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# Adhesives — Test methods for adhesives for floor and wall coverings — Peel test

*Adhésifs — Méthodes d'essai d'adhésifs pour revêtements du sol et muraux — Essai de pelage*



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# Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.



# Adhesives — Test methods for adhesives for floor and wall coverings — Peel test

**SAFETY PRECAUTIONS — Persons using this document should be familiar with the normal laboratory practice, if applicable. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.**

**ENVIRONMENTAL STATEMENT — It is understood that some of the material permitted in this document may have negative environmental impact. As technological advantages lead to acceptable alternatives for these materials, they will be eliminated from this document to the extent possible. At the end of the test, it is essential that the user of this document take care to carry out an appropriate disposal of the wastes.**



## 1 Scope

This document 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 are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 472, *Plastics — Vocabulary*

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

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO 9142, *Adhesives — Guide to the selection of standard laboratory ageing conditions for testing bonded joints*

ISO 10365, *Adhesives — Designation of main failure patterns*

ISO 15605, *Adhesives — Sampling*

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

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

**3.1**
**covering**
flexible resilient or textile floor covering or wall covering

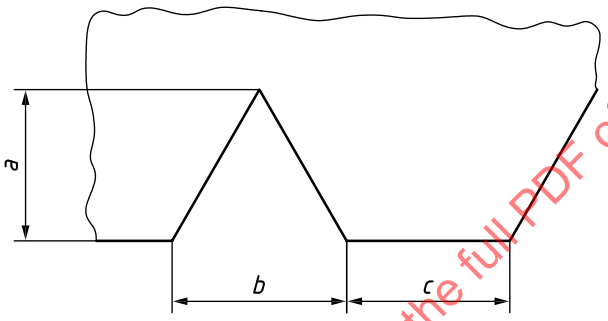
**3.2**
**adhesive for coverings**
adhesive which is intended to produce firm and durable bonds between *coverings* (3.1) and various substrates

## 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

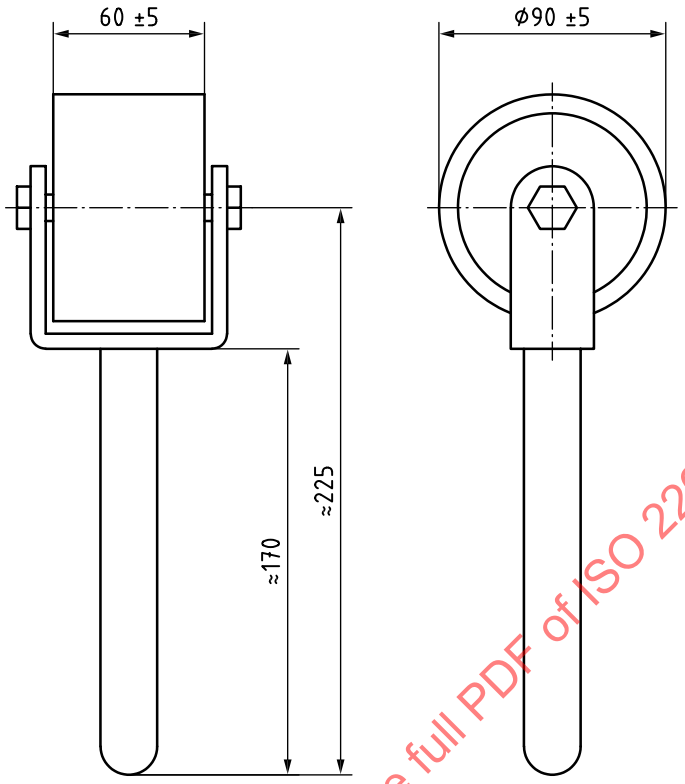



**Figure 2 — Roller**

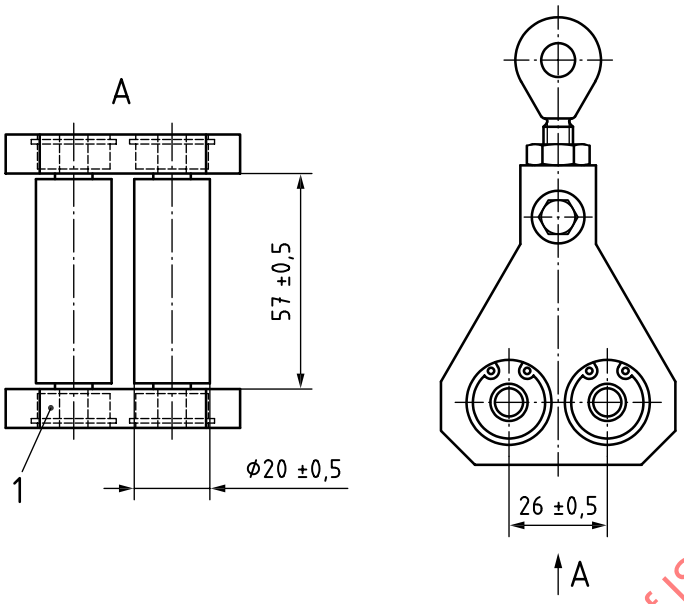
NOTE The length of the handle is not critical and can be used for setting the total mass.

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

**5.4 Tensile testing machine**, conforming to 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.**

Use either fibre cement or plywood as the substrate.

**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 Length and thickness are not critical.

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 is referred to as the upper side of the substrate in this document.

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 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 leaving a 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.

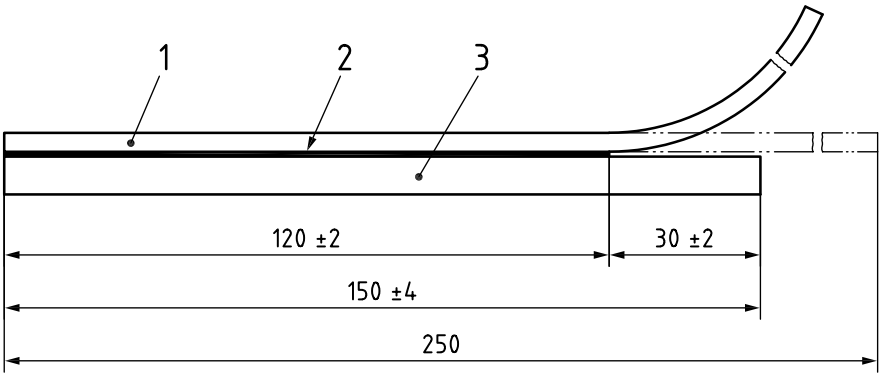
Remove the masking tape when the adhesive has been applied.

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 the time recommended by the adhesive manufacturer (i.e. minimum open time in accordance with ISO 472), 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 (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 Clause 10 i)].

## 7 Conditioning of the test specimens

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

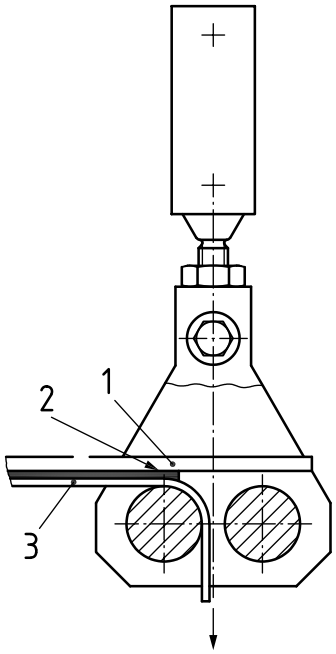
**Table 1 — Conditioning**

| 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 (see 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 (see 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 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, as shown in Formula (1):

$$R_{peel} = \frac{\overline{F}}{b} \tag{1}$$

where

$R_{peel}$ is the peel resistance;

$\overline{F}$ is the mean peel force during separation, in N;

$b$ is the width of test piece, in 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.

The mean value of peel force can be determined by means of an integrator or by means of a graphical method, for example, 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. Systems with digital output may be available for software-based analysis. The use of such modern inventions is encouraged.