BRITISH STANDARD

BS EN
1324:2007

Adhesives for tiles — Determination of shear adhesion strength of dispersion adhesives

The European Standard EN 1324:2007 has the status of a British Standard

ICS 83.180; 91.100.10

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 1324:2007. It supersedes BS EN 1324:1999 which is withdrawn.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.

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Adhesives for tiles - Determination of shear adhesion strength of dispersion adhesives

Adhésifs pour carrelage - Détermination de l'adhérence par cisaillement d'un adhésif en dispersion

Mörtel und Klebstoffe für Fliesen und Platten - Bestimmung der Haftfestigkeit von Dispersionsklebstoffen

This European Standard was approved by CEN on 21 January 2007.

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

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Foreword

This document (EN 1324:2007) 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of an identical text or by endorsement, at the latest by February 2008, and conflicting national standards shall be withdrawn at the latest by February 2008.

This document supersedes EN 1324:1996.

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 United Kingdom.

1 Scope

This European Standard specifies the test method for the determination of the shear adhesion strength of dispersion ceramic tile adhesives.

This European Standard applies to all dispersion ceramic tile adhesives for internal tile installations on walls and floors.

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

NOTE Ceramic tile adhesives can also be used for other types of tiles (natural and agglomerated stones etc.), if they 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 1067, *Adhesives — Examination and preparation of samples for testing*

EN 14411, *Ceramic tiles — Definitions, classification, characteristics and marking*

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

3 Sampling

Take at least 2 kg sample of the adhesive in accordance with EN ISO 15605 and EN 1067.

4 Test conditions

Standard conditions shall be (23 ± 2) °C and (50 ± 5) % relative humidity and a speed of air in the working area less than 0,2 m/s.

5 Test materials

5.1 General

Condition all test materials (adhesive etc.) for at least 24 h under standard conditions.

The adhesive to be tested should be within its shelf life, where this is specified.

5.2 Ceramic tiles

The tiles shall be checked prior to conditioning to ensure that they are new, clean and dry.

The tiles used for this method shall be of:

type P2: glazed porous body tiles in accordance with EN 14411, group BIII, of water absorption (15 ± 3) % by mass, with a thickness in the range 7 mm to 10 mm and a profile back pattern less than 0,25 mm thick, with facial dimensions of (108 ± 1) mm × (108 ± 1) mm.

6 Apparatus

6.1 Template

A smooth non absorbent frame as shown in Figure 1.

Material: PTFE or similar material with non-stick properties

Hole diameter: (14,3 ± 0,1) mm

Actual coverage: (50 ± 5) %

Thickness: (1,5 ± 0,1) mm

Dimensions in millimetres

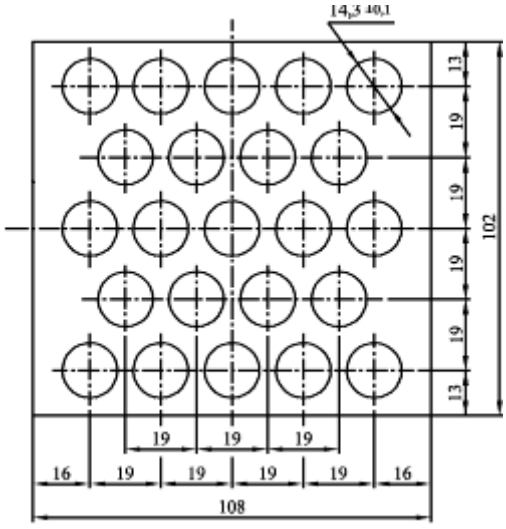


Figure 1 — Template

6.2 Spacers

Spacer rods 0,8 mm diameter, approximately 40 mm long.

6.3 Weight

A weight of less than 100 mm × 100 mm cross sectional area capable of exerting a force of (70 ± 0,15) N.

6.4 Loading machine

A test machine with suitable capacity and sensitivity for the test and with a variable testing speed. The machine shall be capable of applying the load to the tile through a suitable jig (see 6.5).

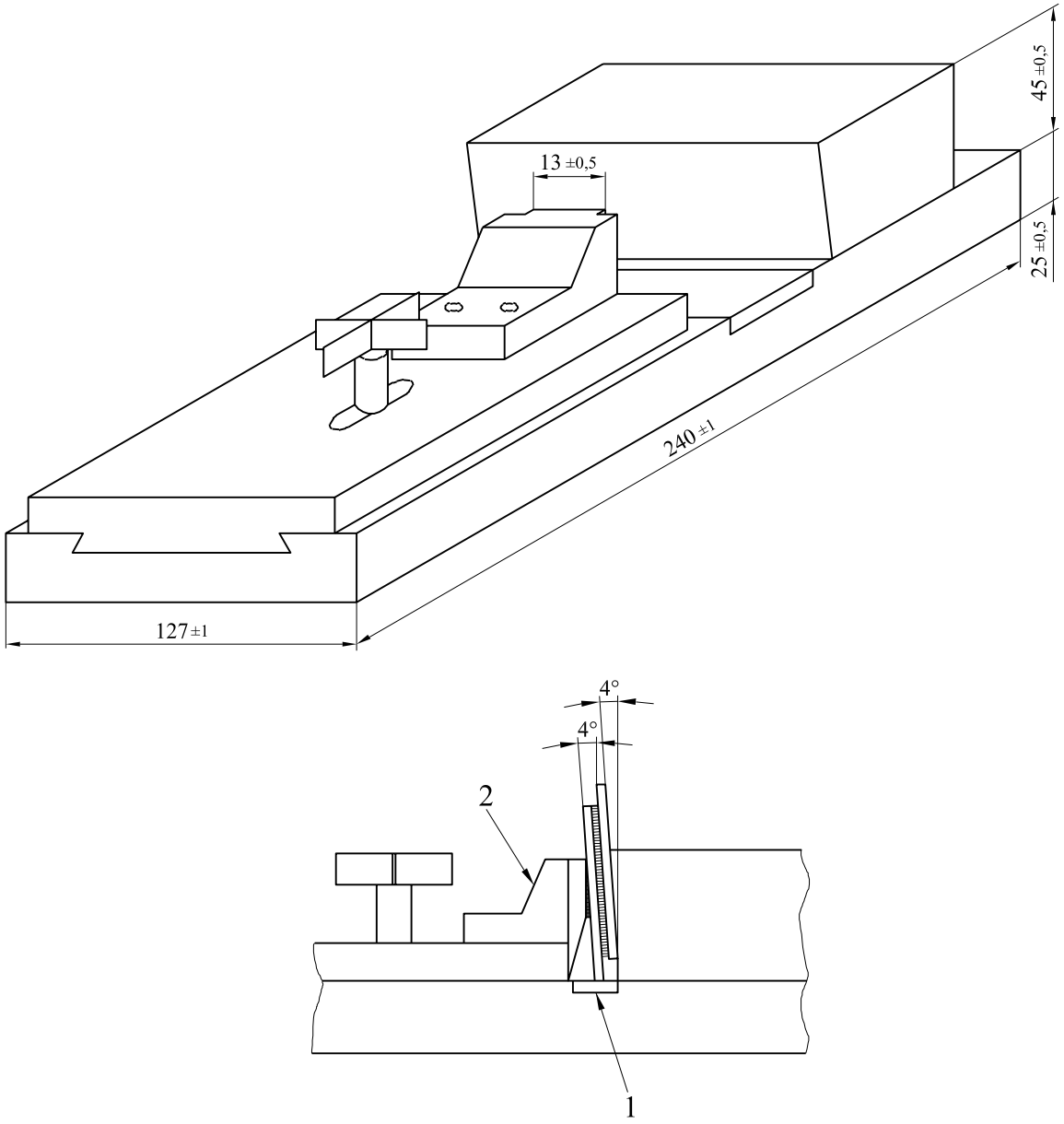
6.5 Shear test jig

A suitable jig used for converting the compressive or tensile load exerted by the testing machine into a shear force. Examples of suitable jigs are shown in Figures 2 and 3.

6.6 Air circulating oven

An air circulating oven capable of controlling the temperature to within ± 3 °C.

Dimensions in millimetres



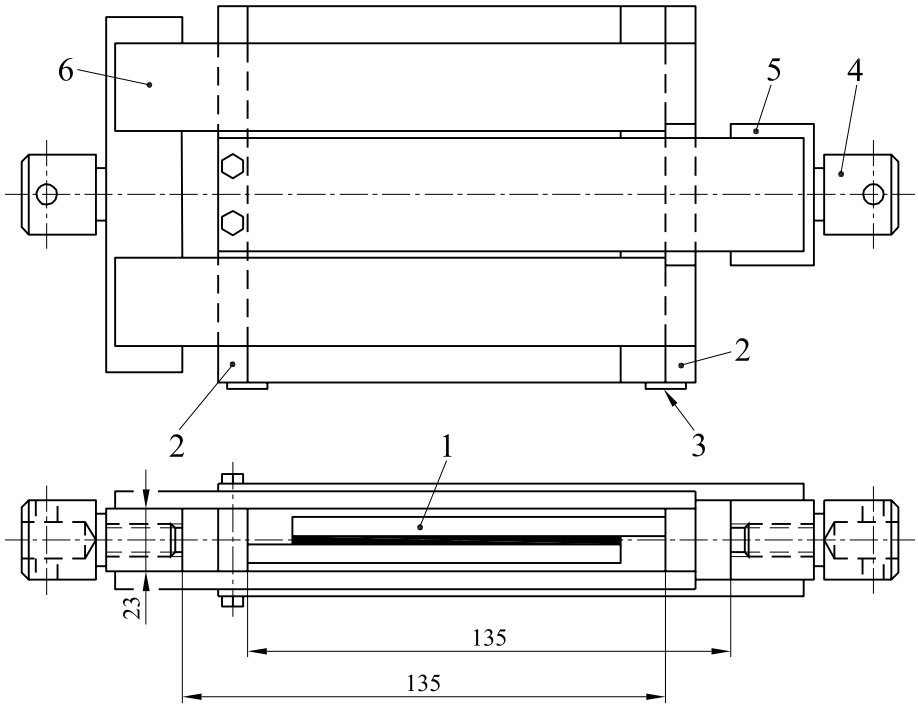
Key

1 hardened insert

2 adjustable jaws from 12 mm to 45 mm

Figure 2 — Jig for shear adhesion test using a vertical compression machine

Dimensions in millimetres



Key

1 test unit

2 pressure plate

3 stops

4 adapter

5 "U" section frame

6 box section frame

Figure 3 — Jig for shear adhesion test using a tensile machine

7 Procedure

7.1 Preparation of test units

Each test unit shall be prepared with two type P2 tiles.

Draw a straight line on the porous side of one tile 6 mm from the tile edge. (To serve as a guide in overlapping of tile as explained below.)

Place the template (see Figure 1) over the unglazed back of the first test tile. Trowel sufficient adhesive across the template and then screed clean so as to neatly and completely fill the holes in the template. Carefully remove the template vertically (see Figure 4).

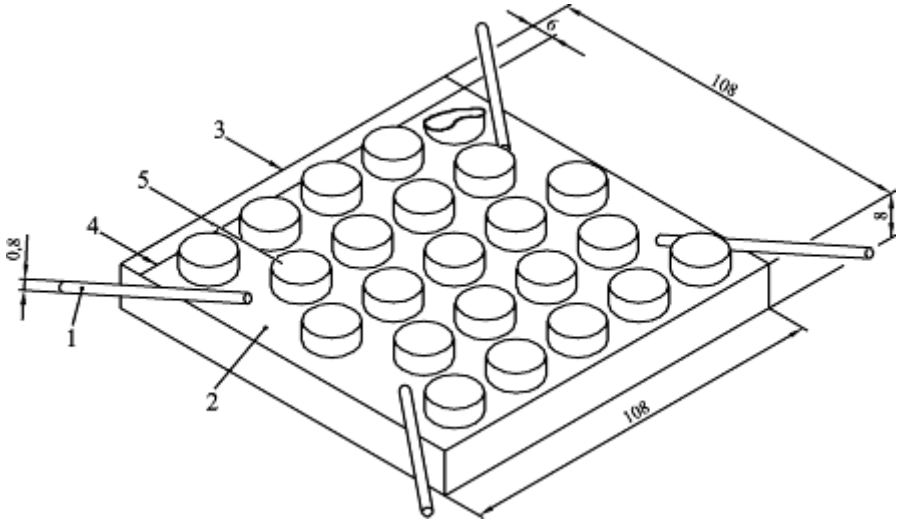
Place spacers rods 0,8 mm thick at each corner of the first tile, approximately 20 mm over the tile.

After 2 min place a second standard test tile over the coated tile. Place it offset to provide an overlap between tiles with displacement of 6 mm, using the previously scribed line as a guide and ensuring that the edges of the tiles are parallel.

Place the test units on a plane surface and carefully load with (70 ± 0,15) N for 3 min. Carefully remove the spacer rods, without disturbing the relative position of the tiles in the test units. A total of ten test units are required for each test.

Condition the units according to the test requirements.

Dimensions in millimetres



Key

1 spacer rods (6.2)

2 ceramic test tile 108 mm × 108 mm

3 direction of application of load

4 guide line

5 adhesive

Figure 4 — Preparation of tile test units

7.2 Initial shear adhesion strength

Condition ten test units in standard test conditions (see Clause 4) for 14 days.

After conditioning has been completed, place the test units in a shear test jig (see 6.5) and apply a shear force by moving the crosshead at a speed of 5 mm/min until failure occurs.

Report the results in Newtons.

7.3 Adhesion strength after water immersion

Condition ten test units in standard test conditions (see Clause 4) for 7 days, then immerse in water at ambient temperature for 7 days. Remove the units and wipe with a cloth and test them as described in 7.2.

Report the results in Newtons.

NOTE This test is only for dispersion adhesives used in internal installations subject to wet conditions.

7.4 Shear adhesion strength after heat ageing

Condition ten test units in standard conditions (see Clause 4) for 14 days and then place them in an air-circulating oven at (70 ± 3) °C for a further 14 days, ensuring that air is free to circulate around each test unit.

Condition the units for a further 24 h in standard conditions and test them as described in 7.2.

Report the results in Newtons.

7.5 Adhesion at elevated temperature

Use the procedure described in 7.4 but test the tile adhesion within 1 min of removal of the test unit from the air circulating oven.

Report the results in Newtons.

8 Evaluation and expression of results

Divide the individual values in Newtons by the conventional area (5 508 mm^2) of adhesive contact. The individual values are quoted to 0,1 N/mm^2.

The shear adhesion strength is determined in the following way:

— determine the mean of ten values;

— discard the values falling outside the range of ± 20 % from the mean value;

— if five or more values remain, determine the new mean value;

— if less than five values remain, repeat the test.

9 Test report

The test report shall provide the following information:

a) number and year of issue of this European Standard, i.e. EN 1324:2007;

b) place, date and time of sampling;

c) type of adhesive, commercial designation and manufacturer;

d) identification of test sample;

e) handling and storage of samples before testing;

f) test conditions;

g) date of testing;

h) test results (individual and mean values and the mode of failure);

i) shear adhesion strength for each condition in N/mm^2;

j) any other factor that could have influenced the result.

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