BRITISH STANDARD

BS EN
725-9 : 1997

Advanced technical ceramics — Methods of test for ceramic powders

Part 9. Determination of untamped bulk density

The European Standard EN 725-9 : 1997 has the status of a British Standard

ICS 81.060.99

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee RPI/13, Advanced technical ceramics, upon which the following bodies were represented:

AEA Technology
Aluminium Federation
British Ceramic Research Ltd.
British Industrial Ceramic Manufacturers' Association
Department of Trade and Industry (National Physical Laboratory)
Flat Glass Manufacturers' Association
GAMBICA (BEAMA Ltd.)
Institute of Refractories Engineers
Ministry of Defence
Refractories Association of Great Britain
Society of British Aerospace Companies Ltd.
University of Manchester

This British Standard, having been prepared under the direction of the Sector Board for Materials and Chemicals, was published under the authority of the Standards Board and comes into effect on
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Amendments issued since publication

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The following BSI references relate to the work on this standard:
Committee reference RPI/13
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Contents

National foreword

This British Standard has been prepared by Technical Committee RPI/13 and is the English language version of EN 725-9 : 1997 *Advanced technical ceramics — Methods of test for ceramic powders — Part 9: Determination of untamped bulk density*, published by the European Committee for Standardization (CEN).

EN 725-9 : 1997 was produced as a result of international discussions in which the United Kingdom took an active part.

EN 725-9 : 1997 has been approved by CEN member bodies under the weighted voting procedures introduced in 1988 to coincide with the introduction of 'New Approach' Directives from the Commisssion of the European Community.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 4, an inside back cover and a back cover.

EUROPEAN STANDARD
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English version

Advanced technical ceramics — Methods of test for ceramic powders — Part 9: Determination of untamped bulk density

Céramiques techniques avancées — Méthodes d'essai pour poudres céramiques — Partie 9: Détermination de la masse volumique apparente en vrac

Hochleistungskeramik — Prüfverfahren für keramische Pulver — Teil 9: Bestimmung der Schüttdichte

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 184, Advanced technical ceramics, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 1997, and conflicting national standards shall be withdrawn at the latest by September 1997.

EN 725 consists of 11 parts:

Part 1 : *Determination of impurities in alumina*

Part 2 : *Determination of impurities in barium titanate (ENV)*

Part 3 : *Determination of oxygen content of non-oxides by thermal extraction*

Part 4 : *Determination of oxygen content of non-oxides by XRF analysis (ENV)*

Part 5 : *Determination of particle size distribution*

Part 6 : *Determination of specific area*

Part 7 : *Determination of absolute density*

Part 8 : *Determination of tapped bulk density*

Part 9 : *Determination of untamped bulk density*

Part 10 : *Determination of compaction properties*

Part 11 : *Determination of reactivity on sintering (ENV)*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Contents

1 Scope

This part of EN 725 describes a method for the determination of the untamped bulk density of ceramic powders.

2 Principle

The mass of a known volume of the powder is determined after allowing it to fall freely into a stationary container, avoiding vibration.

The untamped bulk density is expressed by division of this mass by the volume of the container.

3 Apparatus (see figure 1)

3.1 *Stainless steel cylindrical container*, of volume approximately 100 cm^3 and a diameter to height ratio of 1.

3.2 *24 mesh (710 µm) sieve*, with a typical diameter of 80 mm.

3.3 *Balance*, with a precision of 0,01 g.

3.4 *Tray*, to collect the powder during the filling of the container.

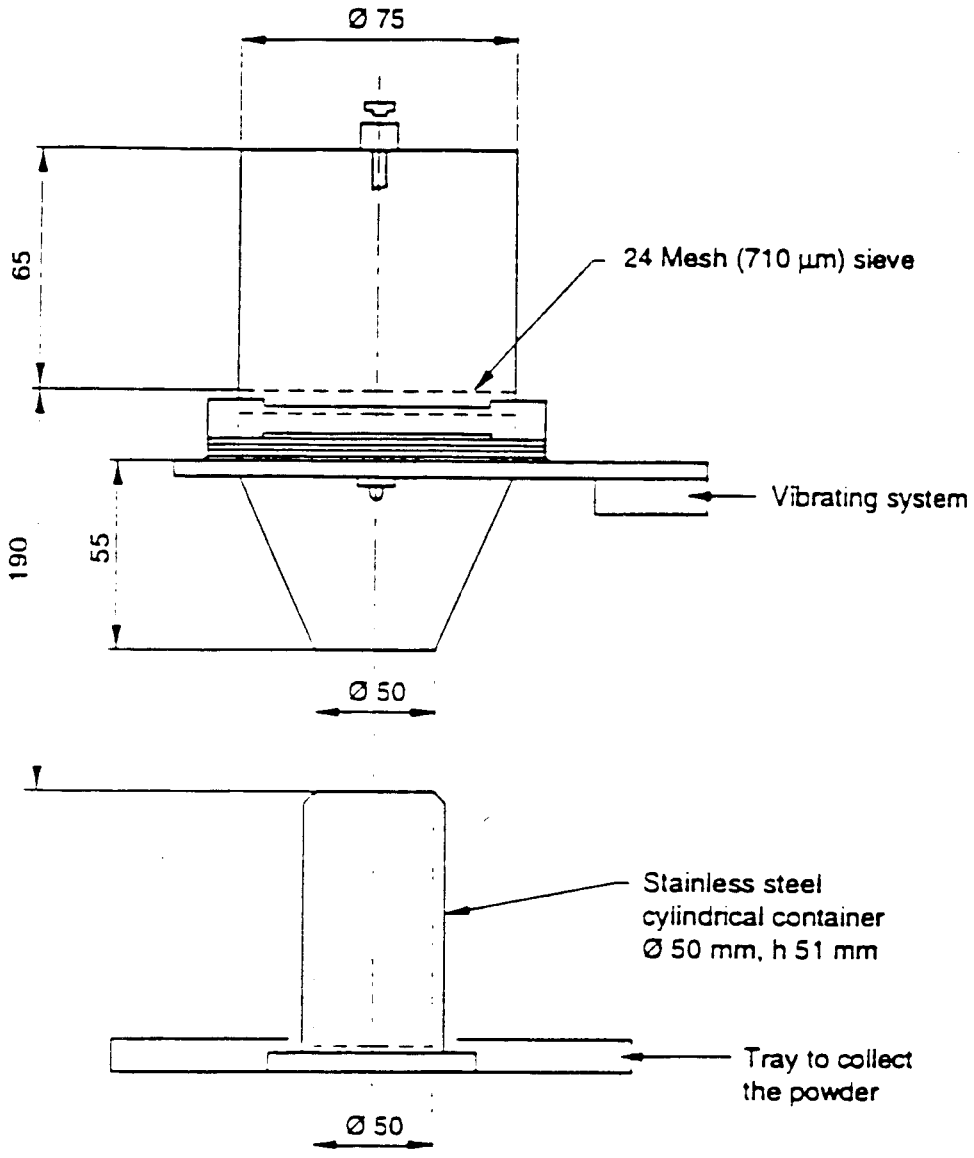

Figure 1. Apparatus

3.5 *Suitable apparatus for the powder sieve assembly,* including a fixing system for the sieve with a cone in its lower part to allow the sieve and the cone to be set to a predetermined height above the top level of the cylindrical container (see **3.1**), and an electric system to regulate the vibration of the sieve.

4 Procedure

4.1 Sample treatment

If there is any treatment of the sample of powder before measurement (e.g. drying), this shall be recorded in the test report.

4.2 Measurement

Weigh the cylindrical container (see **3.1**). Set the cylindrical container in the tray (see **3.4)** so that its axis coincides with that of the cone, with the level of the sieve at a height of 190 mm above the cylindrical container top.

Fill the sieve with the sample. If necessary start the vibration system (see **3.5**) and regulate it to allow the powder to flow evenly. Fill the cylindrical container in between 20 s and 30 s. Stop the feed when the powder has formed a cone above the top of the cylindrical container and is spilling over. Remove the cone of surplus powder 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.

5 Expression of results

The untamped bulk density ρ_b is given by the formula

$$\rho_b = \frac{m_1 - m_0}{V}$$

where

m_o is the mass, in grams, of the empty cylindrical container;

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

V is the volume, in cubic centimetres, of the cylindrical container.

Calculate the density in grams per cubic centimetre and then convert the answer to kilograms per cubic metre, to the nearest 5 kg/m^3.

6 Test report

The test report shall include the following information:

a) the name of the testing establishment;

b) date of the test, report identification and number, operator, signatory;

c) a reference to this standard, i.e. determined in accordance with EN 725-9;

d) a description of the powder (material type, manufacturer code, batch or code number);

e) any pre-treatment of the powder such as drying;

f) the results;

g) any unusual features noted during the determination;

h) any comments about the test or test results.

7 Repeatability and reproducibility

The experience of three laboratories indicates that the method is capable, for an alumina powder with an untamped bulk density of 909 kg/m^3, of achieving:

a) a standard deviation of repeatability of 7 kg/m^3;

b) a standard deviation of reproducibility of 9 kg/m^3.

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