

**Tihedate tulekindlate profiiltoodete katsemeetodid. Osa
15: Soojajuhtivuse määramine kuuma traadi meetodil
(paralleelmeetodil)**

Methods of test for dense shaped refractory products - Part
15: Determination of thermal conductivity by the hot-wire
(parallel) method

EESTI STANDARDI EESSÕNA

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Descriptors: refractory materials, shaped refractories, dense shaped refractory products, powdery materials, tests, determination, thermal conductivity, test specimen, procedures

English version

Methods of test for dense shaped refractory products - Part 15:
Determination of thermal conductivity by the hot-wire (parallel)
method

Méthodes d'essai pour produits réfractaires façonnés
denses - Partie 15: Détermination de la conductivité
thermique par la méthode du fil chaud (parallèle)

Prüfverfahren für dichte geformte feuerfeste Erzeugnisse
Teil 15: Bestimmung der Wärmeleitfähigkeit nach den
Heißdraht-(Parallel-)Verfahren

This European Standard was approved by CEN on 23 March 1998.

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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.

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by October 1998, and conflicting national standards shall be withdrawn at the latest by October 1998.

It is closely based on the corresponding International Standard, ISO 8894-2 "Refractory materials - Determination of thermal conductivity : Part 2 Hot-wire method (parallel)", published by the International Organization for Standardization (ISO).

The determination of thermal conductivity by the hot-wire (cross-array) method is given in EN 993-14.

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, apparent porosity and true 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 of rupture, ambient temperatures
- Part 7 : Determination of modulus of 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 of pyrometric cones
- Part 14 : Determination of thermal conductivity by the hot wire (cross-array) method
- Part 15 : Determination of thermal conductivity by the hot wire (parallel) method
- 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)

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

1 Scope

This Part of EN 993 specifies a hot-wire (parallel) method for the determination of thermal conductivity of refractory products and materials. It is applicable to dense and insulating shaped products and to powdered or granular materials (see 7.2), for thermal conductivities of less than 25 W/m·K. The limits are imposed by the dimensions of the test pieces and higher thermal conductivities can be measured if larger pieces are used. Electrically conducting materials cannot be measured.

NOTE 1 : The thermal conductivity of bonded bricks can be affected by the appreciable amount of water that is retained after hardening or setting and is released on firing. These materials may therefore require pre-treatment; the nature and extent of such pre-treatment and the period for which the test piece is held at the measurement temperature, as a preliminary to carrying out the test, are details that are outside the scope of this Part of EN 993 and should be agreed between the parties concerned.

NOTE 2 : In general it is difficult to make measurements on anisotropic materials and the use of this method for such materials should also be agreed between the parties concerned.

2 Normative references

This European Standard incorporates by dated or undated references, 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.

EN 993-14 Methods of test for dense shaped refractory products - Determination of thermal conductivity by the hot wire (cross-array) method

ISO 31-4 Specification for quantities, units and symbols. Heat

3 Definitions

For the purposes of this standard, the following definitions, in accordance with EN 993-14, and ISO 31-4 apply:

3.1 thermal conductivity, λ : density of heat flow rate divided by the temperature gradient, in units of watt per metre kelvin (W/m·K).

3.2 thermal diffusivity, α :
$$\alpha = \frac{\lambda}{\rho \cdot C_p}$$

where:

λ is the thermal conductivity

ρ is the bulk density

C_p is the specific heat capacity at constant pressure