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BSI Standards Publication

Textile floor coverings — Minimum requirements for carpet underlays

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee PRI/3, Textile 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 textiles - Exigences minimales pour les thibaudes de moquette

Textile Bodenbeläge - Mindestanforderungen an Teppichunterlagen

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Foreword

This document (EN 14499:2015) 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of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by October 2015.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 14499:2004.

The main technical changes with respect to the previous edition are:

— The scope has been extended to include breaking and cracking resistance, which is in line with the requirement clauses;

— A number of editorial and technical inaccuracies in the text and the figures were corrected.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies minimum performance requirements for fibrous, non-fibrous and combined underlays as well as demands for the breaking and cracking resistance.

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

EN ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1)*

ISO 1765, *Machine-made textile floor coverings — Determination of thickness*

ISO 1957, *Machine-made textile floor coverings — Selection and cutting of specimens for physical tests*

ISO 2094, *Textile floor coverings — Determination of thickness loss under dynamic loading*

ISO 3415, *Textile floor coverings — Determination of thickness loss after brief, moderate static loading*

ISO 3416, *Textile floor coverings — Determination of thickness loss after prolonged, heavy static loading*

ISO 10361, *Textile floor coverings — Production of changes in appearance by means of Vettermann drum and hexapod tumbler tester*

BS 4098, *Method for the determination of thickness, compression and recovery characteristics of textile floor coverings*

3 Terms and definitions

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

3.1
needlefelt fibrous underlay
material made wholly of fibres entangled or matted together by needling of a fibre batt

3.2
impregnated fibrous underlay
material made of fibres consolidated by impregnation with a binding agent

Note 1 to entry: A woven, nonwoven or film scrim may be included in a fibrous underlay for support during manufacture.

3.3
cellular rubber underlay
material formed of a vulcanized rubber foam, with or without a carrier or backing material bonded thereto

3.4
cellular plastics underlay
material formed of a polymeric foam, e.g. polyurethane, with or without a carrier or backing material bonded thereto

3.5
rubber crumb underlay
material formed of crumb vulcanized rubber with or without a carrier or backing material bonded thereto

3.6
combined underlay
material composed of one or more layers of any fibrous underlay combined with one or more layers of any non-fibrous (rubber or plastics) underlay

3.7
initial thickness
thickness measured under a pressure of 2 kPa

3.8
compression
change in thickness of the underlay when the pressure is increased from 2 kPa to 100 kPa (see Annex B)

4 Sampling

Sampling shall be carried out in accordance with ISO 1957. A full-width sample 1 m in length in the machine production direction shall be taken. For non-fibrous underlays, a minimum period of 3 days shall be allowed between manufacture and testing.

5 Performance

All underlays shall conform to the minimum performance requirements specified in Table 1.

Table 1 — Minimum requirements

Characteristic	Requirement	Test Method
Breaking Strength (maximum force)	≥ 30 N in each direction	EN ISO 13934-1 [a]
Elongation	≤ 15% for applied force of 30 N	EN ISO 13934-1
Thickness loss of static loading long term after 24 h recovery		ISO 3416
Fibrous underlay	≤ 40 %	
Non-fibrous underlay	≤ 15 %	
Combined underlay	≤ 40 %	
Thickness loss of static loading short term after 1 h recovery		ISO 3415
Fibrous underlay	≤ 40 %	
Non-fibrous underlay	≤ 15 %	
Combined underlay	≤ 40 %	
Thickness loss of dynamic loading		ISO 2094
Fibrous underlay	≤ 40 %	
Non-fibrous underlay	≤ 15 %	
Combined underlay	≤ 20 %	
Thickness	≥ 4,0 mm	ISO 1765 [b]

Characteristic	Requirement	Test Method
Thickness deviation a) mean from nominal Fibrous or combined underlay Non-fibrous underlay b) from max to min Fibrous or combined underlay Non-fibrous Underlay	 ≤ 15 % ≤ 12 % ≤ 4 mm ≤ 3mm	ISO 1765
Resistance to breaking or cracking	No cracks greater than 50 mm along the fold No cracks in backing	Annex A
Compression after dynamic loading Work of compression after dynamic loading Retention of original work of compression	Minimum 2 mm, maximum 8 mm Minimum 50 J/m^2, maximum 200 J/m^2 ≥ 40 %	ISO 2094 [c] and BS 4098
Appearance/use	No negative effect [d]	ISO 10361

[a] The requirement in EN ISO 13934-1 to include at least 20 threads in the test specimen need not be met.

[b] Thickness is measured in accordance with ISO 1765 at 10 equally spaced intervals across the full width of the underlay, using a presser foot area between 700 mm^2 and 1 000 mm^2.

[c] Compression and work of compression are determined in accordance with BS 4098 with following modifications: a presser foot of between 700 mm^2 and 1 000 mm^2 is used and loading of the specimen is only up to 100 kPa. Compression and work of compression are calculated between 2 kPa and 100 kPa (see Annex B) before and after dynamic loading for 1 000 cycles in accordance with ISO 2094. Certain carpet thickness gauges may require modification and the manufacturer's advice should be sought.

[d] A carpet is tested, with and without the underlay in a Vettermann Drum for 22 000 cycles (or Hexapod Tumbler Tester for 12 000 cycles) according to ISO 10361 and subsequently assessed according to EN 1471. There should not be a negative effect of the specimen tested over underlay compared to the specimen without underlay.

6 Classification

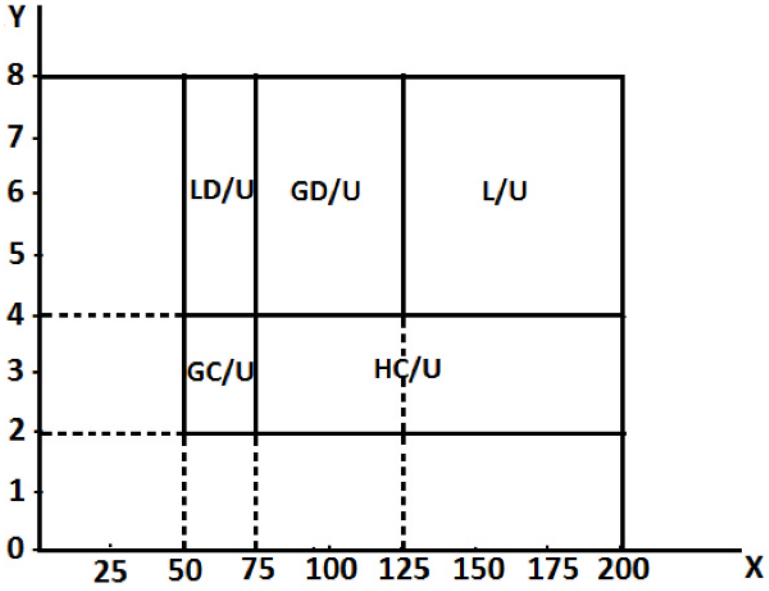
All underlays shall be classified as suitable for different intended use/applications in accordance with the performance levels shown in Figure 1 for work of compression after dynamic loading versus compression after dynamic loading.

The designations and the descriptions of intended use/application are described in Table 2.

Underlays should initially be specified for that particular application.

Table 2 — Designation and description of intended use/application

Designation	Description of intended use/application
LD/U	Light domestic use, not suitable for stairs
GD/U	General domestic use
L/U	Luxury use, domestic locations, where high energy absorption is desirable
GC/U	General contract use, suitable for normal foot and wheel traffic
HC/U	Heavy contract use, suitable for heavy foot and wheel traffic and castor chairs



Key

X-axis work of compression (in J/m²)

Y-axis compression (in mm)

For a description of each designation, see Table 2.

Figure 1 — Classification of underlays (work of compression after dynamic loading, versus compression after dynamic loading, in accordance with BS 4098

7 Marking

Underlays shall be provided with a label or other means giving at least the following information:

a) number and date of this document;

b) manufacturer's or supplier's identification or trade mark;

c) classification of underlay.

Annex A
(normative)

Method for determination of resistance to breaking and cracking

A.1 Principle

A rectangular piece of underlay is folded at each end. One end is placed under a weight-piece, whilst the other is folded without an added weight. After 1 h, the weight-piece is removed and each fold of the test specimen is visually assessed for signs of cracking.

This test is applicable to all types of underlay except those of wholly fibrous construction.

A.2 Apparatus

— Rectangular rigid metal plate of dimensions (80 ± 1) mm x (40 ± 1) mm;

— Weight-piece, such that the combined mass of the rigid metal plate and the weight piece is (2,5 ± 0,1) kg;

— Single-sided adhesive carpet tape, 50 mm wide.

A.3 Test specimen

The test specimen shall have dimensions of (240 ± 5) mm x (120 ± 5) mm.

A.4 Procedure

Fold the test specimen as shown in Figure A.1, so that, when folded, the edges of the test specimen meet and the backing material, if any, is innermost.

Tape the edges of the test specimen together and then turn the test specimen over so that the edges where the folds meet are on the underside.

Place the metal plate on the folded test specimen as shown in Figure A.2.

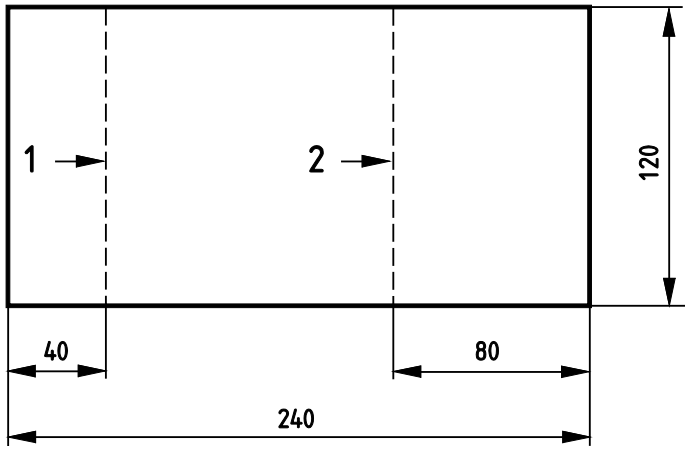
Place the weight-piece on top of the metal plate and leave for 1 h.

Remove the weight-piece and metal plate and immediately examine the folded specimen for signs of cracking and breaking.

A.5 Test report

Report the number of cracks or breaks and their length and location relative to the position of the metal plate during loading.

All dimensions in millimetres

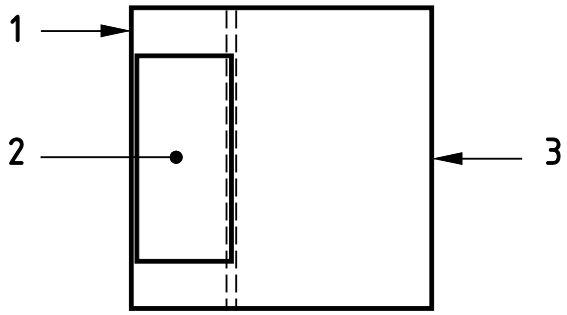


Key

1 fold A

2 fold B

Figure A.1 — Arrangement of folds in test specimen for resistance to breaking and cracking test



Key

1 fold A

2 metal plate

3 fold B

Figure A.2 — Location of metal plate on folded test specimen for resistance to breaking and cracking test

Annex B
(normative)

Determination of work of compression of underlay

The work of compression shall be determined in accordance with BS 4098 except that a pressure foot of between 700 mm^2 and 1 000 mm^2 is used and loading of the specimen is only up to 100 kPa.

The work of compression may be calculated either directly by integration of the area under the loading curve between 2 kPa and 100 kPa by computer (Method 1) or by determination of the area from discrete thickness measurements (Method 2).

If Method 2 is used, thickness measurements shall be taken at 2 kPa, 5 kPa, 10 kPa, 20 kPa, 50 kPa and 100 kPa pressure and the work of compression calculated in J/m^2, using the following expression:

$$W_c = (1{,}5t_2 - 4t_5 + 7{,}5t_{10} + 20t_{20} + 40t_{50} - 73t_{100})$$

Where

W_c is the work of compression in J/m^2;

t_n is the thickness (in mm) at n kPa pressure.

Certain carpet thickness gauges may require modification and the manufacturer's advice should be sought.

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