

Methods of test for dense shaped refractory products -
Part 5: Determination of cold crushing strength

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 993-5:2018 sisaldab Euroopa standardi EN 993-5:2018 ingliskeelset teksti.	This Estonian standard EVS-EN 993-5:2018 consists of the English text of the European standard EN 993-5:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
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ICS 81.080

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English Version

Methods of test for dense shaped refractory products -
Part 5: Determination of cold crushing strength

Méthodes d'essai pour produits réfractaires façonnés
denses - Partie 5: Détermination de la résistance à
l'écrasement à température ambiante

Prüfverfahren für dichte geformte feuerfeste
Erzeugnisse - Teil 5: Bestimmung der
Kaltdruckfestigkeit

This European Standard was approved by CEN on 5 October 2018.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 993-5:2018) has been prepared by Technical Committee CEN/TC 187 "Refractory products and materials", 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of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 993-5:1998.

Reproducibility and repeatability data are available only for a limited number of testing methods and materials, but may be complemented in subsequent edition.

The series of standards EN 993 'Methods of test for dense shaped refractory products' consists of 20 Parts, some of which have been withdrawn and replaced by equivalent standards:

- *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 of rupture, elevated temperatures*
- *Part 8: Determination of refractoriness-under-load* – withdrawn – replaced by EN ISO 1893
- *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)* – withdrawn – replaced by EN ISO 8894-1
- *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)*

- *Part 19: Determination of thermal expansion by a differential method*
- *Part 20: Determination of resistance to abrasion at ambient temperature* – withdrawn – replaced by EN ISO 16282

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document specifies a method of determination of the cold crushing strength of dense shaped refractory products.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13385-1, *Geometrical product specifications (GPS) — Dimensional measuring equipment — Part 1: Callipers; Design and metrological characteristics*

ISO 5022, *Shaped refractory products — Sampling and acceptance testing*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

cold crushing strength

maximum load per unit area, applied under specified conditions at room temperature, that a refractory product will withstand before failure occurs

3.2

dense shaped refractory product

product with specific dimensions, having a true porosity of less than 45 % by volume, when measured in accordance with EN 993-1

3.3

sample

representative collection of items that can be obtained by sampling in accordance with ISO 5022

3.4

item

refractory brick or shape

3.5

test piece

piece of material extracted from an item (3.4) and suitably shaped and prepared for the test

4 Principle

A test piece of known dimensions is subjected under specified conditions to a steadily increasing compressive load until its failure, when it cannot support a further increase in load. The cold crushing strength is calculated from the maximum load indicated at failure and the mean cross-sectional area over which the load is applied.