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Laminate floor coverings — Determination of abrasion resistance

Revêtements de sol stratifiés — Détermination de la résistance à l'abrasion

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 24338 was prepared by Technical Committee ISO/TC 219, *Floor coverings*.

Laminate floor coverings — Determination of abrasion resistance

1 Scope

This International Standard specifies a method for measuring abrasion of laminate floor covering elements. The test described measures the ability of the surface layer to resist abrasive wear-through. Abrasion is achieved by rotating a test specimen in contact with a pair of loaded cylindrical wheels covered with specified abrasive paper. The number of revolutions of the test specimen required to cause a defined degree of abrasion is measured.

The precision of the method is not known. When interlaboratory data becomes available, the precision statement will be added in subsequent revisions.

2 Normative references

The following referenced documents are indispensable for the application 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 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 7267-2, *Rubber-covered rollers — Determination of apparent hardness — Part 2: Shore-type durometer method*

3 Apparatus

3.1 Calibration plates

Taber S-34[1)] or equivalent of rolled zinc sheet, having a thickness of 0,8 mm ± 0,1 mm and a Brinell hardness of (48 ± 2) when tested in accordance with ISO 6506-1, except that the ball diameter shall be 5 mm and the load 360 N. For type approval or verification purposes, the zinc plate shall not be used for more than 10 calibrations per side.

1) Taber S-34 is an example of a suitable product available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this product.

3.2 Abrasive paper strips

Taber S-42[2)] or equivalent, (12,7 ± 0,1) mm wide in the machine direction by approximately 160 mm long, and having the following composition:

a) grammage of 70 g/m^2 to 100 g/m^2;

b) open coated 180 grit Al_2O_3 (aluminium oxide), having a particle size that will pass through a sieve of aperture 100 µm and remain on a sieve of aperture 63 µm;

c) glue bond;

d) adhesive backing.

3.3 Testing machine

The testing machine shall consist of the following items (see Figure 1).

3.3.1 Test specimen holder in the form of a disc (7) which rotates in a horizontal plane at a frequency of 58 r/min to 62 r/min and to which the test specimen (6) can be clamped with a clamping screw (5).

3.3.2 Abrasive wheels (3), two cylindrical rubber-covered wheels of width (12,7 ± 0,1) mm and diameter 50 mm which rotate freely about a common axis. The curved surface of the wheels, to a depth of 6 mm, shall be of rubber (2) of hardness (65 ± 3) IRHD when tested according to ISO 48 or (65 ± 3) Shore A when tested according to ISO 7267-2. The inside faces of the wheels shall be (52,5 ± 0,2) mm apart and equally spaced (26,25 ± 0,10) mm from the centre-line of the abrader head and their common axis of the wheels shall be 20 mm from the vertical axis of the test specimen holder.

3.3.3 Holding and lifting device (8), for the abrasive wheels, so constructed that each wheel exerts a force of (5,4 ± 0,2) N on the test specimen.

3.3.4 Revolution-counter.

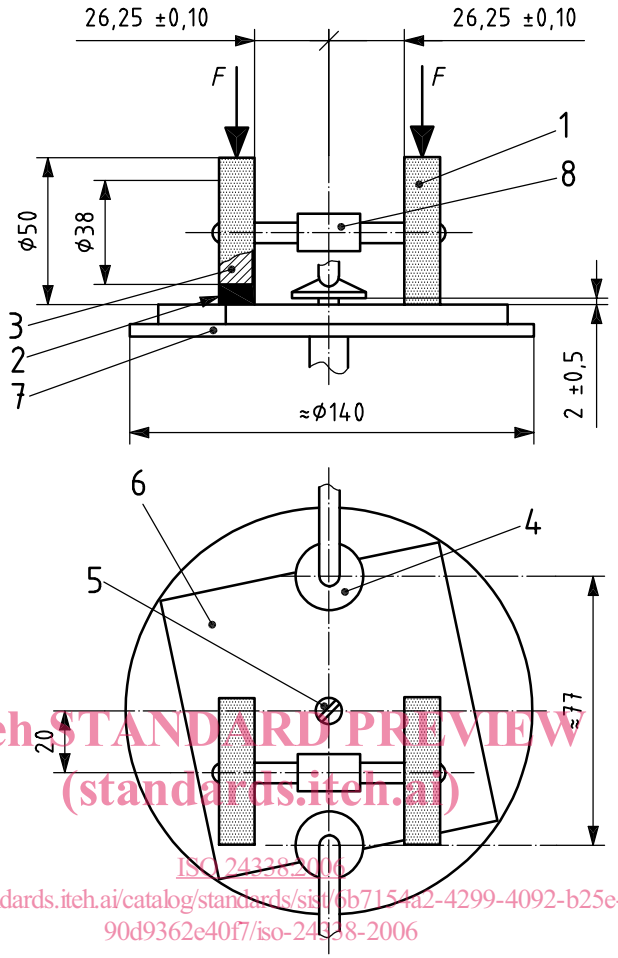
3.3.5 Suction device so fitted that two nozzles (4) are over the abraded area of the test specimen. One nozzle shall be situated between the wheels, the other diametrically opposite. The centres of the nozzles shall be 77 mm apart and (2 ± 0,5) mm from the surface of the test specimen. When the nozzles are closed, there shall be a vacuum of (1,5 to 1,6) kPa.

NOTE 1 It is important to ensure that the abrasive wheels are in good condition, as variations in flatness, hardness, regularity, roundness and width can significantly affect the test result.

NOTE 2 It is important that dimensions listed above and in Figure 1 are followed as deviations can lead to errors exceeding 100%. See Annex A for more information.

2) Taber S-42 is an example of a suitable product available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this product.

Dimensions in millimetres



Key

1 abrasive paper
2 rubber
3 abrasive wheel
4 suction nozzle
5 clamping screw
6 specimen
7 specimen holder disc
8 holding and lifting device

Figure 1 — Abrasion resistance testing machine

3.4 Conditioning chamber

The conditioning chamber shall be able to maintain a standard climate of 23 ºC ± 2 ºC and 50 % ± 5 % relative humidity.

4 Test specimens

Take one laminate floor covering element. Take from this element three test specimens, measuring approximately 100 mm × 100 mm:

— two centered 10 mm in from the short edges; and

— one exactly in the centre of the element (see Figure 2).

Machined edges and machined surfaces shall be avoided in the specimens.

If the dimension of the elements makes the above sampling impossible, then the test specimens shall be sampled from the nearest available area. If the elements measure less than 100 mm, then a joint is necessary. The joint shall be positioned in the middle of the 100 mm × 100 mm specimen.

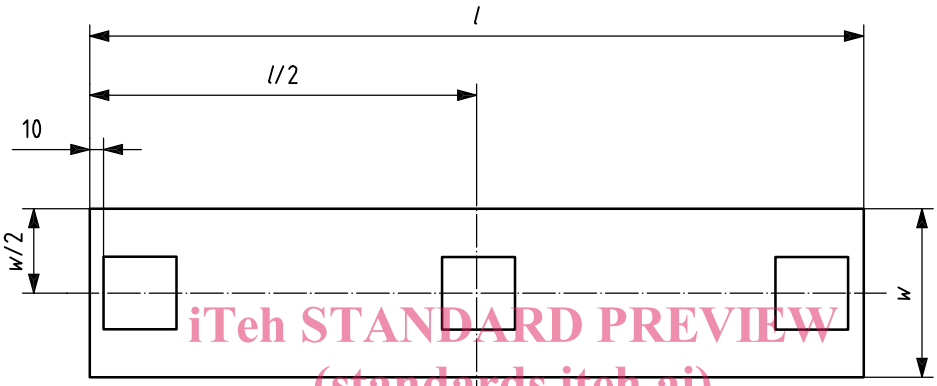


Figure 2 — Sampling from one floor covering element

5 Preparation of test specimens and abrasive papers

Clean the surface of the test specimens with an organic solvent which is immiscible with water. Using a marker pen, mark the surface of each test specimen with two lines mutually at right angles so that the surface area is divided into quadrants (See Figure 3).

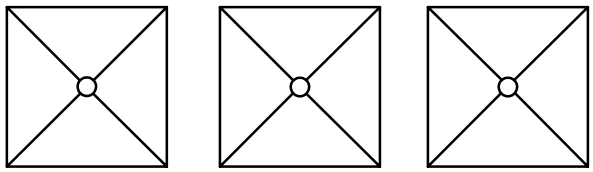


Figure 3 — Division of the three test specimens into quadrants

Precondition the test specimens and the abrasive papers for at least 24 h in the conditioning chamber. After preconditioning, seal the paper strips in polythene bags (maximum 10 strips per bag) until required for immediate use.

6 Procedure

6.1 Preparation of abrasive wheels

Bond a strip of preconditioned unused abrasive paper to each of the rubber covered wheels. Ensure that the cylindrical surface is completely covered without any overlapping of the paper. The outside diameter of the finished assembled wheel shall be (50,90 ± 0,65) mm.

6.2 Calibration of abrasive paper

Prepare two wheels with preconditioned unused abrasive paper according to 6.1 from the same batch to be reserved for testing. Clamp a zinc plate in the test specimen holder, start the suction device, reset the revolution counter to zero, lower the wheels and abrade the zinc plate for 500 revolutions. Wipe the zinc plate clean and weigh to the nearest 1 mg. Renew the abrasive papers with preconditioned unused strips from the same batch, and abrade the zinc plate for a further 500 revolutions. Wipe the zinc plate clean and weigh it again to the nearest 1 mg. The loss in mass shall be (120 ± 20) mg. Any lot of abrasive paper which causes a loss in mass outside this range shall not be used for testing.

6.3 Abrasion of test specimen

Perform the test immediately after the calibration. Prepare two wheels with preconditioned unused abrasive paper from the same batch previously approved by calibration. Fit the wheels to the machine and reset the revolution-counter to zero. Clamp the first test specimen in the holder. Ensure that the surface of the test specimen is flat. Lower the wheels, start the suction device and abrade the test specimen.

Examine the test specimen for abrasion after each 100 revolutions and renew the abrasive papers after every 200 revolutions. Continue the test in this way until the initial wear point (IP) is reached.

The initial wear point (IP) is that point at which the first clearly recognizable wear-through of the print appears and the sub-layer becomes exposed in three quadrants. The initial wear point is reached when there are areas of at least 0,60 mm^2 wear-through in two quadrants and an area of 0,60 mm^2 wear-through becomes visible in a third quadrant. The sub-layer for printed patterns is the background on which the pattern is printed. For plain colours, it is the first layer of different colour.

Wear-through within 10 mm of the centre of a joint shall be disregarded.

Record the number of revolutions as the IP-value. Repeat the test immediately using the two remaining test specimens.

To determine the initial wear point (IP), the “IP-poster” 3) can be used. This is a full-colour photographic visual aid in the three CEN languages to assist correct interpretation, and increase repeatability and reproducibility in the determination of the initial wear point (IP). The poster was developed by CEN/TC 134 and is recommended by both CEN/TC 134 and ISO/TC 219.

To precisely determine the size of the wear-through area, the “Dirt size estimation chart” 4) can be used. The chart is recommended by both ISO/TC 219 and CEN/TC 134.

3) “IP poster” is the trade name of a product supplied by SIS Förlag AB, Box 118 80, Stockholm, Sweden, tel. +46 8 555 52 310, fax + 46 8 555 52 311. Email sis.sales@sis.se. The article number is: 21990 IP-Poster 1.

4) “Dirt size estimation chart” is the trade name of a product supplied by TAPPI, Technology Park, P.O. Box 105113, Atlanta, GA 30348-5113, USA, tel. +1 770 446 1400, fax +1 770 446 6947. The article reference is: TAPPI - Dirt size estimation chart.