SLOVENSKI STANDARD
oSIST prEN ISO 23999:2025

01-februar-2025

Netekstilne talne obloge - Ugotavljanje dimenzijske stabilnosti in gubanja (navpična deformacija) po izpostavitvi toploti (ISO/DIS 23999:2024)

Resilient floor coverings - Determination of dimensional stability and curling (vertical deformation) after exposure to heat (ISO/DIS 23999:2024)

Elastische Bodenbeläge - Bestimmung der Maßhaltigkeit und Schüsselung (vertikale Verformung) nach Wärmeeinwirkung (ISO/DIS 23999:2024)

Revêtements de sol résilients - Détermination de la stabilité dimensionnelle et de l'incurvation après exposition à la chaleur (ISO/DIS 23999:2024)

Ta slovenski standard je istoveten z: **prEN ISO 23999**

ICS:

97.150	Talne obloge	Floor coverings

oSIST prEN ISO 23999:2025 **en,fr,de**

DRAFT International Standard

ISO/DIS 23999

Resilient floor coverings — Determination of dimensional stability and curling (vertical deformation) after exposure to heat

ICS: 97.150

ISO/TC **219**

Secretariat: **NBN**

Voting begins on:
2024-12-10

Voting terminates on:
2025-03-04

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 23999:2024(en)

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Published in Switzerland

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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.

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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 219, Floor coverings.

This fourth edition cancels and replaces the third edition (ISO 23999:2021), which has been technically revised.

The main changes are as follows:

— Scope: Minor changes to the wording (for example “determining dimensional stability and curling” replaced by “dimensional stability and curling (vertical deformation)”)

— Terms and definitions: Adaption/changes to the wording of some definitions and adding missing (e.g. “machine direction” and “across machine direction”)

— Apparatus: Clearer, more unambiguous deviation between devices used for sheet and/or roll materials and rectangular shaped elements (squared tiles or long panels), explanation of the use of the so called “block and dial gauge apparatus” and minor changes/adaptions and correction to the figures (Note: No device and no figure is completely deleted.)

— Test specimen: Description of the preparation distinguishing sheet and/or roll materials and rectangular shaped elements (squared tiles or long panels)

— Calculation and expression of results: Simplification analogous to similar testing standards. No superfluous formulae, e.g. for simple mean value calculations and percentage indication of measurement results. Clarification what is necessary or optional. All terms for calculation are in agreement with the descriptions before and the definitions in clause 3. Calculation and expression of results can be found in new Annex B.

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 floor coverings — Determination of dimensional stability and curling (vertical deformation) after exposure to heat

1 Scope

This document specifies methods for determining dimensional stability and curling (vertical deformation) of resilient floor coverings in all forms (e.g. of sheets, tiles, panels, planks or in rolls) after exposure to heat and/or after reconditioning.

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 terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
dimensional stability
in the context of this document, it is the ability of a resilient floor covering to retain its original linear dimensions (no elongation or shrinking) after exposure to heat, determined by measuring the linear dimensional change in machine direction or across machine direction.

3.2
curling (vertical deformation)
vertically concave (+) or convex (-) deformation from the horizontal

3.3
concave deformation
a type of curling (vertical deformation) appearing as uplifted top surface at the outer edge of the specimen; given as positive value (+)

3.4
convex deformation
a type of curling (vertical deformation) appearing as uplifted/domed top surface in the centre of the specimen; given as negative value (-)

3.5
machine direction (MD)
direction parallel to the length side of a floor covering manufactured in a continuous process

Note 1 to entry: For rectangular or squared cut specimens (e.g. tiles and planks) where the machine direction could not be determined the direction of MD can be arbitrarily assigned for the test to enable differentiation from AMD.

3.6
across machine direction (AMD)
direction across to the length side of a floor covering manufactured in a continuous process

Note 1 to entry: For rectangular or squared cut specimens (e.g. tiles and planks) where the machine direction could be unknown, the MD can be arbitrarily assigned for the test to enable differentiation from MD.

4 Principle

4.1 General

Three test specimens are initially measured and then placed in an oven at an elevated temperature which may cause dimensional changes and curl (3.1 - 3.4). After a specific period in the oven and subsequent time of reconditioning, dimensional stability and the stability against vertical deformation (curling) are measured again on the same test specimens.

4.2 Dimensional stability

The relative change in linear distance between the same marks or same specific locations of the top surface layer of a test specimen, measured after exposure to a heat treatment and reconditioning. Depending on the size of the specimen and the structure of the surface, different measuring devices could therefore be appropriate.

As a case for special interests, the determination of the change of linear dimensions on hot test specimens, meaning before reconditioning. As this does not affect the normative measurement of dimensional stability and curling, it can be determined as an intermediate result on the same test specimens (see Annex A).

4.3 Curling (vertical deformation)

Curling is measured at the highest peaks of the test specimens possibly occurring after the specified heat treatment in an oven at an elevated temperature and reconditioning in a normal conditioned climate.

An initial vertical deformation of the test specimen (before the exposure to heat) can be measured.

5 Apparatus

5.1 Oven

An oven which shall be thermostatically controlled and ventilated, capable of being maintained at a uniform temperature with maximum deviations of ±2 °C.

The oven must be capable to place specimens inside in a way that ensures that radiation from the heating elements does not directly reach the test specimens or support plates (5.2). Therefore, the distance between the support plates (5.2) and the vertical walls of the oven shall be more than 50 mm and the vertical distance between the support plates and between the plates and the oven ceiling and base shall be more than 100 mm.

5.2 Support plates

The support plates on which the specimens will be placed for the test shall be of metal, e.g. aluminium or stainless steel, of dimensions larger than the test specimen, 2,0 mm ± 0,5 mm in thickness. Ensure that the support plates are kept smooth and polished so that surface friction does not interfere with free shrinkage or growth of the test specimens. The plates shall be flat and free of convex or concave distortion and fully support the sample (e.g. a wire rack support plate is not acceptable.).

6 Measuring devices

6.1 Measurement devices for determination of curling (vertical deformation)

The measuring equipment could be any appropriate apparatus or device capable of measuring small distances vertical from the support plate (5.2) with a precision of ±0,1 mm and without influencing the test specimens by any kind of load from the test device itself.

This could be for example:

— a laser measuring device;

— other optical measuring devices;

— tactile measuring devices (e.g. pillar-mounted drop gauge device, feeler gauges or a micrometer).

6.2 Measurement devices for determination of linear dimension changes

All used measuring equipment shall measure with a precision of at least ±0,02 mm.

The measuring equipment could be:

— an optical bench for non-contact dimensional measurements between two marks on the top surface (for example scores which are carefully made in the surface) or;

— callipers or;

— a block and dial set-up (so-called "block and dial gauge apparatus", see 6.2.3) as shown in Figures 2, 3 and 4 for tactile measurement at the outer edge of the specimen top layer.

NOTE 1 For many types of optical benches, ensure that the test specimen is properly seated against the base horizontal index guide when a specific measurement is being taken, otherwise test specimens with concave or convex edges can be read incorrectly.

NOTE 2 For ready shaped floor covering elements (e.g. tiles and planks) the block and dial gauge apparatus is appropriate. For test specimens prepared from sheet or roll material, equipment should be used which take measures from the top surface.

6.2.1 Scoring device

A scoring device, e.g. a single edge razor blade, scalpel or scribe point, can be used to make marks in the top surface of test specimens made from sheet or roll material or optionally for glue down tiles and planks for measuring with an optical bench (6.2).

6.2.2 Rigid steel plate

Optional auxiliary device to help flatten concave or convex deformed test specimens from sheet or roll material or optionally for glue down tiles and planks. A rigid plate of steel, squared and finished, of dimensions 240 mm × 240 mm with holes to see the measuring marks (examples are shown in Figure 1 and 6) on the top surface of the specimens. If larger format specimens are tested, then the rigid plate should be of commensurate size and configuration.

6.2.3 Block and dial gauge apparatus (for tiles and planks)

Test device consisting of a support plate in sufficient size with a lay-on edge (block) to be used with a measuring device (for example a dial gauge, see Figures 2, 3 and 4).

6.2.3.1 Square standard template (optionally)

Standard templates can be used together with the block and dial gauge apparatus (6.2.3) for determination of deviations in size between the template and a product or a specimen. Figure 2 shows an example of a

block and dial gauge apparatus with the possible use of standard templates in 4 different sizes and possible positions of the measuring devices to determine also straightness and squareness. A square standard template has the nominal side length of a product or a test specimen and should be rectangular. The deviations from the template sizes before and after heat exposure can show the linear dimensional changes due to the heat influence.

NOTE 1 A standard template is normally calibrated for straightness, squareness, and length with regard to the nominal sizes of a product. They can be useful for a quick measurement with always the same dimensions (e.g. for in-house production monitoring).

NOTE 2 The calculation of the dimensional changes shown in clause 10 do not refer to the measuring method with the use of a template.

6.2.3.2 Shim or spacer block

An auxiliary device to bridge the gap between the stop (edge) of the block and dial gauge apparatus (6.2.3) and a specimen whose length is (much) greater than the width as shown in Figures 3 and 4. A rigid steel plate, square and with parallel sides, which serves as a filling for the free space to allow the use of the device (6.2.3) with if necessary (for example in case that the dial gauges cannot be placed on the test device elsewhere near to the test specimen).

NOTE Specimens (flooring products) could have different widths which can make it necessary to use shim or spacer blocks with different sizes or a combination of two or more spacer blocks. As the measurement is a relative measurement of a change in dimension, the spacer block can be without calibration.

Dimensions in millimetres

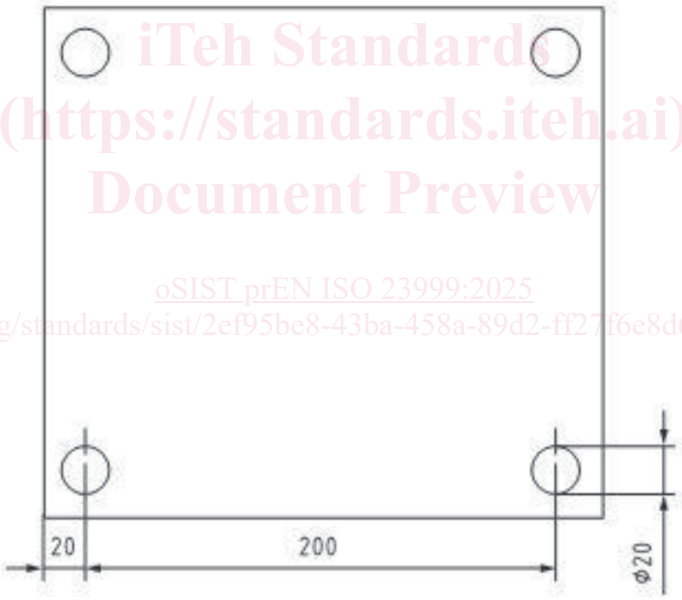

Figure 1 — Rigid steel plate