



BSI Standards Publication

# Adhesives — Test method for adhesives for plastic or rubber floor coverings or wall coverings — Determination of dimensional changes after accelerated ageing

**National foreword**

This British Standard is the UK implementation of EN 1903:2015. It supersedes BS EN 1903:2008 which is withdrawn.

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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English Version

## Adhesives - Test method for adhesives for plastic or rubber floor coverings or wall coverings - Determination of dimensional changes after accelerated ageing

Adhésifs - Méthodes d'essai des adhésifs aux revêtements de sol ou mural en plastique ou en caoutchouc - Détermination des variations dimensionnelles après un vieillissement accéléré

Klebstoffe - Prüfverfahren für Klebstoffe für Boden- und Wandbeläge aus Kunststoff oder Gummi - Bestimmung der Maßänderungen nach beschleunigter Alterung

This European Standard was approved by CEN on 16 February 2015.

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## Foreword

This document (EN 1903:2015) 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of an identical text or by endorsement, at the latest by October 2015 and conflicting national standards shall be withdrawn at the latest by October 2015.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 1903:2008.

The main change in respect to EN 1903:2008 is the change of the roller dimensions.

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## 1 Scope

This European Standard specifies a test method that measures the dimensional changes of a plastic or rubber floor or wall covering bonded to a given substrate after accelerated ageing. 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 9142, *Adhesives - Guide to the selection of standard laboratory ageing conditions for testing bonded joints (ISO 9142)*

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

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

## 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**

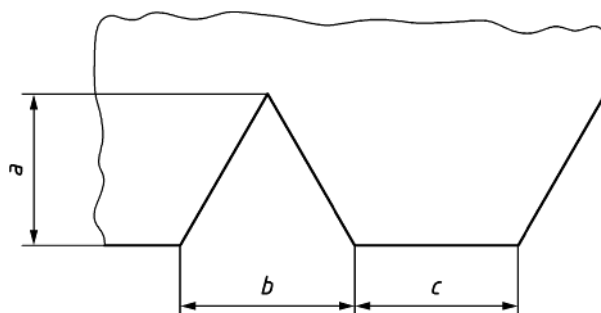
adhesive which is intended to produce firm and durable bonds between coverings and various substrates

## 4 Principle

This test method gives a measure of the suitability of a plastic or rubber floor or wall covering/adhesive combination by monitoring dimensional changes during defined conditioning sequences when bonded to a specific substrate.

## 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.

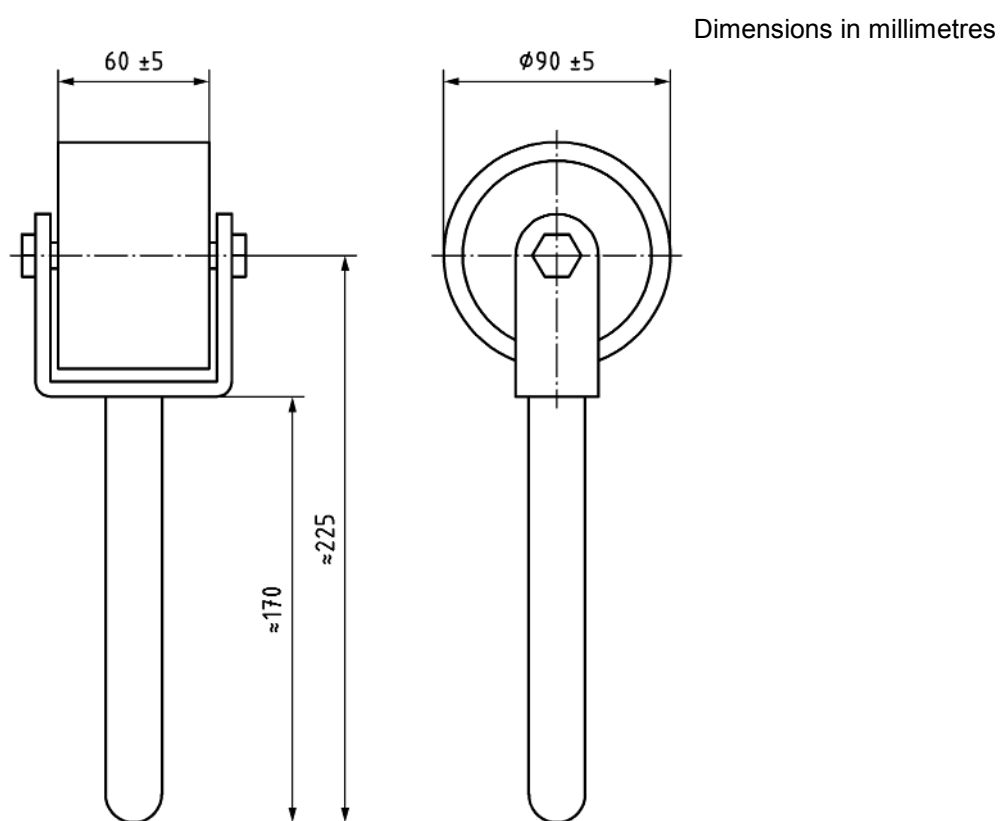


**Key**

- a* notch depth
- b* notch width
- c* notch distance

**Figure 1 — Shape of notches of notched trowels**

**5.2 Roller**, of width  $(60 \pm 5)$  mm, diameter  $(90 \pm 5)$  mm and total mass  $(3,50 \pm 0,05)$  kg with a handle at  $90^\circ$  to the axis (as an example, see Figure 2).



**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  $20^\circ\text{C}$  and  $200^\circ\text{C}$  according to EN ISO 9142.

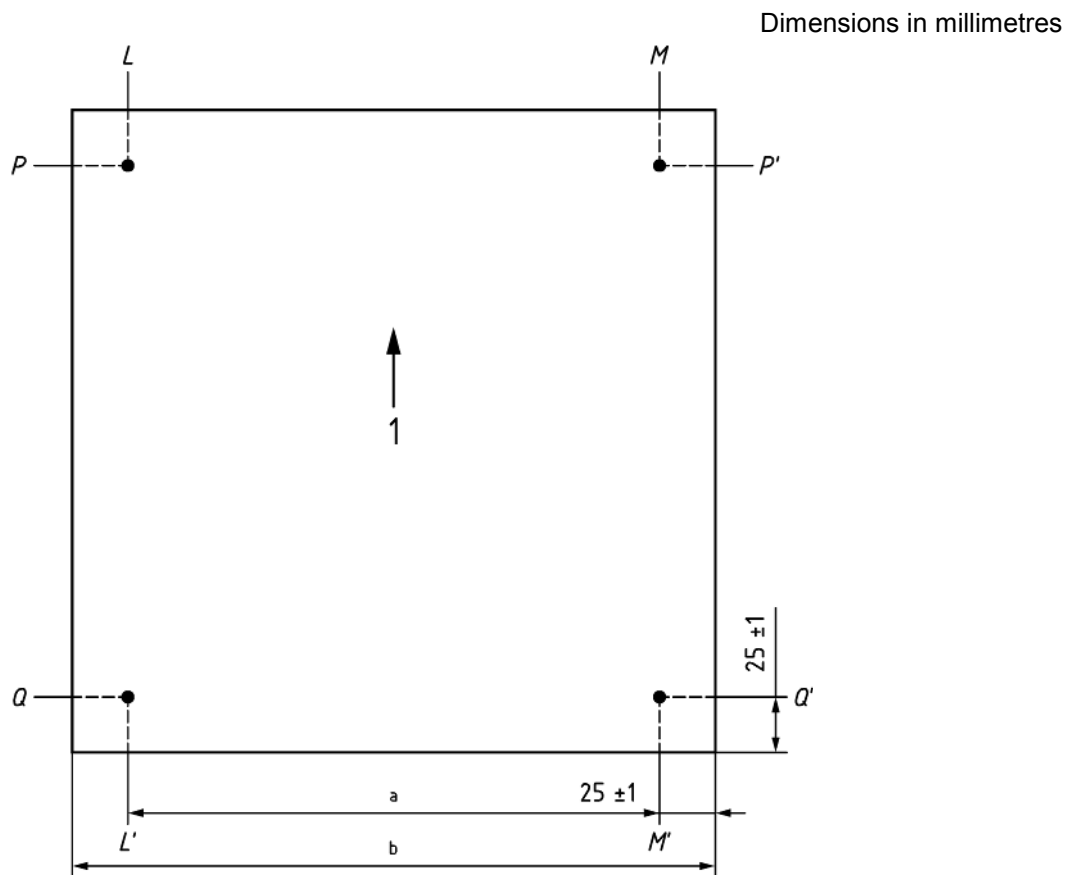
**5.4 Primer**, if applicable.

**5.5 Test covering**, three test pieces for each combination with adhesive dimensions of  $(250 \pm 5)$  mm  $\times$   $(250 \pm 5)$  mm or  $(300 \pm 5)$  mm  $\times$   $(300 \pm 5)$  mm.

**5.6 Substrate**, one uncoated fibre cement panel, fully compressed and autoclaved, of a minimum thickness of approximately 8,0 mm for each test piece. Dimensions shall not be greater than 50 mm longer than the distance between the datum points, i.e. each datum point shall not be greater than  $(25 \pm 1)$  mm from the outer edge (see Figure 3).

NOTE 1 The thickness is not critical.

NOTE 2 Depending on the source of the fibre cement panels the surfaces can 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.



**Key**

- 1 grain direction
- a measurements between studs
- b edge to edge measurements

**Figure 3 — Measurements**

Where edge to edge measurements are being carried out, recommended dimensions are approximately 300 mm  $\times$  300 mm.

**5.7 Suitable measuring devices**, capable of measuring to the nearest 0,01 mm over a length of either 200 mm or 250 mm, e.g. an elongation meter.

**5.8 Adhesives**, for fixing gauge studs to the covering surface if required by the measuring method.



## **6 Preparation of test specimens**

### **6.1 Conditioning of fibre cement substrate**

Place the test panels (5.6) in a heating chamber (5.3) for 6 h at  $(80 \pm 2)$  °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 oven and store in a standard atmosphere of  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % relative humidity for at least 48 h prior to use.

### **6.2 Conditioning of test covering**

#### **6.2.1 Room temperature storage**

Condition all test pieces (5.5) in a standard atmosphere of  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % relative humidity for at least 24 h prior to use.

#### **6.2.2 Elevated temperature pre-treatment**

Place the test pieces (5.5) on a firm horizontal substrate (5.6) and heat for 6 h in a heating chamber (5.3) at  $(80 \pm 2)$  °C. Ensure that the test pieces and substrate 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 pieces and supports from the heating chamber and store for 48 h in a standard atmosphere of  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % relative humidity prior to use.

The pre-treatment will release any stresses in the covering so that it is in a relaxed state when the actual test is commenced. The pre-treatment of the test coverings may be run together with the conditioning of the substrate (6.2).

In most cases a more practical assessment is required. Pre-conditioning of the floor or wall covering materials at elevated temperature (6.2.2) may not be regarded as necessary. If knowledge of dimensional changes after this pre-treatment is required, dimensions should be measured as given in 6.5 before and after the pre-treatment.

### **6.3 Sampling and conditioning 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.

Condition the adhesive in a standard atmosphere of  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % relative humidity for at least 24 h before making the test specimens, in accordance with ISO 554.

### **6.4 Datum points**

#### **6.4.1 Fixing of gauge positions**

Using the appropriate adhesive, fix the gauge studs in four positions, each being  $(25 \pm 1)$  mm from the outer edge of the covering (see Figure 3).

#### **6.4.2 Edge to edge measurements**

Test specimens shall be marked at positions  $(25 \pm 1)$  mm from each edge.

### **6.5 Initial measurements of dimensions prior to bonding**

Measure the dimension of each test piece along the two datum lines LL' and MM' parallel to its grain, when this can be identified, (longitudinally) and the two datum lines PP' and QQ' at right angles to these lines (transversely). Record as measurement A.

Depending on the type of measuring device to be used, the measurements may be made from edge to edge or from scribe datum marks as described previously (see Figure 3).

## 6.6 Preparation of bonded test specimens

### 6.6.1 Cleaning

Ensure that all floor coverings and fibre cement panels are clean and free from dust, loose particles or other contamination.

NOTE For unbonded control test specimens, if required, test pieces are laid directly onto the fibre cement panels.

### 6.6.2 Application of adhesive

Apply the adhesive (5.4) to the upper side of the substrate (5.6) using a notched trowel (5.1) held at an angle of approximately 60° to the slab, comb the adhesive to provide a uniform application. Hold the trowel at a right angle to one edge of the slab and draw it across the slab parallel to that edge in a straight line.

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 three fibre cement panels to be prepared without cleaning). In addition, regularly check the notch size and depth, especially where non-hardened steel blades are in use.

### 6.6.3 Bonding

After a time recommended by the adhesive manufacturer (i.e. minimum open time in accordance with EN 923), place a test piece on the prepared panel ensuring that the machine direction of the test piece is at right angles to the adhesive ridges. Smooth with light hand pressure and then roll with a roller (5.2) starting at one edge rolling up and down and gradually moving across the panel ensuring all areas are rolled. Repeat the rolling in a direction at right angles to the first rolling.

NOTE For coverings which show a tendency to curl after rolling, a dead load of  $(5,0 \pm 0,25)$  kg mass can be applied  $(3,0 \pm 0,5)$  h onto the test specimens. The load is spread evenly over the whole surface thus ensuring a contact over the total bonded area.

## 7 Procedure

### 7.1 Preconditioning

Condition test specimens in a standard atmosphere of  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % relative humidity in accordance with ISO 554 for seven days.

Measure all dimensions and record all results as measurement B.

### 7.2 Conditioning cycle (accelerated ageing)

Store both unbonded and bonded test specimens at 50 °C for 13 days in heating chamber (5.3), ensuring that the panels are horizontal and separated to allow good air circulation.

Remove and post condition in a standard atmosphere for 24 h. Re-measure and record as measurement C<sub>1</sub>.

### 7.3 Subsequent cycles

Repeat the cycle in 7.2 giving measurements C<sub>2</sub>, C<sub>3</sub>, etc. At least two cycles shall be completed, but further cycles may be carried out if required.

## 8 Evaluation and expression of results

For each datum line on each test piece measure the following dimensional changes:

- a) change during conditioning (B to A);
- b) change after one cycle ( $C_1$  to A);
- c) change after further cycles ( $C_2$  to A,  $C_3$  to A, etc.).

For both the unbonded control test specimens and the bonded test specimens, tabulate the dimensional changes, i.e. for each set of three test specimens there will be six values for the longitudinal direction and six values for the transverse direction (two datum lines in each direction on three test specimens).

Calculate the arithmetic mean of each set of six values. Calculate and express the result of the mean dimensional change as a percentage of the nominal dimension to two decimal places.

## 9 Test report

The test report shall include at least the following:

- a) reference to this European Standard, i.e. EN 1903;
- b) designation of the adhesive together with the batch number;
- c) designation of test covering and primer optional used for substrate preparation;
- d) notched trowel used;
- e) open time allowed;
- f) type of measuring device used, giving uncertainty of measurements;
- g) whether pre-treatment of test covering was included and if so, the mean dimensional change determined, if required;
- h) mean percentage change in dimensions for each set of triplicate test specimens in both directions and after both the conditioning period and each cycle at 50 °C;
- i) graph of the mean dimensional change on a linear graph against conditioning period and cycles at 50 °C for both bonded and unbonded test specimens;
- j) any physical changes or abnormalities observed in the bonded test specimens after the conditioning cycles;
- k) any factors that may have affected the results;
- l) date of the test.





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