



**SLOVENSKI STANDARD**  
**SIST ENV 1402-3:2000**  
**01-september-2000**

---

**Neoblikovani ognjevzdržni izdelki - 3. del: Pripravljeni neoblikovani izdelki**

Unshaped refractory products - Part 3: Characterization as received

Ungeformte feuerfeste Erzeugnisse - Teil 3: Prüfung im Anlieferungszustand

Produits réfractaires non façonnés - Partie 3: Caractérisation à l'état de réception

**Ta slovenski standard je istoveten z: ENV 1402-3:1998**

[SIST ENV 1402-3:2000](https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4f6c-8d21-d4ae16492fac/sist-env-1402-3-2000)

<https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4f6c-8d21-d4ae16492fac/sist-env-1402-3-2000>

**ICS:**

81.080            Ognjevzdržni materiali            Refractories

**SIST ENV 1402-3:2000**            **en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST ENV 1402-3:2000

<https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4f6c-8d21-d4ae16492fac/sist-env-1402-3-2000>

EUROPEAN PRESTANDARD  
PRÉNORME EUROPÉENNE  
EUROPÄISCHE VORNORM

**ENV 1402-3**

October 1998

ICS 81.080

Descriptors: refractory materials, unshaped refractories, acceptance, specifications, characteristics, delivery, inspection, homogeneity

English version

**Unshaped refractory products - Part 3: Characterization as received**

Produits réfractaires non façonnés - Partie 3:  
Caractérisation à l'état de réception

Ungeformte feuerfeste Erzeugnisse - Teil 3: Prüfung im  
Anlieferungszustand

This European Prestandard (ENV) was approved by CEN on 28 September 1998 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.

[SIST ENV 1402-3:2000](https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4f6c-8d21-d4ae16492fac/sist-env-1402-3-2000)

<https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4f6c-8d21-d4ae16492fac/sist-env-1402-3-2000>



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

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

**Contents**

<b>Foreword</b>	3
<b>1 Scope</b>	4
<b>2 Normative references</b>	4
<b>3 Principle</b>	5
<b>4 Sampling</b>	5
<b>5 Determination of chemical composition</b>	5
<b>6 Determination of grain size distribution</b>	6
<b>7 Determination of moisture content</b>	9
<b>8 Determination of workability index</b>	10
<b>9 Test report</b>	12
<b>Annex A (informative) Summary of tests</b>	15

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST ENV 1402-3:2000

<https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4ffc-8d21-d4ae16492fac/sist-env-1402-3-2000>



## 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 seven 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 : Pre-formed shapes

CEN/TC187 approved this European Prestandard by resolution No 4 during its sixth meeting held in Paris, 93-10-06.

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.

(standards.iteh.ai)

SIST ENV 1402-3:2000

<https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4ffc-8d21-d4ae16492fac/sist-env-1402-3-2000>

## 1 Scope

This Part of ENV 1402 specifies the methods for the characterization of unshaped refractory materials as received and for checking the homogeneity of a delivery of a product. It is applicable to castables (dense and insulating), gunning materials and mouldables, as defined in ENV 1402-1.

NOTE : A check list of appropriate tests is given in annex A.

## 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
ENV 1402-1	Unshaped refractory products - Part 1: Introduction and definitions
ENV 1402-2	Unshaped refractory products - Part 2 : Sampling for testing
EN ISO 10058	Magnesites and dolomites - Chemical analysis (ISO 10058:1992)
ISO 565	Test sieves - Metal wire cloth, perforated metal plate and electroformed sheet - Nominal sizes of openings

### 3 Principle

The following four determinations can be made:

- a) chemical composition;
- b) grain size distribution by means of sieve analysis;
- c) moisture content of mouldables;
- d) workability index of plastics.

It is not necessary to carry out all of these determinations to characterize a material.

### 4 Sampling

Take samples in accordance with the guidance given in ENV 1402-2 and prepare the quantities required by each individual determination.

### 5 Determination of chemical composition

#### 5.1 Preparation of test sample

For mouldables supplied wet, dry the samples (see clause 4) in accordance with 6.5.1. For all samples, reduce the amount by coning and quartering and grind to the particle size required for chemical analysis.

NOTE : The methods of chemical analysis used include the determination of loss on ignition. <https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4f6c-8d21-d4ae16492fac/sist-env-1402-3-2000>

#### 5.2 Alumino-silica products

Determine the chemical composition either in accordance with EN 955-2 (wet methods), prEN 955-5 (X-ray fluorescence (XRF) analysis) or ENV 955-4 (Analysis by Flame Atomic Absorption Spectrometry (FAAS) and Inductively Coupled Plasma Emission Spectrometry (ICP)).

NOTE : For products containing chrome, prEN 955-3 can be used in place of EN 955-2.

Report the method used.

#### 5.3 Basic products

Determine the chemical composition in accordance with EN ISO 10058 (wet methods), prEN 955-3 for products containing chrome or prEN 955-5 (XRF analysis).

Report the method used.

Page 6

ENV 1402-3:1998

## 5.4 Special products

As no standard is presently available for the determination of materials other than the aluminosilica or basic series, the chemical composition shall be determined according to methods agreed between the parties.

The methods used shall be indicated in the test report.

NOTE : Methods for the analysis of silicon carbide refractories are in course of preparation.

## 5.5 Carbon-containing products

Carry out the elemental analysis of the oxide constituents on the calcined product, in accordance with either 5.2 or 5.3. Determine the total carbon and the residual carbon in accordance with EN 993-3.

NOTE : Any other non-oxide constituents should be analyzed in accordance with the guidance in 5.4.

## 6 Determination of grain size distribution

### 6.1 Principle

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

The grain size distribution is measured by determining the amount of material retained on the range of sieves used and is expressed as a percentage of the total initial dry mass of material.

### 6.2 Apparatus

<https://standards.iteh.ai/catalog/standards/sist/c3261f40-d48a-4f6c-8d21-d4ae16492fac/sist-env-1402-3-2000>

6.2.1 *Balance*, accurate to  $\pm 0,1$  g.

6.2.2 *Sieves*, in accordance with ISO 565, and of diameter 250 mm or greater.

6.2.3 *Sieving apparatus*. The working characteristics of the apparatus shall be indicated (e.g. vibration characteristics, amplitude and frequency).

6.2.4 *Drying oven*, preferably with exhaust.

6.2.5 *Soxhlet apparatus*

6.2.6 *Electric hot plate or heating mantle*

6.2.7 *Muffle furnace*



### 6.3 Quantity of sample

Take the following quantities of sample, from that obtained in clause 4, for a single test, selecting in accordance with the maximum size of grains:

- a) maximum size up to 2 mm : 100 g
- b) maximum size up to 6 mm : 250 g
- c) maximum size up to 10 mm : 500 g
- d) maximum size above 10 mm : 1 000 g

expressed in terms of dry material

These quantities are related to dense materials. When testing insulating materials the sample quantity may be reduced according to the bulk density without any reduction of the test accuracy. The reduced quantity shall be given in the test report.

### 6.4 Preparation of test samples

Reduce the sample in accordance with ENV 1402-2, taking care to avoid any fragmentation, to produce the required number of test portions, each of which complies with the minimum mass given in 6.3.

iTeh STANDARD PREVIEW

In the case of mouldables containing oil or tar submit the sample to the following preliminary treatment, taking sufficient sample to enable reduction to be carried out after the pre-treatment.

SIST ENV 1402-3:2000

Warm the sample in an evaporating dish and break it down with a spatula, taking care not to crush any of the grains. Place the sample in filter thimbles in one or more Soxhlets. Carry out the extraction with boiling toluene, an electric hotplate or a heating mantle being used as a means of heating. The extraction is complete when the toluene siphoned over is colourless.

### 6.5 Procedure

#### 6.5.1 Drying and measurement of dry sample mass

Samples of castables, gunning materials, dry ramming mixes and mouldables, following the removal of oil or tar shall be dried at  $(110 \pm 5) ^\circ\text{C}$  to constant mass and cooled to ambient temperature.

Weigh the test sample to  $\pm 0,1 \text{ g}$  ( $m_1$ ).

Mouldables containing fine particles and non-organic liquid are not dried before sieving in order to avoid hardening and difficult dispersion (see 6.5.2.2). A separate sample is used to determine the moisture content of the material using the method given in clause 7. The mass of dry material contained in the test sample for sieving ( $m_1$ ) is calculated as follows;