



SLOVENSKI STANDARD
SIST EN 13892-3:2004

01-julij-2004

A YrcXY'dfYg_i ýUb^Ua YýUb]W'nUYghf]l `È' "XY. 8c`c Yj Ub^cXdcfbcgh]dfchj
cVfUV]!`dc`6“\ a Y

Methods of test for screed materials - Part 3: Determination of wear resistance-Böhme

Prüfverfahren für Estrichmörtel und Estrichmassen - Teil 3: Bestimmung des
Verschleißwiderstandes nach Böhme

ITeH STANDARD PREVIEW

Méthodes d'essai des matériaux pour chapes - Partie 3: Détermination de la résistance a
l'usure Böhme

[SIST EN 13892-3:2004](https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-8b4c5a62a128/sist-en-13892-3-2004)

Ta slovenski standard je istoveten z: **EN 13892-3:2004**

ICS:

91.100.10 Cement. Mavec. Apno. Malta Cement. Gypsum. Lime.
Mortar

SIST EN 13892-3:2004

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 13892-3:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-8b4c5a62a128/sist-en-13892-3-2004>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13892-3

May 2004

ICS 91.100.10

English version

Methods of test for screed materials - Part 3: Determination of wear resistance-Böhme

Méthodes d'essai des matériaux pour chapes - Partie 3:
Détermination de la résistance à l'usure Böhme

Prüfverfahren für Estrichmörtel und Estrichmassen - Teil 3:
Bestimmung des Verschleißwiderstandes nach Böhme

This European Standard was approved by CEN on 2 February 2004.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 13892-3:2004](https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-8b4c5a62a128/sist-en-13892-3-2004)

<https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-8b4c5a62a128/sist-en-13892-3-2004>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Principle	4
4 Symbols and abbreviations	4
5 Apparatus	5
6 Abrasive material	5
7 Preparation of specimens	6
8 Testing	6
8.1 General.....	6
8.2 Determination of density.....	7
8.3 Procedure	7
9 Expression of results	7
10 Test report	7
Bibliography	11

[SIST EN 13892-3:2004](https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-8b4c5a62a128/sist-en-13892-3-2004)
<https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-8b4c5a62a128/sist-en-13892-3-2004>

Foreword

This document (EN 13892-3:2004) has been prepared by Technical Committee CEN/TC 303 "Floor screeds and in-situ floorings in buildings", the secretariat of which is held by DIN.

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 November 2004, and conflicting national standards shall be withdrawn at the latest by November 2004.

It was prepared by Working Group 2 "Screed materials and floor screeds - Test-methods" taking into account the proposals submitted by Working Group 1 "Screed materials and floor screeds - Definitions, properties and requirements".

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

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 13892-3:2004

<https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-8b4c5a62a128/sist-en-13892-3-2004>

EN 13892-3:2004 (E)**1 Scope**

This European Standard specifies a method for determining the wear resistance of moulded specimens made from cementitious screed material, primarily for hard aggregate wearing screed materials or optionally for other screed materials. The method is also suitable for specimens cut from floor screed. This method is unsuitable for synthetic resin screed materials.

2 Normative references

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 (including amendments).

EN 459-2, *Building lime – Part 2: Test methods.*

EN 13813, *Screed material and floor screeds - Screed material - Properties and requirements.*

EN 13892-1, *Methods of test for screed materials – Part 1: Sampling, making and curing specimens for test.*

ISO 565, *Test sieves - Metal wire cloth, perforated metal plate and electroformed sheet - Nominal sizes of openings.*

IT-EN STANDARD PREVIEW
(standards.iteh.ai)

3 Principle

SIST EN 13892-3:2004

<https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-694c3a02a126/sist-en-13892-3-2004>

Cast specimens are placed on the Böhme abrader, on the test track of which standard abrasive is strewn, the disk then being rotated and the specimens subjected to an abrasive load of 294 N for a given number of cycles.

4 Symbols and abbreviations

$A = \Delta V$ is the wear resistance-Böhme in cm^3 per 50 cm^2 and the loss in volume after 16 cycles.

$\Delta l = l_0 - l_{16}$ is the mean reduction in mm after 16 cycles.

l_0 is the mean thickness of the specimen in mm from the measurements made at all nine measuring points prior to testing.

l_{16m} is the mean thickness of the specimen in mm from the measurements made at all nine measuring points after completion of the test.

Δm is the reduction in mass in g after 16 cycles.

ρ_R is the density of the specimen in g/cm^3 or, in the case of multi-layer specimens, the density of the wearing layer.

5 Apparatus

The Böhme abrader as shown in Figure 1 consists of a rotating table with a defined test track to receive the abrasive, a specimen holder and a loading device.

The rotating table shall have a diameter of approximately 750 mm and be flat and positioned horizontally. When loaded, its speed shall be (30 ± 1) rpm.

The table shall be provided with a revolution counter and a device that switches off the rotating table automatically after 22 revolutions.

The test track shall be annular, with an inside radius of approximately 120 mm and an outside radius of approximately 320 mm to give a width of (200 ± 5) mm, and be replaceable.

The track shall be made of cast iron with a perlitic structure, a phosphorus content not exceeding 0,35 % and a carbon content of more than 3 %. The track shall have a Brinell hardness of 190 HB to 220 HB 2,5/187,5 determined as the mean from measurements taken at not less than ten points along the edge of the track.

The face of the track in contact with the specimen shall be fine finished (surface roughness of $6 \mu\text{m}$ to $16 \mu\text{m}$). The track should be designed so as to permit both sides to be used.

The track surface is subject to wear in service; the resulting reduction in thickness shall not exceed 0,3 mm and any grooves not be deeper than 0,2 mm. If these values are exceeded, the track shall be replaced or refinished. When the track has been refinished three times, its hardness shall be determined anew.

The specimen holder shall consist of a U frame approximately 40 mm thick, with a clear distance of (5 ± 1) mm from the test track. The frame shall be positioned so that the centreline distance between specimen and rotating table is 220 mm and the angle bead of the specimen holder, which supports the specimen, is located at a distance of (4 ± 1) mm above the rotating table. The mounting of the specimen holder shall ensure that, during testing, no vibration occurs.

The loading device shall consist of a lever of two arms of different length, a loading weight and a counterweight, the lever being pivoted with as little friction as possible and positioned almost horizontally during the test. The system shall be designed to ensure that the load is transferred vertically via the plunger to the centre of the specimen. The self-weight of the lever is balanced by the counter-weight and the scale arm to receive the loading weight. The force acting on the specimen results from the loading weight multiplied by the leverage ratio, the mass of the weight being selected to produce a test force of (294 ± 3) N (corresponding to about $0,06 \text{ N/mm}^2$ compressive stress), which shall be verified by calculation.

To establish the reduction in thickness of the specimen it shall be placed on a measuring table. A template (see Figure 2) shall be placed over the specimen in a marked orientation, to identify the nine measuring points. A dial gauge rigidly attached to the measuring table is used to measure, to an accuracy of 0,01 mm, the vertical position at any measuring point. The dial gauge is fitted with a plunger with a spherical end-bearing of 3 mm diameter.

6 Abrasive material

The standard abrasive material used shall be an artificial corundum¹⁾ designed to produce an abrasive wear of 1,10 mm to 1,30 mm when testing standard granite²⁾ specimens and of 4,20 mm to 5,10 mm when testing standard limestone²⁾ specimens. The tolerances of the chemical composition of the abrasive material is given in Table 1. Conformance to these requirements, the homogeneity of the material and the uniformity of bulk density and grading of the abrasive shall be checked before use.

1) Information on sources of supply of standard abrasives and on impartial testing laboratories is obtainable from the Normenausschuß Materialprüfung (Materials Testing Standards Committee) of DIN, Burggrafenstr. 6, 10787 Berlin.

2) The standard material is stocked by the laboratory responsible for the inspection of standard abrasives.

EN 13892-3:2004 (E)

Table 1 —Standard requirements of the chemical composition

Constituent	Content mass percentage
corundum (crystallized aluminium oxide Al ₂ O ₃)	≥ 99,3

The loose density of the standard abrasive grit shall be between 1,60 kg/dm³ and 1,70 kg/dm³. The loose density is determined according to the test method described in EN 459-2 whereby the filling container of the apparatus is to be filled with 2 kg of the grit.

The mass percentage of material on each sieve shall correspond to the particle size distribution of Table 2.

Table 2 —Sieve analysis

test sieve according to ISO 565	residue mass in %
20	99,82 ≥ R ≥ 99,00
40	99,02 ≥ R ≥ 96,50
63	88,27 ≥ R ≥ 79,49
90	27,21 ≥ R ≥ 17,16

7 Preparation of specimens

The wear resistance Böhme is measured on the top surface as cast of 3 specimens made in accordance with EN 13892-1 or cut from floor screed.

Cubes with edge length of (71 ± 1,5) mm shall be used as specimens. Alternatively square blocks, of the same edge length, but a minimum thickness of 30 mm including any support slab may be used.

The contact face, that is the face to be tested and the bottom face of the specimen shall be parallel and flat. For determining the reduction in thickness the bottom face shall, if appropriate, be ground parallel or otherwise machined so as to be parallel.

8 Testing

8.1 General

The wear resistance Böhme shall be determined as loss in volume, calculated from changes in mass. In the case of multi-layer specimen the wear resistance is determined as a reduction in thickness. In case of the chosen determination, one of the following procedures shall be undertaken.

8.2 Determination of density

To determine the loss in volume, prior to testing, the density of the specimen, ρ_R , shall be determined by measurements, to the nearest 0,1 mm, and by weighing, to the nearest 0,1 g.

8.3 Procedure

Prior to testing each specimen shall be measured by mass or by thickness, as appropriate. For mass each specimen shall be weighed to an accuracy of 0,1 g. For reduction in thickness each specimen shall be placed contact face up on a measuring table, and readings taken from the dial gauge at a total of nine measuring points arranged as shown in Figure 2, the results being given to the nearest 0,01 mm.

Each specimen shall undergo testing for 16 cycles, each consisting of 22 revolutions.

20 g of standard abrasive shall be strewn evenly on the test track and the specimen, clamped into the holder and with the test contact face facing the track, loaded centrally with (294 ± 3) N.

The rotating table shall then be rotated, taking care that the abrasive on the track remains evenly distributed over an area traversed by the specimen.

After each cycle, both rotating table and contact face shall be cleaned, and the specimen turned progressively through 90° and new abrasive strewn on the track.

After each cycle the contact area shall be inspected visually and any significant changes noted.

After completion of the test and careful cleaning, each specimen shall be remeasured, as appropriate.

NOTE Measurements after every 4 cycles may provide useful information on the rate of wear.

SIST EN 13892-3:2004

9 Expression of results

<https://standards.iteh.ai/catalog/standards/sist/1c4fb7bd-0540-41bb-bf75-8b4c5a62a128/sist-en-13892-3-2004>

The wear resistance Böhme A after 16 cycles shall be determined as the loss in specimen volume ΔV , using equation (1).

$$A = \Delta V = \frac{\Delta m}{\rho_R} = \Delta l \times 5 \quad \text{in cm}^3 \text{ per } 50 \text{ cm}^2 \quad (1)$$

10 Test report

The test report shall include the following information:

- a) number, title and date of issue of this European Standard;
- b) name and address of the laboratory carrying out the tests and name and address of the laboratory preparing the samples (if different);
- c) identification number of the test report;
- d) name and address of the manufacturer or supplier of the product;
- e) name and identification marks or batch number of the product;
- f) date of supply of the product;
- g) method of sampling (by reference to EN 13892-1 and by which organisation);