PUBLICLY AVAILABLE SPECIFICATION

ISO/PAS 17984

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Machine-made textile floor coverings — Determination of dimensional changes after exposure to heat and/or water

Revêtements de sol textiles fabriqués à la machine — Détermination de la variation dimensionnelle après exposition à la chaleur et/ou à l'eau

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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 3.

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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed every three years with a view to deciding whether it can be transformed into an International Standard.

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

ISO/PAS 17984 was prepared by Technical Committee ISO/TC 219, *Floor coverings*.

Annex A of this Publicly Available Specification is for information only.

Introduction

When ISO/TC 38/SC 12 reviewed ISO 2551:1981, it decided that because the original method gave rise to technical difficulties, any revision should incorporate a number of test method options for dimensional stability to heat, water and combined heat and water and stability out of the plane. In order to establish the utility of this new approach, and to allow the precision of each test method to be established, it was decided to initially publish a document that would allow for further development based on some or all of these methods.

When ISO/TC 219 inherited the project from the disbanded ISO/TC 38/SC 12 it decided that the most appropriate publication was a Publicly Available Specification (PAS) and that ISO 2551 would not be withdrawn until PAS 17984 had been thoroughly reviewed for a period following its publication.

Machine-made textile floor coverings — Determination of dimensional changes after exposure to heat and/or water

1 Scope

This Publicly Available Specification specifies procedures for the determination of both planar and out-of-plane dimensional changes that take place when machine-made textile floor coverings are subjected to heat, water or varied heat and water conditions.

The following methods are applicable to all machine-made textile floor coverings including those produced in tile form.

— Method 1: Determination of dimensional changes after exposure to heat.

— Method 2: Determination of dimensional changes after immersion in water.

— Method 3: Determination of dimensional changes due to the effects of varied heat and water conditions.

— Method 4: Dimensional changes out of the plane.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Publicly Available Specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this Publicly Available Specification are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 139, *Textiles — Standard atmospheres for conditioning and testing.*

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

ISO 2424, *Textile floor coverings — Vocabulary.*

3 Terms and definitions

For the purposes of this Publicly Available Specification, the terms and definitions given in ISO 2424 apply.

4 Principle

Comparison is made between either planar or out-of-plane dimensions of a test specimen after conditioning in the standard atmosphere for testing textiles and after being subjected to either heat, water or specified varied heat and water conditions.

5 Apparatus

5.1 Methods 1, 2 and 3

5.1.1 Instrument capable of measuring length to the nearest 0,1 mm, e.g. an optical bench or mechanical device with gauge.

5.1.2 Plate glass sheet, marginally smaller than the test specimen, or other means of keeping the specimen flat while measurements are made. This will not be required if the instrument in 5.1.1 incorporates such a glass or metal plate.

5.1.3 Steel pins or **other appropriate means of indicating the reference points on the test specimen,** if necessary.

NOTE A suitable piece of equipment incorporating 5.1.1, 5.1.2 and 5.1.3 is given in annex A.

5.2 Methods 1 and 3

5.2.1 Ventilated drying oven, capable of being controlled at 60 °C ± 2 °C, with perforated and lacquered shelves that can be placed in the oven.

5.2.2 Desiccator or **similar apparatus, for maintaining specimens in a dry condition.**

5.3 Methods 2 and 3

5.3.1 Container, for holding water at 20 °C ± 2 °C, with dimensions at least 20 mm greater than the test specimen and deep enough to accommodate the submerged test specimen.

5.3.2 Rigid perforated tray, of a sufficient size to carry the test specimen.

5.3.3 Efficient wetting agent, e.g., sodium dioctyl sulfosuccinate, or dodecylbenzene sodium sulfonate.

5.3.4 Means of ensuring a forced draught of ambient air, if required.

5.4 Method 4 (if used in conjunction with methods 1, 2 or 3)

5.4.1 Gauge or **instrument,** capable of measuring in the vertical dimension, to an accuracy of 0,5 mm.

6 Sampling and selection of test specimens

6.1 Sampling

Select the specimens in accordance with ISO 1957.

6.2 Number and dimensions of test specimens

Take at least three test specimens each measuring not less than 450 mm × 450 mm, noting the direction of manufacture.

6.3 Conditioning

Lay out the specimens flat, singly and with the use surface uppermost in the standard atmosphere for testing for at least 48 h and until they reach constant mass (defined as no change in mass greater than 1 %) when determined at hourly intervals over a period of 3 h.

7 Procedure

7.1 Method 1: Determination of dimensional changes after exposure to heat

Make the first measurements (l_0) on the fully conditioned specimen using, e.g. the method described in annex A.

Place the specimen on the rigid perforated tray (5.3.2) with the use surface uppermost, and put it on a shelf in the drying oven (5.2.1) at 60 °C ± 2 °C. Keep the specimen in the drying oven for a period of 24 h. Remove it and place it immediately in a desiccator or similar apparatus (5.2.2) to allow cooling to take place. When its temperature has reached 20 °C ± 2 °C, remove the specimen from the desiccator and immediately measure the dimensions (l_1) using, e.g. the method described in annex A.

Leave the specimens in the standard atmosphere for testing to allow reconditioning to take place, until constant mass is again obtained (see 6.3). Measure the dimensions (l_2) to the nearest 0,1 mm, using e.g. the method described in annex A. Note the final appearance of the specimen.

7.2 Method 2: Determination of dimensional changes after immersion in water

Make the first measurements (l_0) on the fully conditioned specimen using, e.g. the method described in annex A.

Place the specimen on the rigid perforated tray with the use surface uppermost, and immerse it, laid flat, in water to which has been added 0,5 g/l of an efficient wetting agent (5.3.3), calculated on active matter content, at a temperature of 20 °C ± 2 °C. Allow the specimen to soak in the water for 2 h, ensuring that it remains submerged throughout. Lift the tray with the specimen from the water, taking precautions to avoid distorting its shape. Leave to drain in a horizontal position for 5 min ± 1 min. Place the specimen on the measuring board (5.1.1) and again measure the dimensions (l_1), using e.g. the method described in annex A.

Dry the specimen on the tray in the standard atmosphere for testing, as described in clause 6, using a forced air draught (5.3.4) if necessary, until constant mass is again obtained as in 6.3. Measure the dimensions (l_2) using e.g. the method described in annex A. Note the final appearance of the specimen.

7.3 Method 3: Determination of dimensional changes due to the effects of varied heat and water conditions

7.3.1 Initial measurement of the specimen

Make all measurements on the conditioned specimen when it is completely flat; this can be achieved by use of the glass plate (5.1.2) or other means.

On the conditioned specimen, measure the distance between the edges parallel to the direction of manufacture and between the edges at right angles to the direction of manufacture, each at two locations approximately 200 mm apart. If required by the method of measuring adopted, mark the pair of reference points, e.g. by the use of steel pins (5.1.3), approximately 200 mm apart on the edge parallel to the direction of manufacture and also on the edge at right angles to the direction of manufacture. Make all measurements on the back of the specimen to the nearest 0,1 mm.

NOTE Products made of discrete layers, e.g. foam-backed constructions, should be measured on both the backing and the use-surface, and the results of both measurements given in the test report.

7.3.2 Determination

Place the test specimen, lying freely on the perforated and lacquered shelves, in the drying oven (5.2.1), controlled at 60 °C ± 2 °C. Keep the specimen in the drying oven for 2 h, then remove it and measure the distance between the two parallel edges or the two sets of marks to the nearest 0,1 mm, within 6 min to 7 min of removing the specimen from the oven.

Immerse the test specimen, laid flat, in water at a temperature of 20 °C ± 2 °C and allow it to soak in the water for 2 h. Remove the specimen from the water, taking precautions to avoid distorting its shape. Excess moisture may be removed by placing the specimen between sheets of blotting paper. Within 5 min ± 1 min of removing the specimen from the water, again measure the distance between the two parallel edges or the two sets of marks as specified in 7.1.

Dry the test specimen for 24 h in the drying oven at 60 °C ± 2 °C under the same conditions as before. Within 6 min to 7 min of removing the specimen from the oven again measure the distance between the two parallel edges or two sets of marks as specified in 7.1.

Finally, leave the test specimen for 48 h in the standard atmosphere for testing textiles. Measure the distance between the two parallel edges or the two sets of marks to the nearest 0,1 mm, note the final appearance of the test specimen, and assess the degree of distortion as mild, moderate or severe and state the nature of the distortion i.e. dishing, doming or wrinkling.

7.4 Method 4: Dimensional changes out of the plane

Measure the vertical deformation shown by the specimen initially, and after treatment with the various specified conditions of heat, water or heat and water, using the apparatus described in 5.4.1 and a baseboard such as that described in A.2.1.

Lay the specimen on the baseboard, use surface uppermost, and measure the distance between the baseboard and the back of the specimen at various points along the edges (edge curl).

Record the maximum edge curl to the nearest 0,5 mm for each side of the specimen as being the greatest distance between the back of the sample and the base plate.

8 Planar stability

Calculate the arithmetic mean of the dimensions obtained for all specimens in the direction of manufacture and in the direction at right angles to this for each of the stages referred to in clause 7.

Calculate in each case the variations observed and express as a percentage, to the nearest 0,05 %, using the formula

$$\frac{l_m - l_0}{l_0} \times 100$$

where

l_0 is the arithmetic mean of the initial measurements;

l_m is the arithmetic mean of measurements at each of the stages referred to in clause 7.

Indicate shrinkage by a minus sign and an increase in dimensions by a plus sign.

9 Test report

The test report shall contain the following information:

a) the test method(s) used;

b) a statement that the procedure was conducted in accordance with this Publicly Available Specification, and details of any operations not included, or optional;

c) the individual values for each specimen of the measurements made in the direction of manufacture and in the direction at right angles to the direction of manufacture, together with the results obtained as specified in clause 8;

d) a description of the final appearance of the test specimens, i.e. whether they exhibit mild, moderate or severe distortion;

e) an indication of the type of measuring instrument used;

f) the maximum edge curl per side per specimen;

g) details of any deviations from the standard method procedure.

Annexe A
(informative)

Determination of dimensions of textile floor covering test specimens

A.1 Scope

This method is applicable to textile floor coverings of all types, with a maximum thickness of 15 mm.

A.2 Apparatus

A.2.1 A rigid, durable, smooth and waterproof baseboard

The baseboard should consist, e.g. of metal or marine plywood coated with a plastic laminate, of a size suitable to accommodate the test specimen. Two stop bars, approximately 25 mm wide and 15 mm high, are fitted at right angles along two adjacent sides with a gap of approximately 1 mm at the corner. On each of the two opposite sides, two cut-outs or slots are made approximately 20 mm wide and at least 20 mm long, to accommodate the presser feet of the dial gauge micrometers. The slots are positioned at 1/3 and 2/3 the nominal specimen size (length of side) from the stop bars, and are required to allow the presser feet to move ± 10 mm from the nominal size of the specimen (see Figure A.1).

A.2.2 Four dial gauge micrometers

Each micrometer has presser feet 20 mm diameter, traverse > 20 mm, capable of measuring to 0,1 mm and operating with a force of between approximately 0,5 N and 1 N. The gauges are mounted centrally within the cut-outs or slots with their axes in a horizontal plane and so that their centres are 5 mm above the level of the base. A means of holding the dial gauge presser foot shafts in their maximum position is required.

A suitable apparatus is shown in Figures A.1 and A.2.

NOTE It may be possible to accommodate more than one nominal specimen size on one apparatus by repositioning the dial gauges and/or by additional stop bars.

A.2.3 Metal squares or T-squares

These are of known dimensions equivalent to the nominal specimen dimensions and accurate to 0,25 mm (for calibration of the gauge position).

A.2.4 Square flatplates

These are 10 mm smaller than the nominal specimen size, of mass approximately 5 kg/m^2 (for covering specimens during the test).

A.3 Test specimens

A.3.1 Sampling, number, dimensions and conditioning

The sampling, number, dimensions and conditioning of test specimens should be in accordance with the standard method being used.

NOTE Selection should generally be as described in ISO 1957.

A.3.2 Marking

Wherever possible, the direction of manufacture should be identified. All measurements should be made with reference to this, and the sides should be marked A, B, C, D as shown in Figure A.3. If the direction of manufacture cannot be identified, an arbitrary identification of direction and related sides should be made.

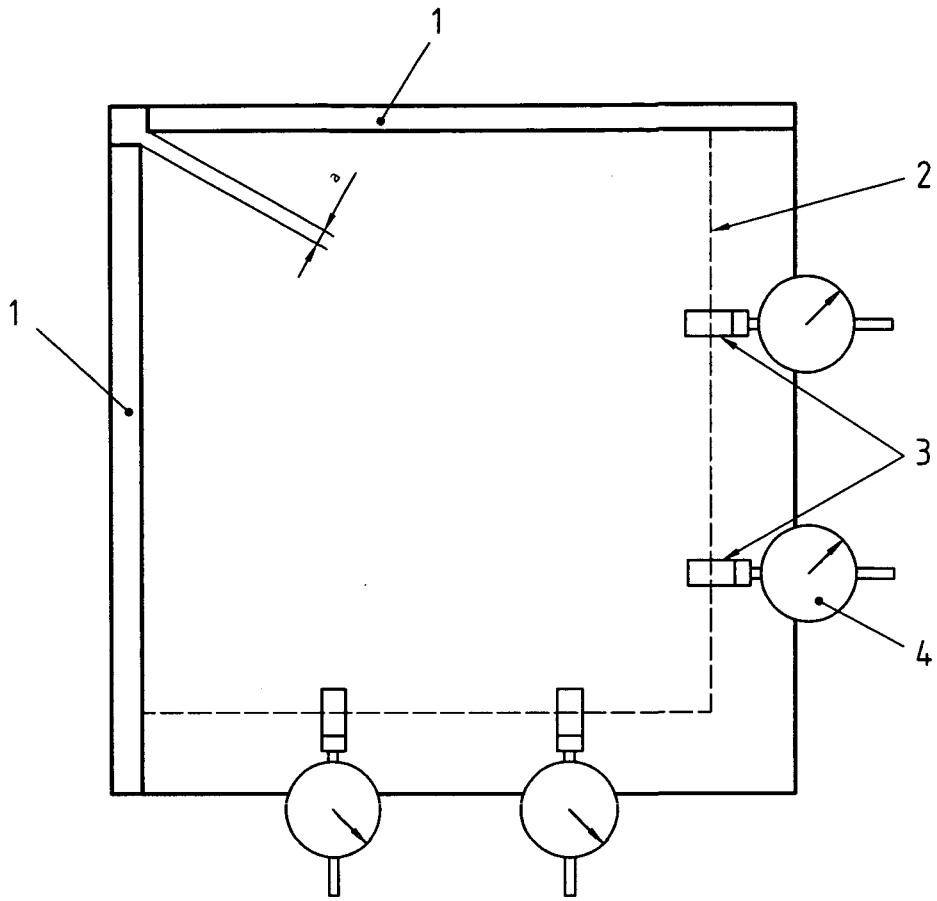
A.4 Procedure

A.4.1 With the dial gauge presser foot shafts in their maximum positions, place the appropriate calibration square or T-square on the baseboard and ensure that it is in contact with the stop bars. Release the dial gauge shafts and obtain a zero reading for each micrometer. Re-lock the dial gauge shafts in their maximum positions and remove the calibration square.

A.4.2 Place the specimen, reverse side uppermost, on the apparatus, with side A firmly against the top stop bar and at least part of side D in contact with the side stop bar, taking particular care where direction of pile might cause springing back. Place the appropriately sized flat plate centrally on top of the specimen, ensuring that the specimen remains flat and in position, allow the feet of the dial gauges situated opposite side A to rest against the edge of the specimen, and record the readings on both gauges to the nearest 0,1 mm.

By reference to the calibration, and by the appropriate addition or subtraction of the zero reading, calculate the two values for dimensions in the direction of manufacture.

A.4.3 Remove the flat plate and re-position the specimen so that side D is firmly against the side stop bar and at least part of side A is in contact with the top stop bar. (No re-positioning will be required if sides A and D are precisely at right angles to each other.) Replace the flat plate and carry out the measurements as described in 7.2, but this time using the two dial gauges situated opposite side D. Again calculate the two values for dimensions at right angles to the direction of manufacture.

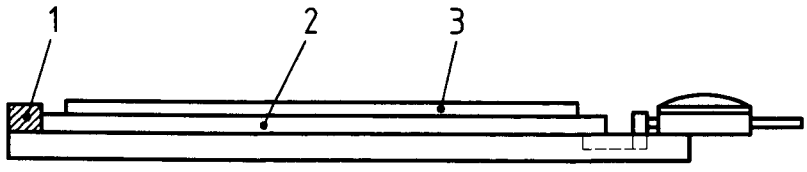


Key

1 Stop bars
2 Test specimen
3 Cut outs/slots
4 Gauges

[a] Approximately 1 mm.

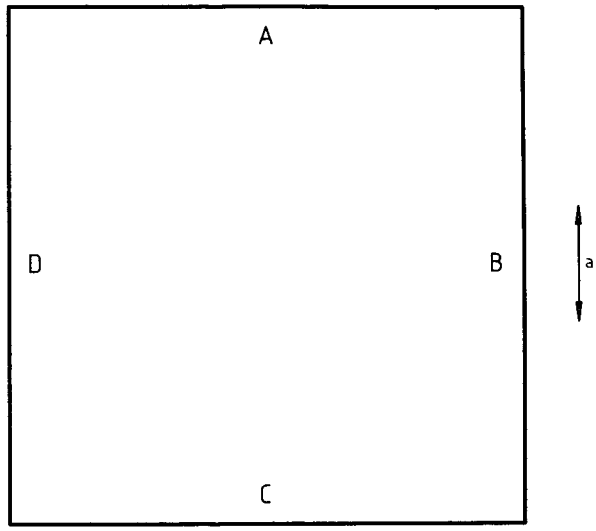
Figure A.1



Key

1 Stop bar
2 Baseboard
3 Test specimen

Figure A.2



[a] Direction of manufacture.

Figure A.3

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