

# Grouts for tiles

## Part 2: Determination of resistance to abrasion

ICS 91.100.10

## National foreword

This British Standard is the UK implementation of EN 12808-2:2008. It supersedes BS EN 12808-2:2002 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/539, Ceramic tiles and other rigid tiling.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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**Grouts for tiles - Part 2: Determination of resistance to abrasion**Mortiers de joints pour carrelages - Partie 2: Détermination  
de la résistance à l'abrasionMörtel und Klebstoffe für Fliesen und Platten - Teil 2:  
Bestimmung der Abriebfestigkeit

This European Standard was approved by CEN on 29 August 2008.

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## Foreword

This document (EN 12808-2:2008) has been prepared by Technical Committee CEN/TC 67 “Ceramic tiles”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by April 2009, and conflicting national standards shall be withdrawn at the latest by April 2009.

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

This document supersedes EN 12808-2:2001.

This document is one of a series of European Standards for ceramic tile adhesives including:

EN 1308, *Adhesives for tiles - Determination of slip*

EN 1323, *Adhesives for tiles - Concrete slabs for tests*

EN 1324, *Adhesives for tiles - Determination of shear adhesion strength of dispersion adhesives*

EN 1346, *Adhesives for tiles - Determination of open time*

EN 1347, *Adhesives for tiles - Determination of wetting capability*

EN 1348, *Adhesives for tiles - Determination of tensile adhesion strength for cementitious adhesives*

EN 12002, *Adhesives for tiles - Determination of transverse deformation for cementitious adhesives and grouts*

EN 12003, *Adhesive for tiles - Determination of shear adhesion strength of reaction resin adhesives*

EN 12004, *Adhesives for tiles – Requirements, evaluation of conformity, classification and designation*

EN 12808-1, *Grouts for tiles – Part 1: Determination of chemical resistance of reaction resin mortars*

EN 12808-2, *Grouts for tiles – Part 2: Determination of resistance to abrasion*

EN 12808-3, *Grouts for tiles – Part 3: Determination of flexural and compressive strength*

EN 12808-4, *Grouts for tiles – Part 4: Determination of shrinkage*

EN 12808-5, *Grouts for tiles – Part 5: Determination of water absorption*

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

## 1 Scope

This European Standard applies to all ceramic tile grouts used for internal and external tile installations on walls and floors.

This European Standard specifies the test method to be used to determine the abrasion resistance of ceramic tile grouts.

This European Standard does not contain performance requirements or recommendations for the design and installation of ceramic tiles.

NOTE Ceramic tile grouts may also be used for other types of tiles (natural and agglomerated stones, etc.), where these do not adversely affect the stones.

## 2 Normative references

The following referenced documents are indispensable for the application 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.

EN 196-1:2005, *Methods of testing cement – Part 1: Determination of strength*

EN 1067, *Adhesives - Examination and preparation of samples for testing*

EN ISO 10545-6, *Ceramic tiles – Part 6: Determination of resistance to deep abrasion for unglazed tiles (ISO 10545-6:1995)*

EN ISO 15605, *Adhesives – Sampling (ISO 15605:2000)*

## 3 Sampling

Take a sample of at least 2 kg of the product to be tested in accordance with EN ISO 15605 and EN 1067.

## 4 Test conditions

Standard conditions shall be  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % R.H. and a speed of air in the working area less than 0,2 m/s.

## 5 Test materials

Condition all test materials for at least 24 h under standard conditions.

## 6 Apparatus

**6.1** Abrasion apparatus consisting essentially of a rotating disk, a storage hopper, a test specimen support and a counterweight in accordance with EN ISO 10545-6 (see Figure 1).

**6.2** Abrasive material white fused aluminium oxide of grain size 80 (see EN ISO 10545-6).

**6.3** Measuring gauge capable of measuring to 0,1 mm (see EN ISO 10545-6).

**6.4** Template: a smooth, square, rigid, non absorbent frame (e.g. in polyethylene or PTFE), with internal dimensions of  $(100 \pm 1)$  mm x  $(100 \pm 1)$  mm and thickness of  $(10 \pm 1)$  mm.

## 7 Procedure

### 7.1 Mixing of grouts

The amount of water and/or liquid admix required for preparing the cementitious grout shall be as stated by the manufacturer in parts by weight, i.e. liquid to dry powder.

Prepare at least 2 kg of the grout in a mixer of the type described in Clause 4.4 of EN 196-1:2005, using the slow speed settings,  $(140 \pm 5)$  r/min rotation and  $(62 \pm 5)$  r/min planetary movement.

Carry out the following procedure:

- pour the liquid into the pan;
- scatter the dry powder over the liquid;
- mix for 30 s;
- take out the mixing paddle;
- scrape down the paddle and pan within 1 min;
- replace the paddle and mix for 1 min.

Let the grout mature as specified in the manufacturer's instructions, and then mix for a further 15 s.

In the case of reaction resin grouts follow the manufacturer's instructions.

### 7.2 Preparation of test specimens

Place the template over a polyethylene film.

Trowel a sufficient quantity of grout across the template and then screed clean so as to fill neatly and completely the hole in the template. Cover with a glass plate according to EN 196-1. After 24 h remove the template carefully.

Condition the units according to the test requirements.

Prepare two specimens for each grout sample.

### 7.3 Conditioning

The test units are conditioned for 27 days in standard conditions:  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % R.H.

### 7.4 Test procedure

Place a test specimen in the apparatus, with the trowelled face against the wheel, so that it is tangential against the rotating disc. Ensure that the feed of abrasive material into the grinding zone is uniform at a rate of  $(200 \pm 10)$  g per 100 revolutions.

Rotate the steel disc for 50 revolutions.

Remove the test sample from the apparatus and measure the chord length of the groove by means of the measuring gauge to the nearest 0,5 mm.

Test each sample in at least two places on its trowelled surface.

## 8 Expression of results

The resistance to abrasion is expressed as the volume  $V$  of material removed, in cubic millimetres.

This is calculated from the chord length of the groove by means of the expression:

$$V = \left( \frac{\pi\alpha}{180} - \sin \alpha \right) \cdot \frac{h \cdot d^2}{8}$$

where

$\sin (\alpha / 2) = L / d$ ;

$d$  is the diameter of the rotating disc (in mm);

$h$  is the thickness of the rotating disc (in mm);

$\alpha$  is the angle (in degrees) subtended at the centre of the rotating disc by the chord (see Figure 2);

$L$  is the length of the chord (in mm).

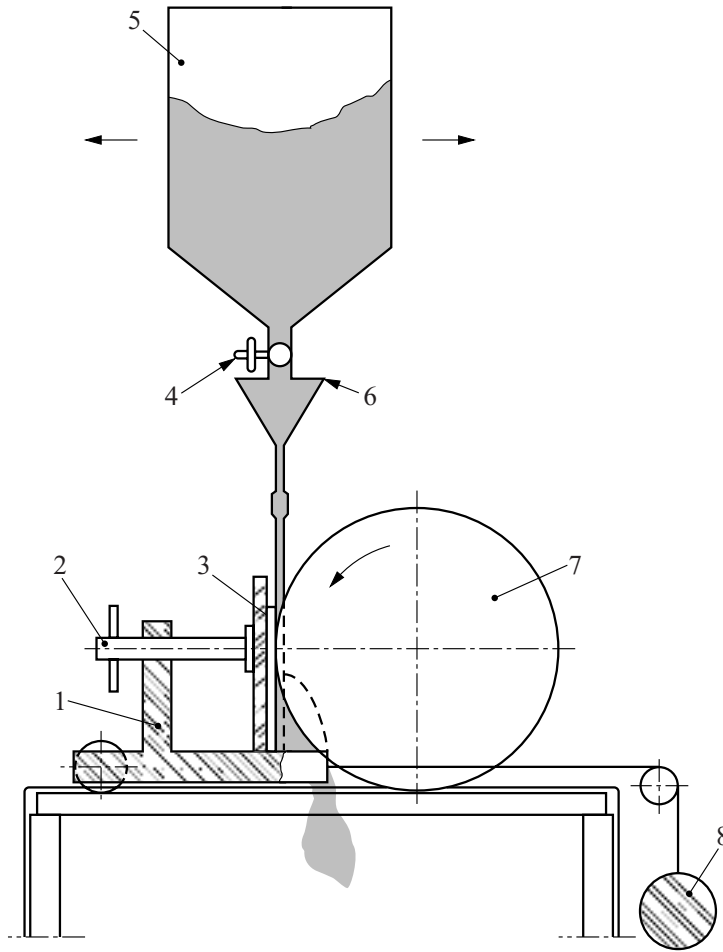
Some equivalent values are given in Table 1.

## 9 Test report

The test report shall provide the following information:

- a) number, title and issue of this European Standard;
- b) place and date of sampling;
- c) type of grout, commercial designation and manufacturer name;
- d) identification of the test sample;
- e) handling and storage of samples before testing;
- f) test conditions;
- g) date of testing;
- h) amount of water or liquid used for preparing the grout;
- i) test results (volume  $V$  for each individual groove and the mean value, in cubic millimetres);
- j) any other factor that could have influenced the result.

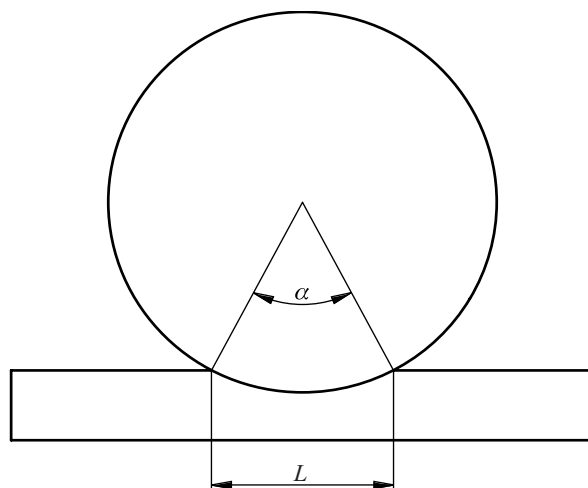




**Key**

- 1 Test specimen clamp
- 2 Fixing screw
- 3 Test specimen
- 4 Valve
- 5 Storage hopper for abrasive material
- 6 Even-flow tunnel
- 7 Steel disc
- 8 Counterweight

**Figure 1 — Abrasion apparatus**



**Figure 2 — Definition of chord**

**Table 1 — Equivalent values**

L mm	V mm <sup>3</sup>	L mm	V mm <sup>3</sup>	L mm	V mm <sup>3</sup>	L mm	V mm <sup>3</sup>	L mm	V mm <sup>3</sup>
20,0	67	30,0	227	40,0	540	50,0	1 062	60,0	1 851
20,5	72	30,5	238	40,5	561	50,5	1 094	60,5	1 899
21,0	77	31,0	250	41,0	582	51,0	1 128	61,0	1 947
21,5	83	31,5	262	41,5	603	51,5	1 162	61,5	1 996
22,0	89	32,0	275	42,0	626	52,0	1 196	62,0	2 046
22,5	95	32,5	288	42,5	649	52,5	1 232	62,5	2 097
23,0	102	33,0	302	43,0	672	53,0	1 268	63,0	2 149
23,5	109	33,5	316	43,5	696	53,5	1 305	63,5	2 202
24,0	116	34,0	330	44,0	720	54,0	1 342	64,0	2 256
24,5	123	34,5	345	44,5	746	54,5	1 380	64,5	2 310
25,0	131	35,0	361	45,0	771	55,0	1 419	65,0	2 365
25,5	139	35,5	376	45,5	798	55,5	1 459	65,5	2 422
26,0	147	36,0	393	46,0	824	56,0	1 499	66,0	2 479
26,5	156	36,5	409	46,5	852	56,5	1 541	66,5	2 537
27,0	165	37,0	427	47,0	880	57,0	1 583	67,0	2 596
27,5	174	37,5	444	47,5	909	57,5	1 625	67,5	2 656
28,0	184	38,0	462	48,0	938	58,0	1 669	68,0	2 717
28,5	194	38,5	481	48,5	968	58,5	1 713	68,5	2 779
29,0	205	39,0	500	49,0	999	59,0	1 758	69,0	2 842
29,5	215	39,5	520	49,5	1 030	59,5	1 804	69,5	2 906

## **Bibliography**

- [1] EN 13888, Grouts for tiles - Definitions and specifications

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