

## **Tihedate tulekindlate profiiltoodete katsemeetodid. Osa 2: Tegeliku tiheduse määramine**

Methods of test for dense shaped refractory  
products - Part 2: Determination of true density

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 993-2:1999 sisaldab Euroopa standardi EN 993-2:1995 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 23.11.1999 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 993-2:1999 consists of the English text of the European standard EN 993-2:1995.</p> <p>This document is endorsed on 23.11.1999 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b> See standardi osa esitab tulekindlate ja toormaterjalide tegeliku tiheduse määramise meetodi.</p>	<p><b>Scope:</b></p>
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**ICS** 81.080

**Võtmesõnad:** kindlaksmääramine, teimid, teimimistingimused, tihedad tulekindlad profiiltooted, tihedus, toormaterjalid, tulekindlad materjalid, tulekindlad profiilsed isoleertooted

ICS 81.080

Descriptors: Refractory products, density, testing.

**English version**

**Methods of test for dense shaped refractory products**

**Part 2: Determination of true density**

Méthodes d'essai pour produits  
réfractaires façonnés denses. Partie 2:  
Détermination de la masse volumique  
absolue

Prüfverfahren für dichte geformte  
feuerfeste Erzeugnisse. Teil 2:  
Bestimmung der Dichte

This European Standard was approved by CEN on 1995-02-15.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**

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

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## Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 187 "Refractory products and materials", the secretariat of which is held by BSI.

It is closely based on the corresponding International Standard, ISO 5018 "Refractory materials - Determination of true density", published by the International Organization for Standardization (ISO).

Reproducibility and repeatability data are not available, but may be given in a subsequent edition.

EN 993 'Methods of test for dense shaped refractory products' consists of 18 Parts:

- Part 1 : Determination of bulk density and porosity
- Part 2 : Determination of true density
- Part 3 : Test methods for carbon-containing refractories
- Part 4 : Determination of permeability to gases
- Part 5 : Determination of cold crushing strength
- Part 6 : Determination of modulus rupture, ambient temperatures
- Part 7 : Determination of modulus rupture, elevated temperatures
- Part 8 : Determination of refractoriness-under-load
- Part 9 : Determination of creep in compression
- Part 10 : Determination of permanent change in dimensions on heating
- Part 11 : Determination of resistance to thermal shock (ENV)
- Part 12 : Determination of pyrometric cone equivalent
- Part 13 : Specification for pyrometric cones
- Part 14 : Determination of thermal conductivity (hot wire, cross-array)
- Part 15 : Determination of thermal conductivity (hot wire, parallel)
- Part 16 : Determination of resistance to acids
- Part 17 : Determination of bulk density of granular material (mercury method)
- Part 18 : Determination of bulk density of granular material (water method)

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 August 1995, and conflicting national standards shall be withdrawn at the latest by August 1995.

According to the CEN/CENELEC Internal Regulations, 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, United Kingdom.

## 1 Scope

This Part of EN 993 specifies a method for measuring the true density of refractory and raw materials.

## 2 Normative reference

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 565 Test sieves - Woven metal wire cloth and perforated plates - Nominal sizes of aperture.

## 3 Definitions

For the purpose of this Part of EN 993, the following definitions apply.

**3.1 true density:** The ratio of the mass of a quantity of dried material to its true volume.

**3.2 true volume:** The volume of the solid material in a porous body.

## 4 Principle

The true density is determined by measuring the dry mass and the true volume of a sample of the material after it has been crushed and ground to such a particle size that as far as possible no closed pores remain. The volume of the ground material is determined using a pycnometer and a liquid of known density, the temperature of the liquid being controlled or carefully measured.

Unfired refractory products and basic products may require pre-treatment, the conditions of which are agreed between the parties concerned.

## 5 Apparatus

**5.1 Pycnometer,** of capacity from 25, 50 or 100 mL, fitted with a ground stopper having a capillary bore.

**5.2 Balance,** with an accuracy of  $\pm 0,1$  mg.

**5.3 Evacuating equipment,** capable of reducing the pressure to a value not greater than 2500 Pa, and a means of measuring the pressure used.