



SLOVENSKI STANDARD
SIST ENV 1402-8:2000

01-september-2000

Neoblikovani ognjevzdržni izdelki - 8. del: Ugotavljanje komplementarnih lastnosti

Unshaped refractory products - Part 8: Determination of complementary properties

Ungeformte feuerfeste Erzeugnisse - Teil 8: Bestimmung zusätzlicher Eigenschaften

Produits réfractaires non façonnés - Partie 8: Détermination des caractéristiques complémentaires

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Ta slovenski standard je istoveten z: ENV 1402-8:1999

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ICS:

81.080 Ognjevzdržni materiali Refractories

SIST ENV 1402-8:2000

en

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EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
EUROPÄISCHE VORNORM

ENV 1402-8

February 1999

ICS 81.080

Descriptors: refractory materials, unshaped refractories, tests, determination, characteristics

English version

Unshaped refractory products - Part 8: Determination of complementary properties

Produits réfractaires non façonnés - Partie 8: Détermination des caractéristiques complémentaires

Ungeformte feuerfeste Erzeugnisse - Teil 8: Bestimmung zusätzlicher Eigenschaften

This European Prestandard (ENV) was approved by CEN on 8 January 1999 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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

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

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Foreword

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

ENV 1402 'Unshaped refractory products' consists of eight Parts:

- Part 1 : Introduction and definitions
- Part 2 : Sampling for testing
- Part 3 : Characterization as received
- Part 4 : Consistency testing
- Part 5 : Preparation and treatment of test pieces
- Part 6 : Measurement of physical properties
- Part 7 : Tests on pre-formed shapes
- Part 8 : Determination of complementary properties

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

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1 Scope

This European Prestandard describes methods for determination of the properties of unshaped refractory materials from test pieces prepared and stored in accordance with prENV 1402-5¹⁾. The methods complement those described in ENV 1402-6.

The methods have been adapted from standards for shaped refractory products to make them applicable to dense and insulating castables, plastic materials and ramming mixes as defined in ENV 1402-1, before and after firing.

2 Normative references

This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- | | |
|----------------|---|
| EN 955-2 | Chemical analysis of refractory products - Part 2: Products containing silica and/or alumina (wet method); |
| prEN 955-3 | Chemical analysis of refractory products - Part 3: Chrome-bearing materials (wet methods); |
| ENV 955-4 | Chemical analysis of refractory products - Part 4: Products containing silica and/or alumina (Analysis by Flame Atomic Absorption Spectrometry (FAAS) and Inductively Coupled Plasma atomic Emission Spectrography (ICP)) |
| prEN 955-5 | Chemical analysis of refractory materials - Part 5: XRF fused cast bead method; |
| EN 993-3 | Methods of test for dense shaped refractory products - Part 3: Test methods for carbon - containing refractories; |
| EN 993-4 | Methods of test for dense shaped refractory products - Part 4: Determination of permeability to gases; |
| ENV 993-11 | Dense shaped refractory products - Part 11: Determination of resistance to thermal shock; |
| EN 993-14:1998 | Methods of testing dense shaped refractory products - Part 14: Determination of thermal conductivity by the hot wire (cross array) method; |
| EN 993-15:1998 | Methods of test for dense shaped refractory products - Part 15: Determination of thermal conductivity by the hot wire (parallel) method; |

EN 993-16	Dense shaped refractory products - Methods of test - Part 16: Determination of resistance to sulfuric acid;
ENV 1402-1	Unshaped refractory products - Part 1: Introduction and definitions;
ENV 1402-2	Unshaped refractory products - Part 2: Sampling for testing;
ENV 1402-3:1998	Unshaped refractory products - Part 3: Characterization as received;
prENV 1402-5 ¹⁾	Unshaped refractory products - Part 5: Preparation and treatment of test-pieces;
ENV 1402-6	Unshaped refractory products - Part 6 : Measurement of physical properties;
prENV 12698-1 ¹⁾	Chemical analysis of silicon carbide refractories - Part 1: General methods for analysis of oxides, oxygen and nitrogen;
prENV 12698-2 ¹⁾	Chemical analysis of silicon carbide refractories - Part 2: Products containing less than 25 % silicon carbide;
prENV 12698-3 ¹⁾	Chemical analysis of silicon carbide refractories - Part 3: Products containing more than 25 % silicon carbide;
prENV 12698-4 ¹⁾	Chemical analysis of silicon carbide refractories - Part 4: Nitride bonded material.
EN ISO 10058	Magnesites and dolomites - Chemical analysis (ISO 10058:1992);
ISO/DIS 12676	Refractory products - Determination of resistance to carbon monoxide

3 Principle

The principles behind the tests in this Prestandard are given in the relevant standards listed in clause 2.

The methods complement those described in ENV 1402-6. It is not necessary to use all the methods to characterize a material.

4 Determination of permeability to gases

4.1 General

This determination shall be carried out on test-pieces after drying or after firing at a temperature and time to be agreed between the parties. This shall be noted in the test report.

¹⁾ in preparation

¹⁾ in preparation

4.2 Test-pieces

Use cylindrical test-pieces with dimensions defined in EN 993-4 and obtained from shapes A, B or C by sawing or coring, and prepared, stored, dried and/or fired according to the relevant sections of prENV 1402-5¹⁾. The direction from which the test-pieces are cut with regard to the direction of shaping shall be stated in the test report; the plane faces of the cylinder shall be at least at 4 mm away from the initial faces of shape.

If the test-pieces cannot be obtained by sawing or coring, due to the nature of the material, they may be prepared directly and this shall be noted in the test report.

In all cases, the test-pieces shall be dried at $110^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for a minimum of 24 h and fired at a temperature and time to be defined between the parties and to be noted in the test report.

4.3 Procedure

Determine the permeability to gases in accordance with EN 993-4.

5 Determination of the resistance to thermal shock

5.1 General

This determination shall be carried out on test-pieces fired at a temperature equal to or higher than the temperature of the test. The temperature and time shall be agreed between the parties and shall be noted in the test report. [SIST ENV 1402-8:2000](https://standards.iteh.ai/catalog/standards/sist/b51d7c7b-a521-44ea-9ff1-95c6917860b2/sist-env-1402-8-2000)

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5.2 Test-pieces

Use test-pieces with dimensions as defined in ENV 993-11. The test pieces shall be sawn or ground from shapes A or C as defined in prENV 1402-5¹⁾, and previously fired at the agreed temperature and time (see 5.1). The location from which the test-pieces are to be taken from the shape shall be agreed upon and shall be noted in the test report.

If the test-pieces cannot be prepared by sawing or grinding of prefired shapes, they may be prepared directly, dried and fired to the agreed temperature afterwards and this shall be noted in the test report.

5.3 Procedure

Determine the resistance to thermal shock of the prefired test-pieces in accordance with ENV 993-11.

¹⁾ in preparation

6 Determination of thermal conductivity

6.1 General

This determination may be carried out on fired or unfired, dried test-pieces in accordance with EN 993-14 (hot wire, cross array) or with EN 993-15 (hot wire, parallel).

For both fired and unfired, dried test-pieces, variation in thermal conductivity can occur due to time dependent mineralogical and microstructural changes if the test-piece has not been prefired to a temperature equal to or higher than the measurement temperature.

It is therefore necessary to take special care to ensure that equilibrium is attained when testing such test pieces. This can entail holding the test furnace at the measurement temperature for prolonged periods.

6.2. Test pieces

Test-pieces shall be used corresponding to shape A as defined in prENV 1402-5¹⁾.

For fired test-pieces, the firing shall be carried out in accordance with prENV 1402-5¹⁾ or as agreed between the parties or for a sufficient length of time.

6.3. Procedure

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Determine the thermal conductivity at each defined measurement temperature in accordance with EN 993-14 or EN 993-15.

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For unfired test pieces, the rate of rise of the test furnace shall be in accordance with that specified in prENV 1402-5¹⁾ for the type of material under test.

NOTE : In all cases where the test piece has been prefired, (either before or during the test) to a lower temperature than the measurement temperature, it can be necessary to maintain the furnace at this temperature for extended periods to attain equilibrium (see 6.8 of EN 993-14, or 6.6 of EN 993-15). In some cases, it can be advisable to maintain the temperature overnight.

7 Determination of sulfuric acid resistance

7.1 General

Determination of resistance consists of the chemical attack by sulfuric acid on test-pieces crushed to a specific grain size.

7.2. Test pieces

Use shape A test-pieces prepared in accordance with prENV 1402-5¹⁾, stored and dried at

¹⁾ in preparation