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Third edition
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Resilient and textile floor coverings — Determination of side length, edge straightness and squareness of tiles

Revêtements de sol résilients ou textiles — Détermination de la longueur des bords, de la rectitude des arêtes et de l'équerrage des dalles

Reference number
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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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 219, *Floor coverings*.

This third edition cancels and replaces the second edition (ISO 24342:2007), which has been technically revised. The main changes compared to the previous edition are as follows:

— The Scope has been updated by including planks.

— Clause 5, Apparatus, has been restructured according to the current ISO drafting rules.

— 5.1, Reference plate: tolerance for the angle, has been adjusted to ±0,000 18 rad (0,01°), in analogy to 5.3 and 5.5.

— Clause 9, Calculation and expression of the results, has been updated by including measurement of the average lengths and by specifying the precision of reporting for squareness and straightness.

— Clause 10, Test report, has been updated according to modifications done in clause 9.

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.

Resilient and textile floor-coverings — Determination of side length, edge straightness and squareness of tiles

1 Scope

This document describes methods for determining side lengths, straightness of edges and squareness of resilient or textile floor tiles and planks.

The side lengths, straightness and squareness of resilient or textile floor tiles and planks are important considerations because installed flooring will have an objectionable appearance if these performance criteria are not followed. This can cause the installed tiles/planks to line up unevenly, producing unsightly seams and corners that do not match.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
squareness
measurement of the amount each corner of the tile/plank deviates from 90°, as depicted in Figure 1

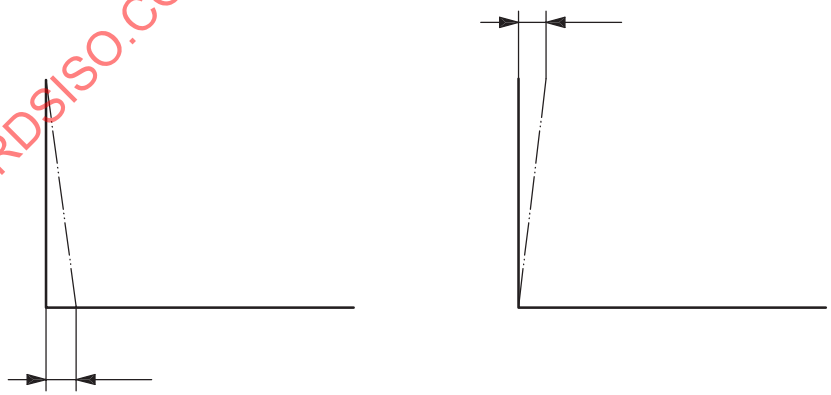


Figure 1 — Definition of squareness

3.2
straightness
property of an edge to be straight, unbent, as depicted in Figure 2

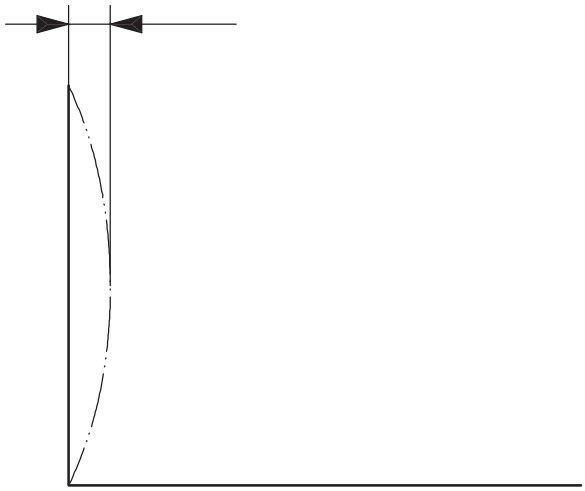


Figure 2 — Definition of straightness

3.3
tile/plank
type of resilient or textile flooring of predetermined shape intended to be used in a modular mode

Note 1 to entry: Tiles are usually square, but can also be rectangular, in which case they are also referred to as e.g. “plank”, “panel”.

4 Principle

The surface dimensions of a tile/plank are measured by a contact method at defined positions in each direction. To assess the squareness, each corner of a right-angled tile/plank is fitted into the dihedral angle of a precision square and the maximum gap between the arm of the square and the ends of the tile/plank is measured. The maximum opening between the arm and the edge is measured at defined points along the edge to assess the straightness.

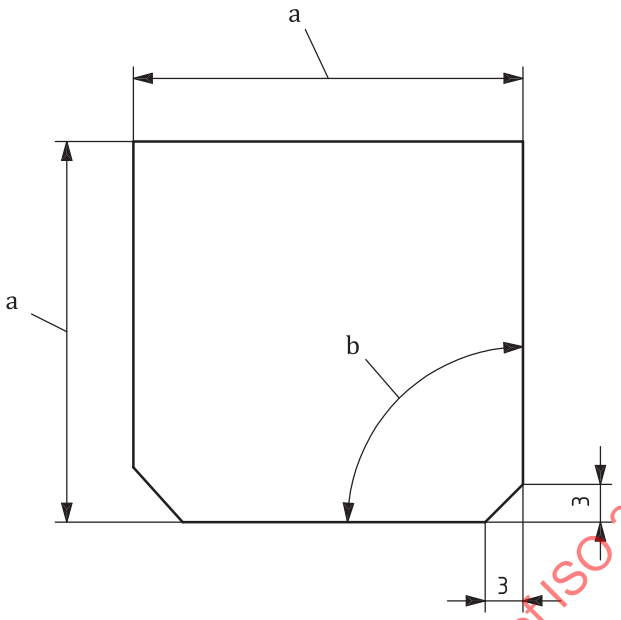
5 Apparatus

5.1 Reference plate

Reference plate, also referred to as a “calibration plate”, made to the target dimensions of the manufactured tile/plank.

The length and width dimensions shall be within 0,02 mm of the specified dimensions of the resilient or textile tiles/planks. The reference plate shall contain at least two sides that are perpendicular to [±0,000 18 rad (0,01°)] one another. These are used to set the squareness gauge to zero (see Figure 3).

Dimensions in millimetres



a Tile target dimension ±0,02 mm.

b 1,570 80 rad ± 0,000 05 rad.

Figure 3 — Reference plate (case of tile)

5.2 Rigid metal or glass plate

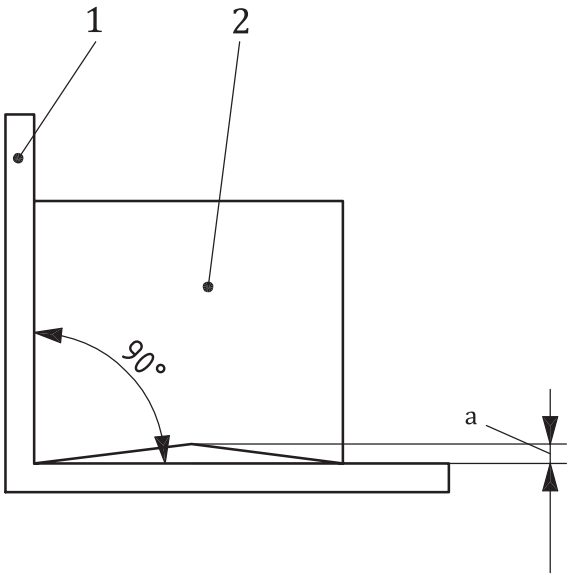
Rigid metal or glass plate shall be squared (or a rectangle) and finished, with dimensions 5 mm to 10 mm less than those of the tile/plank, for the thickness gauge method.

The mass per unit area of the plate shall be approximately 20 kg/m^2.

5.3 Flat bedplate apparatus

Apparatus for measuring the squareness and straightness of floor tiles/planks.

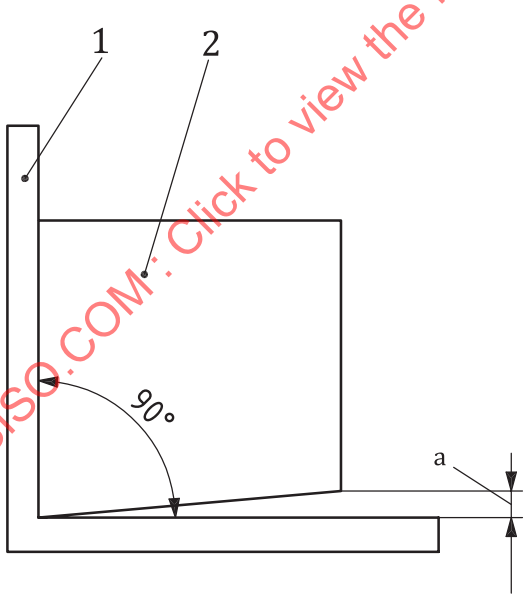
This apparatus shall be an "L" shaped steel device having an angle of 1,570 80 rad (90°) with a tolerance of ±0,000 18 rad (0,01°), as shown in Figures 4 and 5 with the length of both reference strips larger than the largest dimension of the tile/plank. To measure the side length, place a dial gauge (5.4) on the flat bedplate as shown in Figure 6.



Key

1 measuring tool
2 tile/plank
a Maximum length of gap.

Figure 4 — Apparatus and position of tile/plank for measuring straightness



Key

1 measuring tool
2 tile/plank
a Out of squareness.

Figure 5 — Apparatus and position of tile/plank for measuring squareness

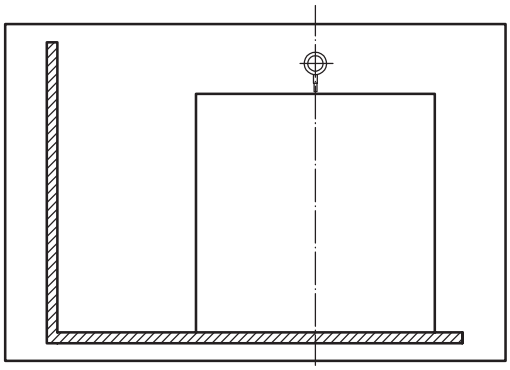


Figure 6 — Apparatus for measuring side length

5.4 Dial gauge, calliper gauge and/or thickness gauges

Use a dial gauge, a sliding calliper gauge or equivalent device having an accuracy of 0,05 mm to measure the length of the tiles/planks up to 610 mm. Alternatively, use a set of thickness gauges in steps of 0,05 mm, which can be easily inserted at any point between the "L" shaped steel device (5.3) and the edge of the tile/plank.

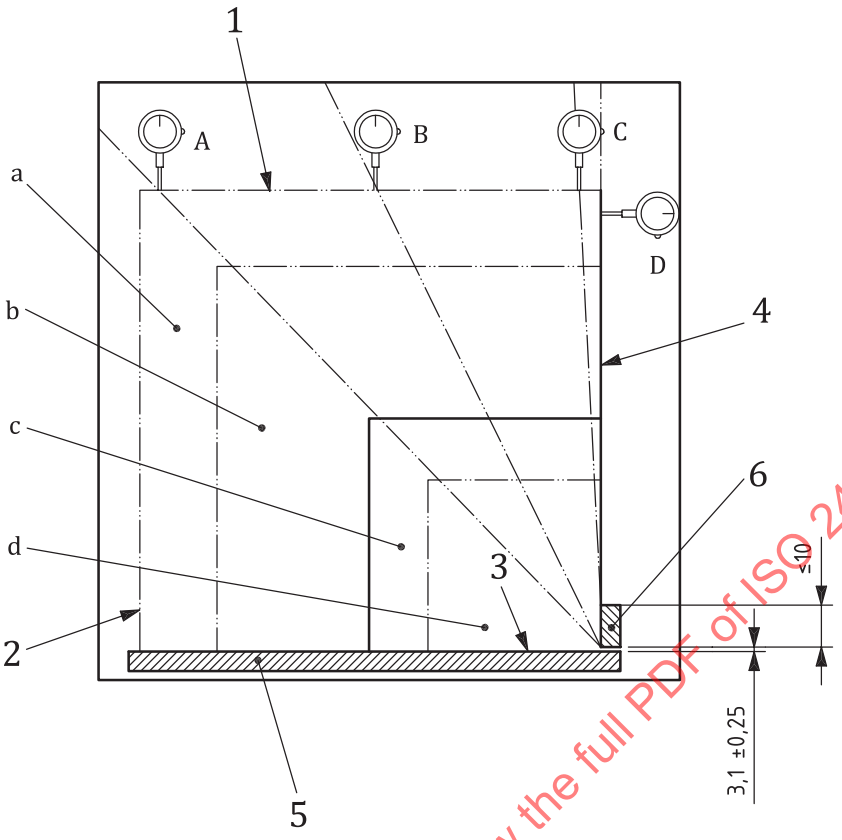
5.5 Movable dial gauges apparatus

Movable dial gauges apparatus containing two fixed index strips according to Figure 7.

A horizontal index strip shall be mounted parallel to and just inside the lower edge of the bedplate (5.3). It shall be 38 mm ± 3 mm greater in length and a minimum of twice the thickness of the largest resilient or textile tile/plank to be tested. A second index strip shall be mounted 1,570 80 ± 0,000 18 rad (90° ± 0,01°) to the horizontal index strip. The lower end of this index strip shall be 3,1 mm ± 0,25 mm above the right end of the horizontal index strip and is used to locate one corner of the sample tile/plank. The length of the second index strip shall be maximum 10 mm.

The four dial gauges are mounted allowing for measurement of various tiles/planks side lengths while remaining within 10 % of the corner of the tile/plank edge (for the two corner gauges and one squareness gauge) or within the central 10 % of the tile/plank edge (for the centre gauge only). Dial gauges may report measurements using electrical or mechanical means, but they shall be graduated to read 0,02 mm and have a stem travel greater than 6 mm. The contact foot of the dial gauge stem shall be flat, 12,7 mm to 19,1 mm in diameter and exert a total force of not more than 1,0 N. Dial gauges shall be securely positioned so that when the reference plate (5.1) is in place, the contact foot is extended approximately 50 % of its full travel.

Dimensions in millimetres



Key

1	edge 1	a	Template 610 mm × 610 mm.
2	edge 2	b	Template 508 mm × 508 mm.
3	edge 3	c	Template 305 mm × 305 mm.
4	edge 4	d	Template 229 mm × 229 mm.
5	horizontal index strip		
6	second index strip		
A, B, C, D	dial gauges		

Figure 7 — Apparatus for measuring side length, straightness and squareness

6 Sampling and selection of specimens

Five tiles/planks shall be taken from the product. Where a pack of tiles/planks comprises the sample, ensure that the first and the last tiles/planks are not selected for testing. Mark the machine direction (MD) on every tile/plank. If the machine direction cannot be determined by the appearance of the material, mark one direction. Report that the machine direction could not be determined.

7 Atmosphere for conditioning and testing

7.1 Resilient floor coverings

Condition the test specimen at (23 ± 2) °C and (50 ± 5) % relative humidity for at least 24 h and test in the same conditions. Specimens shall be conditioned on a flat surface such as a table or floor surface to ensure they will contact the bedplate (5.3) uniformly during measurement.

7.2 Textile floor coverings

Condition the test specimen at (20 ± 2) °C and (65 ± 4) % relative humidity for at least 24 h and test in the same conditions. Specimens shall be conditioned on a flat surface such as a table or floor surface to ensure they will contact the bedplate (5.3) uniformly during measurement.

8 Procedure

8.1 General

Dirt and foreign particles may collect along the upper face of the index strip and affect the zero set point. Use a small brush to maintain the cleanliness of the index strip surfaces before and after each use.

In the following subclauses, options are given for methods for determining the side length (8.2), squareness (8.3) and straightness (8.4).

8.2 Side length

8.2.1 Gauge method

Place the appropriate reference plate (5.1) onto the bedplate apparatus (5.3) (see Figure 6). Set the dial indicator to zero. Remove the reference plate. Place the tile/plank on the flat bedplate, with the rigid square/rectangle plate (5.2) on top. Take three measurements of the distance between the opposite sides in each direction, two of these measurements approximately 10 mm from the perpendicular edges and the third equidistant from the first two.

8.2.2 Movable dial gauge method

Place the appropriate reference plate (5.1) onto the bedplate surface (5.3) and slide firmly against the two index strips. Set each of the four dial indicators to zero. Remove the reference plate. All dial indicators will now reflect their fully extended measurements. In the case of digital indicators, the display will indicate a negative number. In the case of mechanical dial indicators, the display will move counter-clockwise from zero.

Identify one edge of the sample tile/plank as edge 1 by attaching a label to the face of the tile/plank near that edge. Place the tile/plank into the apparatus (5.5) and carefully move it into position such that it will depress all four dial gauges and that there is firm contact with both index strips. Record the measurements on all four gauges to the nearest 0,02 mm as they will be used for the side length, straightness and squareness calculations (see Table 1).

Remove the tile/plank from the bedplate and rotate it 90° in the clockwise direction. Repeat the process described in preceding paragraph and record the four gauge readings. Repeat for each of the two remaining sides.

After all samples have been measured, place the reference plate back on the bedplate to verify that no movement of the dial gauges has occurred. If the movement is greater than 0,02 mm, repeat the measurement process.

8.2.3 Sliding calliper method

Take three measurements of the distance between the opposite sides in each direction, two of these measurements approximately 10 mm from the perpendicular edges and the third equidistant from the first two.

8.3 Squareness

8.3.1 Thickness gauge method

To measure the squareness of a floor tile/plank using a thickness gauge (5.4), place one edge of the tile/plank against an arm of the square/rectangle and slide it up to touch the other arm. Then place the rigid plate (5.2) on top without moving the tile/plank. Determine the thickest gauge which can be easily inserted between the second arm of the square/rectangle and the tile/plank at the end of the edge to assess the deviation from the squareness (see Figure 5).

8.3.2 Movable dial gauge method

See 8.2.2.

8.4 Straightness

8.4.1 Thickness gauge method

The straightness of a tile/plank is the largest gap existing at the middle of the edge of the tile/plank (see Figure 2). Measure this gap by inserting the dial gauge or the thickness gauge (5.4) between the "L" shaped steel device (5.3) and the edge of the tile/plank.

8.4.2 Movable dial gauge method

See 8.2.2.

9 Calculation and expression of the results

9.1 For flat bedplate apparatus (5.3) and thickness gauge (5.4)

9.1.1 Side length

Calculate the average of the deviations in each direction per tile/plank and the measured average lengths. The side lengths shall be reported to 0,1 mm.

9.1.2 Squareness

Calculate the greatest deviation at the end of the edge for squareness. Report to the nearest 0,05 mm.

9.1.3 Straightness

Calculate the greatest deviation at any point along the edge for straightness. Report to the nearest 0,05 mm.

9.2 For the movable dial gauge apparatus

Record all tile size measurements in the format shown in Table 1. Measurements shall be recorded to the nearest 0,02 mm for all gauges. The four rotations provide two measurements of the length and width of the tile/plank specimens. Report the dimensions and squareness for each specimen using the formulae in Table 2.

Perform the calculations using Table 2 data to determine length, width and squareness deviations for the sample tile/plank. The final report shall include test date, side length, straightness and squareness deviations.