BS EN 16776:2016

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Resilient floor coverings — Heterogeneous polyurethane floor coverings — Specification

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee PRI/60, Resilient and Laminate Floor Coverings.

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

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Revêtements de sol résilients - Revêtements hétérogènes en polyuréthanne - Spécification

Elastische Bodenbeläge - Homogene und heterogene Polyurethan-Bodenbeläge - Spezifikation

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European foreword

This document (EN 16776:2016) has been prepared by Technical Committee CEN/TC 134 “Resilient, textile and laminate floor coverings”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.

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1 Scope

This European Standard specifies the characteristics of heterogeneous resilient floor coverings based on polyurethane with thermosetting properties supplied in either roll, planks or tile form. This specification does apply for floor covering consisting of a wear layer and other compact layers made from polyurethane which differ in composition, chemical crosslinking and/or design and can contain a decor layer, reinforcement and other backing.

This specification does not apply for floor coverings that are specified in EN ISO 10582, EN ISO 24011, EN 1817 or EN 14565.

To encourage the consumer to make an informed choice, the standard includes a classification system (see EN ISO 10874) based on intensity of use, which shows where these floor coverings should give satisfactory service. It also specifies requirements for marking.

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 424, *Resilient floor coverings — Determination of the effect of simulated movement of a furniture leg*

EN 425, *Resilient and laminate floor coverings — Castor chair test*

EN 1471, *Textile floor coverings — Assessment of changes in appearance*

EN ISO 105-B02, *Textiles — Tests for colour fastness — Part B02: Colour fastness to artificial light: Xenon arc fading lamp test (ISO 105-B02)*

EN ISO 291, *Plastics — Standard atmospheres for conditioning and testing (ISO 291)*

EN ISO 10874, *Resilient, textile and laminate floor coverings — Classification (ISO 10874)*

EN ISO 23997, *Resilient floor coverings — Determination of mass per unit area (ISO 23997)*

EN ISO 23999, *Resilient floor coverings — Determination of dimensional stability and curling after exposure to heat (ISO 23999)*

EN ISO 24340, *Resilient floor coverings — Determination of thickness of layers (ISO 24340)*

EN ISO 24341, *Resilient and textile floor coverings — Determination of length, width and straightness of sheet (ISO 24341)*

EN ISO 24342, *Resilient and textile floor-coverings — Determination of side length, edge, straightness and squareness of tiles (ISO 24342)*

EN ISO 24343-1, *Resilient and laminate floor coverings — Determination of indentation and residual indentation — Part 1: Residual indentation (ISO 24343-1)*

EN ISO 24344, *Resilient floor coverings — Determination of flexibility and deflection (ISO 24344)*

EN ISO 24346, *Resilient floor coverings — Determination of overall thickness (ISO 24346)*

ISO 11378-1, *Textile floor coverings — Laboratory soiling tests — Part 1: Kappasoil test*

ISO 16581, *Resilient and laminate floor coverings — Determination of the effect of simulated movement of a furniture leg*

ASTM F1515, *Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
wear layer
layer of the floor covering directly exposed to wear

Note 1 to entry: Binder content should be minimum 80 %. The binder content is consisting of polyurethane resin.

3.2
scratch
permanent, visible surface damage of a physical nature

4 Requirements

The requirements and test methods for floor coverings made from polyurethane are illustrated in Table 1.

Table 1 — General requirements

Characteristic	Requirement	Test method
Roll form: length in m width in mm	Not less than nominal values	EN ISO 24341
Tiles: side length in mm Does not apply to planks squareness and straightness for side length: mm ≤ 400 mm > 400 mm	Deviation ≤ 0,15 % of nominal length up to 0,5 mm maximum Deviation allowed at any point ≤ 0,25 ≤ 0,35	EN ISO 24342
Overall thickness in mm - average[a] - individual results in mm - minimum overall thickness	Nominal value + 0,13 - 0,10 Average value[b] ± 0,15 1,20 mm	EN ISO 24346
Total mass per unit area in g/m² (average)	Nominal value + 13 % - 10 %	EN ISO 23997
Determination of thickness of layers Average of the wear layer thickness	Nominal value + 30 % - 10 % and shall not exceed ± 0,03 mm	EN ISO 24340
Residual indentation in mm	≤ 0,10	EN ISO 24343-1

Dimensional stability after exposure to heat (expansion or shrinkage in %)	≤ 0,15 %	EN ISO 23999
Effect of simulated movement of a furniture leg	welded in accordance with manufacturer's instructions: no damage shall be visible with foot Type 0 (32 kg)	ISO 16581 EN 424
Curling after exposure to heat Rolls and tiles (intended for welding) Tiles (intended for unwelded laying)	 ≤ 8 mm ≤ 2 mm	EN ISO 23999
Flexibility	Test using a 20 mm mandrel. For products which show signs of cracking, perform a further test using a 50 mm mandrel. If results show no further cracking, record the use of a 50 mm mandrel.	EN ISO 24344 Method A
Evaluation in respect to occurrence of scratches	The load which the first uninterrupted scratches cause on the surface shall be recorded (visible to the naked eye)	Annex A
Colour fastness to artificial light	6 minimum or AE ≤ 8 after 300 h, where E is the irradiance, expressed in watts per square meter	EN ISO 105-B02 Method 3[c] ASTM F1515
Suitability for castor chair use	After 25 000 cycles, no delamination shall occur. No disturbance to the surface other than a slight change in appearance	EN 425

[a] Average value of the measured values.

[b] Average value of the results of the specimens.

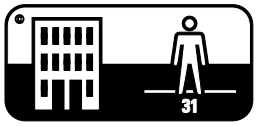
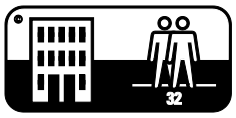
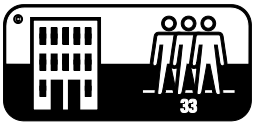
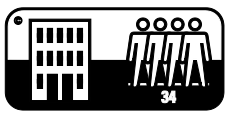
[c] A full sized test specimen shall be exposed. A further test specimen shall be stored in the dark, which will further serve as a reference standard for evaluation of the colour change.

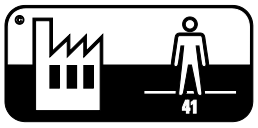
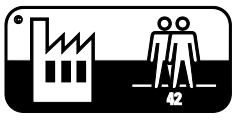
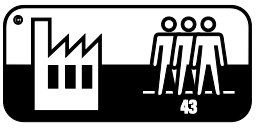
5 Use and performance specification

The classification scheme for resilient floor coverings is described in EN ISO 10874. The requirements for heterogeneous polyurethane floor coverings in accordance with this scheme are specified in Table 2.

Table 2 — Classification requirements

Class	Test method	21	22	23
Symbol	EN ISO 10874			
Level of Use		Domestic moderate	Domestic general	Domestic heavy
Furniture leg	ISO 16581 EN 424	Type 3	Type 3	Type 3
Scratch resistance in N	Annex A	≥ 3	≥ 3	≥ 3
Thickness of wear layer	EN ISO 24340	≥ 0,10 mm	≥ 0,10 mm	≥ 0,15 mm

Class	Test method	31	32	33	34
Symbol	EN ISO 10874				
Level of Use		Commercial moderate	Commercial general	Commercial heavy	Commercial very heavy
Furniture leg	ISO 16581 EN 424	Type 3	Type 2	Type 2	Type 2
Scratch resistance in N	Annex A	≥ 5	≥ 5	≥ 6	≥ 6
Thickness of wear layer	EN ISO 24340	≥ 0,15 mm	≥ 0,15 mm	≥ 0,20 mm	≥ 0,20 mm

Class	Test method	41	42	43
Symbol	EN ISO 10874			
Level of Use		Light industrial moderate	Light industrial general	Light industrial heavy
Furniture leg	ISO 16581 EN 424	Type 2	Type 2	Type 2
Scratch resistance in N	Annex A	≥ 6	≥ 7	≥ 7
Thickness of wear layer	EN ISO 24340	≥ 0,20 mm	≥ 0,20 mm	≥ 0,20 mm

6 Marking

Floor coverings that are covered by this standard and/or their packaging shall bear the following marking:

a) number and date of this European standard, i.e.. EN 16776:2016;

b) manufacturer's or supplier's identification;

c) product name;

d) colour/pattern and number batch and, if applicable, roll/package number;

e) applicable classes/symbols of the product;

f) for rolls: the length, width and thickness;

g) for tiles: the dimensions of a tile and the area in square metres contained in a package.

Annex A
(normative)

Method for test for resistance to scratching

A.1 Introduction

This method of test specifies a procedure to assess the appearance of scratches on resilient floor covering surfaces under laboratory conditions.

A.2 Principle

A test piece mounted on a horizontal rotating plate is scratched by a defined steel pin. The pin can be loaded with different weights. The load at which the pin causes an uninterrupted scratch of defined characteristics is used for the ranking of the product.

A.3 Apparatus and materials

NOTE The item numbers in parentheses in A.3.1.1 to A.3.1.6 refer to Figure A.1.

A.3.1 Scratch tester (Figure A.1), consisting of A.3.1.1 to A.3.1.6

A.3.1.1 Stand with a device to indicate the horizontal, e.g. a spirit level

A.3.1.2 Turntable (4) freely rotating, motor-driven, for supporting the test piece, rotating around its vertical axis at (35 ± 5) mm per second at the position where the scratch is made

A.3.1.3 Clamping disc (6) to keep the test specimen flat

A.3.1.4 Arm (5) with a holder for the steel pin (3), mounted on a ball bearing, with horizontal axis.

This arm is engraved with a scale (1) and is made adjustable in order to ensure that it is always horizontal, independent of the thickness of the test piece, when the steel pin touches the surface of the specimen.

A.3.1.5 Movable weight (2) that can be moved along the arm (5)

The mass of the weight together with the effective mass of the arm presses the steel pin onto the surface to be tested. The force exerted on the steel pin shall be accurate to 0,01 N, when measured at the mounting device for the pin.

A.3.1.6 Steel pin (3) (also shown in Figure A.2), made from tungsten carbide–cobalt (WC–Co) hard metal, HIP treated (hot isostatic pressed).

The steel pin shall have a diameter of 3 mm ± 0,02 mm. The conical tip shall have a diameter of 0,5 mm ± 0,02 mm and an angle of 45° ± 1°, as indicated in Figure A.2.

A.3.2 Soil B02[1)] according to ISO 11378-1, consisting of:

— 37,80 % peat dust;

— 17,45 % Portland Cement;

— 17,70 % kaolin;

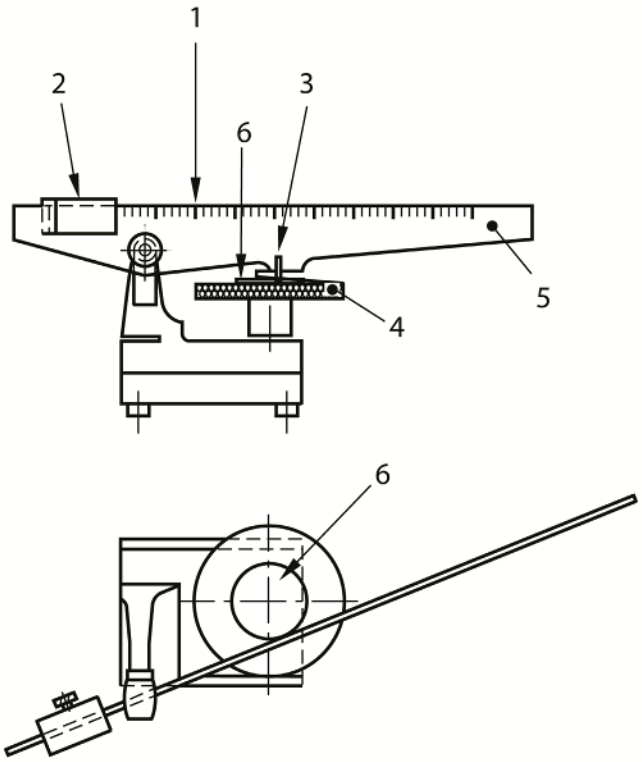
— 17,70 % quartz;

— 6,20 % Nujol mineral oil 014;

— 1,05 % dust wfk 09 X;

— 0,60 % ferric oxide black;

— 1,50 % ferric oxide yellow.

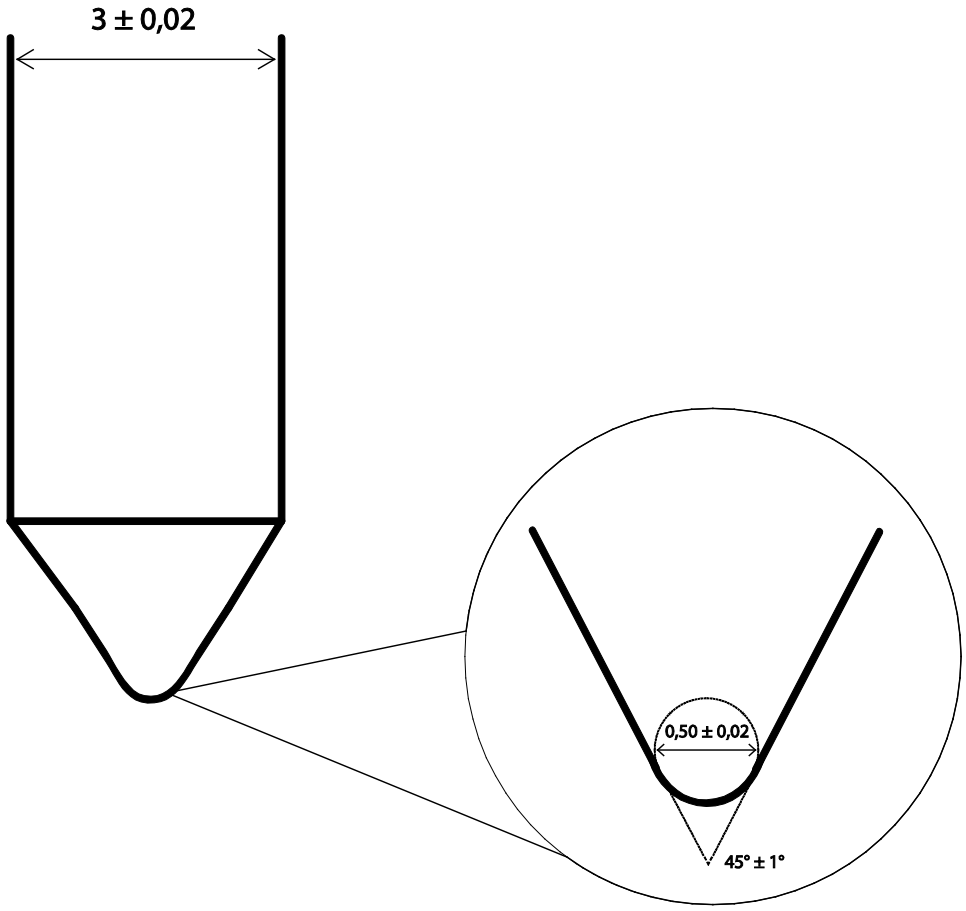


Key
1 adjustable scale
2 movable weight
3 steel pin
4 turntable
5 arm
6 clamping disc

Figure A.1 — Example of a type of apparatus for the determination of resistance to scratching

1) Forschungsinstitut für Reinigungstechnologie, Adlerstraße 42, D-47798 KREFELD, Germany, supply soil to this specification commercially. This information is given for the convenience of users of this European Standard and does not constitute an endorsement by CEN of their product. Equivalent products may be used if they can be shown to lead to the same results.

Dimensions in millimetres unless indicated otherwise



Key

Pin diameter:	0,3mm ± 0,02 mm
Cone tip diameter:	0,5 mm ± 0,02 mm
Cone angle:	45° ± 1°

Figure A.2 — Steel pin

A.4 Sampling and conditioning

Take three circular test pieces from a sample. The diameter shall be approximately 105 mm, depending on the device.

Condition the test pieces for at least 24 h at the standard atmosphere (23 ± 2) °C and (50 ± 5) % relative humidity in accordance with EN ISO 291.

A.5 Procedure

Place the test piece on the rotating plate.

Start the test with a weight of 2 N. Place the arm (5) in a vertical position. Fix the test piece with the clamping disc (6) and secure it so as to avoid any slipping. Lower the arm carefully so as to place the steel pin in contact with the test piece, being careful to avoid any damage to the pin. Adjust the height of the arm (5), so that it is horizontal when the point of the steel pin rests on the test piece.

Start the turntable rotating. If there is no scratch, increase the weight for each new test by 5 N. To increase the weight lift up the arm. Use the screw fitted to the device to adjust to a new trace for each test.

Continue the tests until a continuous and permanent surface damage is obtained on the sample. Then reduce the force in steps of 0,5 N to determine the lowest force that causes damage.

The distance between the traces on the surface shall be at least 2 mm. Ensure that the traces are at a distance from the centre of the test piece than to provide a speed of (35 ± 5) mm per s. Take a new test piece if more traces are needed.

A.6 Evaluation

Once traces have been made on the test piece, rub soil conforming to A.3.2 over the test piece using a cotton cloth. Place the test piece into an observation box as specified in EN 1471. The distance between the eye and the test piece shall be approximately 80 cm.

Record the mass of the load that caused the first uninterrupted scratch on the surface.

A.7 Report

The report shall contain the following information:

a) reference to this standard i.e.: EN 16776;

b) complete identification of the product tested, including type, source, colour and manufacturer's reference number;

c) method of sampling;

d) previous history of the sample;

e) or each test piece the mass of the load that caused the first visible uninterrupted circle of scratch on the surface;

f) any deviation from this method of test which may have affected the results.

A.8 Calibration of steel pins

A.8.1 General

The steel pin shall meet the requirements shown in Figure A.2. It shall not be refurbished. Check the calibration of each new steel pin according to A.8.3 before the first test and after every 20 test pieces tested. Replace the pin when it ceases to meet the requirement.

A.8.2 Procedure

Take a photograph of the conic peak of the steel pin in a microscope (four-times enlargement). It is useful to put the steel pin on a white background.

Place a standard template of the steel pin of the same magnification as the photograph over the photograph and measure the deviation of the radius of the peak.

In addition, measure the angle of the cone, which should be the same as for a new pin.

A.8.3 Evaluation

The radius of the tip shall be 0,25 mm ± 0,02 mm. The angle of the legs of the cone shall be 45° ± 1°, as shown in Figure A.2. If the deviation is higher the steel pin shall be replaced.

Annex B
(informative)

Optional properties

When the following properties are required for specific applications, the floor covering should be tested in accordance with the appropriate methods:

— electrical resistance: EN 1081;

— static electrical propensity: EN 1815;

— response to stains and chemicals: EN ISO 26987.

Bibliography

[1] EN 1081, *Resilient floor coverings — Determination of the electrical resistance*

[2] EN 1815, *Resilient and textile floor coverings — Assessment of static electrical propensity*

[3] EN 1817, *Resilient floor coverings — Specification for homogeneous and heterogeneous smooth rubber floor coverings*

[4] EN 12466, *Resilient floor coverings — Vocabulary*

[5] EN 14565, *Resilient floor coverings — Floor coverings based upon synthetic thermoplastic polymers — Specification*

[6] EN ISO 10582, *Resilient floor coverings — Heterogeneous poly(vinyl chloride) floor coverings — Specification (ISO 10582)*

[7] EN ISO 24011, *Resilient floor coverings — Specification for plain and decorative linoleum (ISO 24011)*

[8] EN ISO 26987, *Resilient floor coverings — Determination of staining and resistance to chemicals (ISO 26987)*

[9] ISO 4918, *Resilient, textile and laminate floor coverings — Castor chair test*

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