BS EN 1372:2015

BSI Standards Publication

Adhesives — Test method for adhesives for floor and wall coverings — Peel test

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee PRI/52, Adhesives.

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

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Adhesives - Test method for adhesives for floor and wall coverings - Peel test

Adhésifs - Méthodes d'essais d'adhésifs pour revêtements de sol et muraux - Essai de pelage

Klebstoffe - Prüfverfahren für Klebstoffe für Boden- und Wandbeläge - Schälversuch

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Foreword

This document (EN 1372:2015) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by AENOR.

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of an identical text or by endorsement, at the latest by October 2015 and conflicting national standards shall be withdrawn at the latest by October 2015.

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 1372:1999.

The main changes in respect to EN 1372:1999 are the addition of a plywood substrate and the change of the roller dimensions.

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1 Scope

This European Standard specifies a test method to measure the adhesion of a resilient or textile floor covering or wall covering bonded to a given substrate under peel forces. The term “wall covering” does not include any type of wallpaper.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 923:2005+A1:2008, *Adhesives - Terms and definitions*

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

EN ISO 7500-1, *Metallic materials - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Verification and calibration of the force-measuring system (ISO 7500-1)*

EN ISO 9142, *Adhesives - Guide to the selection of standard laboratory ageing conditions for testing bonded joints (ISO 9142)*

EN ISO 10365, *Adhesives - Designation of main failure patterns (ISO 10365)*

EN ISO 15605, *Adhesives - Sampling (ISO 15605)*

ISO 554, *Standard atmospheres for conditioning and/or testing - Specifications*

ISO 3205, *Preferred test temperatures*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923:2005+A1:2008 and the following apply.

3.1
covering
flexible resilient or textile floor covering or wall covering

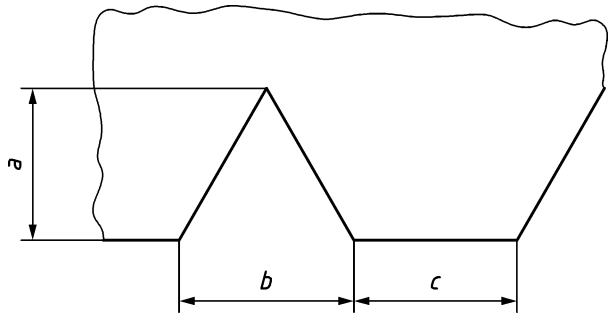
3.2
adhesive for coverings
adhesive which is intended to produce firm and durable bonds between coverings and various substrates

4 Principle

The adhesion is determined by measuring the resistance to peeling under specified conditions before and after storing the bonds at 23 °C/50 °C under specified conditions.

5 Apparatus and materials

5.1 Notched trowel (for the shape of the notch, see Figure 1) with dimensions *a*, *b* and *c* specified by the adhesive manufacturer.



Key

a notch depth

b notch width

c notch distance

Figure 1 — Shape of notches of notched trowel

5.2 Roller, of width (60 ± 5) mm, diameter (90 ± 5) mm and total mass (3,50 ± 0,05) kg with handle at 90° to the axis (as an example, see Figure 2).

Dimensions in millimetres

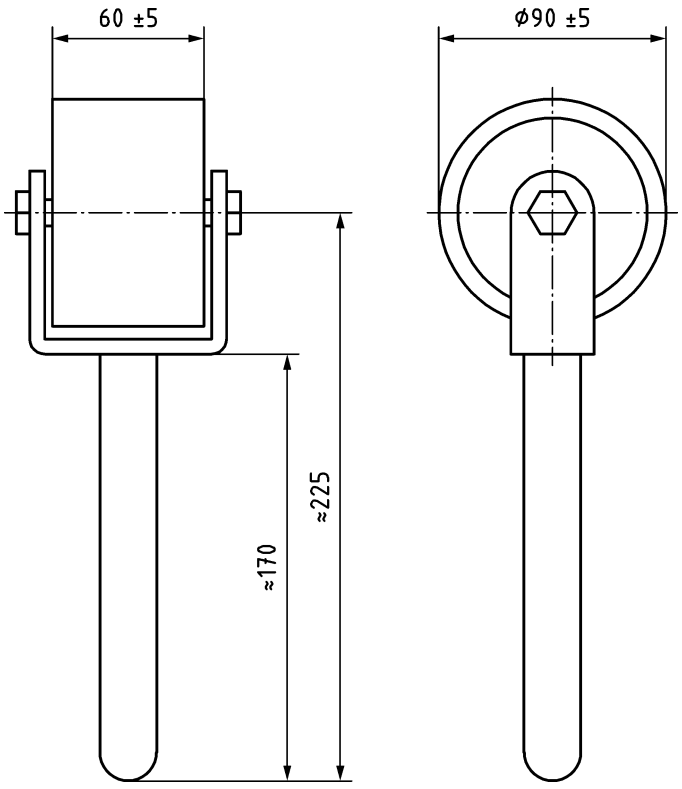


Figure 2 — Roller

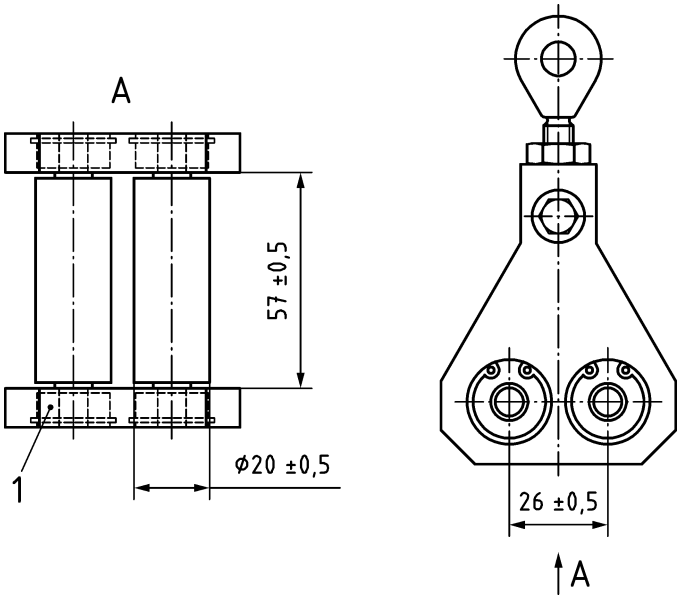
NOTE The length of the handle is not critical and can be used for setting the total mass.

5.3 Heating chamber, ventilated and adjustable to a temperature between 20 °C and 200 °C according to EN ISO 9142.

5.4 Tensile testing machine, conforming to EN ISO 7500-1, class 1.

5.5 Peeling device, with rolls as shown in Figure 3.

Dimensions in millimetres



Key

1 bearing

Figure 3 — Peeling device

5.6 Primer, if applicable.

5.7 Test covering, five test pieces for each conditioning sequence of dimensions 250 mm × 50 mm, the 250 mm long side running in the machine direction (where this can be identified) and shall be taken at least 10 mm from the edge.

5.8 Substrate materials:

5.8.1 Fibre cement substrate, one uncoated fibre cement panel, fully compressed and autoclaved, for each test piece. Five fibre cement panels for each conditioning sequence with a length of approximately 150 mm and a thickness of approximately 8,0 mm. The width is (50 ± 0,5) mm.

NOTE 1 Length and thickness are not critical.

NOTE 2 Depending on the source of the fibre cement panels the surfaces sometimes differ with respect to gloss, absorbency and strength. In this case, it is important to do some preliminary assessment (i.e. peel tests) of the panels to identify the preferred side for testing. The preferred side will be called the upper side of the substrate in this standard.

If failure of the substrate is the main finding of the preliminary substrate assessment, a suitable primer may be used for testing.

5.8.2 Plywood substrate, one uncoated plywood panel for each test piece. Five plywood panels for each conditioning sequence with a length of approximately 150 mm and a thickness of approximately 5,0 mm. The width is (50 ± 0,5) mm.

NOTE Length and thickness are not critical.

6 Preparation of the test specimens

6.1 Cleaning

Ensure that all test coverings and substrate materials are clean and free from dust, loose particles or other contamination.

6.2 Sampling of adhesive

Take a sample in accordance with EN ISO 15605 of the adhesive to be tested and examine and prepare it in accordance with EN 1067.

6.3 Conditioning of materials

6.3.1 Adhesive and floor and wall coverings

Condition the materials at a standard atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity in accordance with ISO 554 for at least 24 h prior to use.

6.3.2 Fibre cement substrate

Place the test panels (5.8.1) in a heating chamber (5.3) for 6 h at (80 ± 2) °C. Ensure that the test panels are spaced in such a way as to enable a free passage of air over them. At the end of this period, remove the test panels from the heating chamber and store for 48 h in a standard atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity prior to use.

6.3.3 Plywood substrate

Condition the materials at a standard atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity in accordance with ISO 554 for at least 24 h prior to use.

6.4 Application of adhesive

Place masking tape across one end of the upper side of each panel so as to leave 120 mm length to be coated with adhesive.

Apply the adhesive under test across the full width of the panel using a notched trowel (5.1), held at an angle of approximately 60°, steadily down the length of the panel to provide a uniform adhesive application.

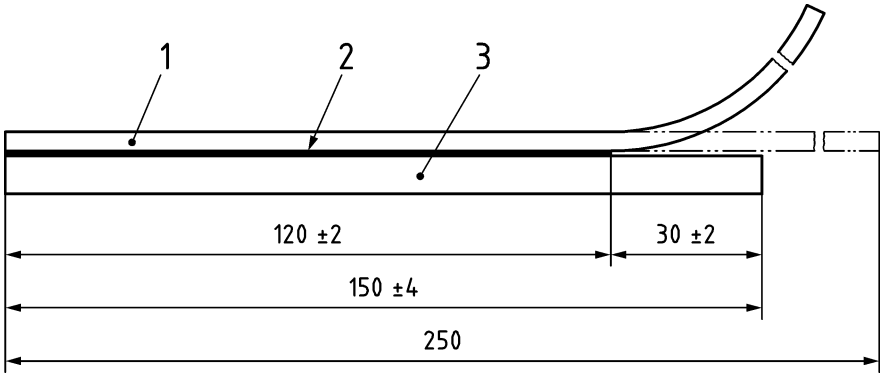
Remove the masking tape when the adhesive has been applied.

NOTE When applying the adhesive, it is essential that the serrated blade is kept clean and free of adhesive build-up. Clean the blade regularly (no more than five panels to be prepared without cleaning). In addition, regularly check the notch size and depth, especially where non-hardened steel blades are in use.

6.5 Bonding of the test covering

After a time recommended by the adhesive manufacturer (i.e. minimum open time in accordance with EN 923), place the test covering (5.7) onto the coated panel (5.8) such that one end of the test covering is coincident with the end of the panel coated with the adhesive. Then align the test covering with the panel to produce a bonded area of 120 mm × 50 mm (see Figure 4).

Dimensions in millimetres



Key

1 test covering
2 adhesive
3 substrate

Figure 4 — Peel test specimen

Immediately after positioning the test covering, roll the test specimen with a roller (see 5.2) by passing forward and backward once along the test specimen without any additional pressure being applied.

Remove any excess adhesive carefully from the edges of the test specimen with a clean tissue. Do not stack more than five test specimens.

For coverings which show a tendency to curl after rolling, a dead load of (2,0 ± 0,1) kg mass can be applied (3 ± 0,5) h onto a stack of five test specimens. The load is spread evenly over the whole surface thus ensuring a contact over the total bonded area of each test specimen. The procedure applied should be recorded in the test report [see 10 j)].

7 Conditioning of the test specimens

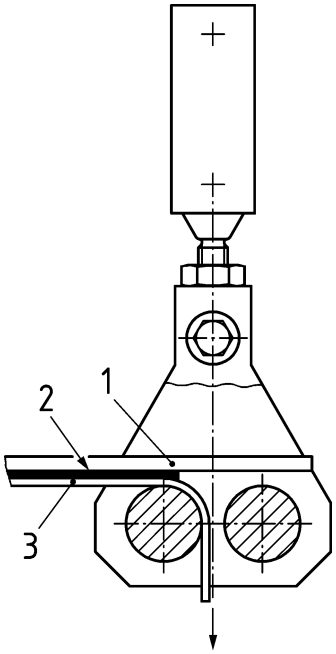
After assembly, expose the test specimens to the conditions as given in Table 1.

Table 1 — Conditioning

Control test	Test I	Test II[a]
28 days at a standard atmosphere of 23/50 (see ISO 554)	7 days at a standard atmosphere of 23/50 (se ISO 554)	
	20 days at (50 ± 2)°C (see ISO 3205)	41 days at (50 ± 2)°C (see ISO 3205)
	1 day at a standard atmosphere of 23/50 (see ISO 554)	
[a] This test to be optional for determining the effect of any type of interaction between an adhesive and a covering.		

8 Test procedure

Fix the peeling device (5.5) into the upper grip of the tensile testing machine (5.4) and place the test specimen such that the free end of the test covering is between the rolls. Clamp the free end in the lower grip of the test machine (Figure 5).



Key

1 substrate
2 adhesive
3 test covering

Figure 5 — Clamping of peel test specimens

Set the tensile testing machine to operate with a crosshead movement of (100 ± 10) mm/min.

9 Evaluation and expression of results

Peel resistance in newtons per millimetre [N/mm] is the mean value of peel force in newtons [N] obtained from the trace over the course of separation per unit width in millimetres [mm] of the test specimen:

$$R_{\text{peel}} = \frac{\overline{F}}{b}$$

where

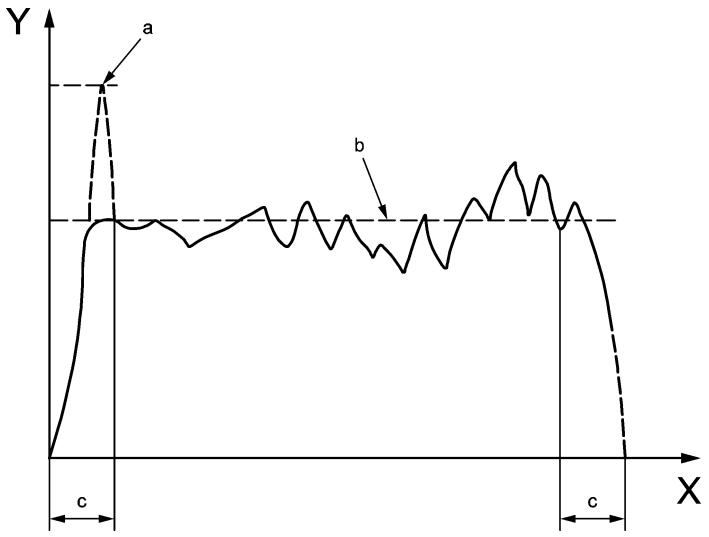
R_{peel} is peel resistance;

$\overline{F}$ is mean peel force during separation [N];

b is width of test piece [mm].

Obtain the mean value of peel force (see Figure 6) ignoring the first and last 10 mm of the bond, i.e. taking into account only the middle 100 mm of the bond.

NOTE The mean value of peel force can be determined by means of an integrator or by means of a graphical method, e.g. lay a transparent plate with the length axis drawn on it, onto the curve in such a way that the straight line is at right angles to the axis of the peel force and move it along sideways until the areas above and below are equal.



Key

X peel length of bond, in millimetres

Y peel force, in newtons

a initial peak value of peel force

b mean peel force value after initial peak (if any)

c first and last 10 mm are ignored

Figure 6 — Determination of mean peel force

Record the peel resistance for each test specimen, the type of failure according to EN ISO 10365 and calculate the mean value for all five test specimens. Any result which differs by more than 15 % from this value shall be discarded and a second mean value calculated from the remaining results. If more than two results are outside the range, discard the highest and the lowest value and calculate the mean of the remaining three results.

10 Test report

The test report shall include, at least the following:

a) reference to this European Standard, i.e. EN 1372;

b) designations of the adhesive together with the batch number;

c) designation of test covering, substrate and primer optional used for substrate preparation;

d) notched trowel used;

e) open time allowed;

f) conditioning sequences used;

g) mean value for peel resistance in N/mm for each conditioning sequence and the type of failure, e.g. failure in adhesion, in cohesion of adhesive or in adherent. Report the method of evaluations in accordance with Clause 9;

h) any physical changes or abnormalities observed in the bonded test specimen after accelerated ageing conditions;

i) main failure pattern according to EN ISO 10365;

j) any factors that have affected the result;

k) date of the test.

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