** Feed the aluminium oxide to the centre of the funnel from a height of about 40 mm, taking care not to vibrate the apparatus. Adjust the powder flow to between 20 and 60 g/min.

If the sieve is clogged, use a brush to clear it, taking care not to vibrate the apparatus. When the top of the cone reaches the nozzle of the funnel, cease feeding the aluminium oxide.

Using a pencil, mark the circumference of the base of the cone on the eight radii engraved on the base-plate.

Remove the aluminium oxide and measure the four marked diameters.