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Laminate and textile floor coverings — Determination of dimensional variations after exposure to humid and dry climate conditions

Revêtements de sols stratifiés et textiles — Détermination des variations dimensionnelles après exposition à des conditions climatiques humides et sèches

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Contents

Page

Foreword

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ISO 24339 was prepared by Technical Committee ISO/TC 219, *Floor coverings*.

Laminate and textile floor coverings — Determination of dimensional variations after exposure to humid and dry climate conditions

1 Scope

This International Standard specifies a process to determine the capability of laminate and textile floor coverings to withstand exposure to moderate humid and dry climate conditions. The subclauses pertaining to flatness, openings between elements and height differences between elements only apply to laminated floor coverings.

2 Principle

To simulate as real use conditions as possible, a test floor covering with an approximate area of 5,5 m^2 is installed in a climate chamber. After a conditioning period of one week, the floor covering is exposed for four weeks to humid climate and finally another four weeks to dry climate conditions. When applicable, after each week, dimensional variations, flatness, openings between elements, height differences between elements, etc. are recorded.

3 Apparatus

3.1 Climate chamber, of large enough size to have room for a subfloor as described in 3.2, enabling the following atmospheres to be maintained:

— an atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity (RH) called conditioning atmosphere;

— an atmosphere of (23 ± 2) °C and (85 ± 5) % relative humidity (RH) called humid atmosphere;

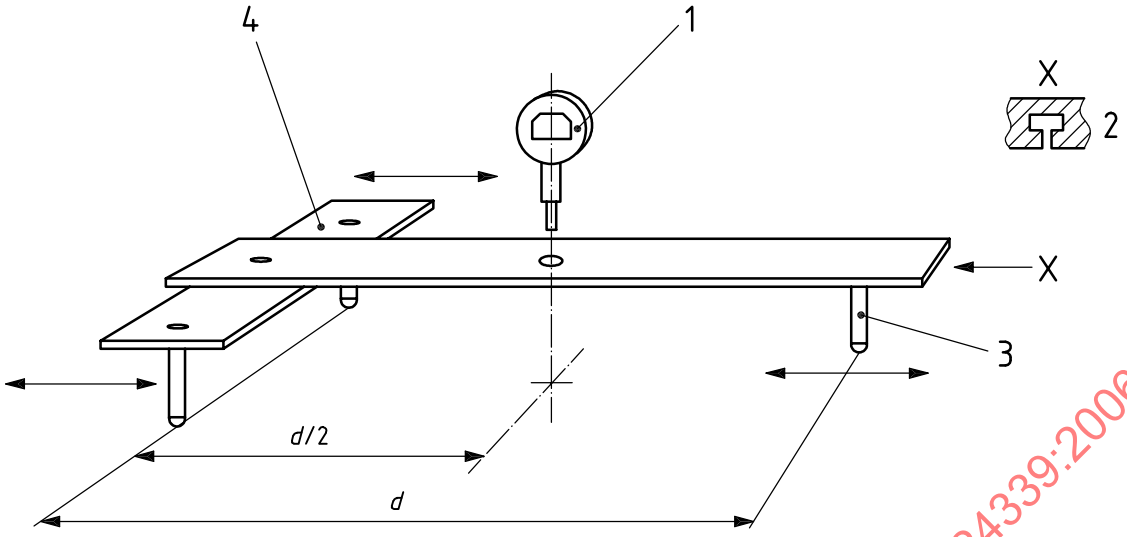
— an atmosphere of (23 ± 2)°C and (30 ± 5) % relative humidity (RH) called dry atmosphere.

It is possible to use one chamber to maintain successively the three atmospheres or to have three chambers, each one maintaining only one of these atmospheres all the time.

3.2 Subfloor, with an approximate size of 3 m × 2 m, rigid and flat (maximum tolerances ± 5 mm / 2 m and ± 1 mm / 200 mm).

3.3 Set of thickness gauges, with accuracy and an interval of 0,05 mm.

3.4 Apparatus for measuring width flatness, consisting of a dial gauge accurate to ± 0,01 mm with a rounded tip of radius ⩽ 5 mm, installed centrally in relation to three rounded supports with radius ⩾ 5 mm. The supports shall be adjustable along a T-shaped assembly of bars to provide the required gauge length. The measurement, d, shall not be less than the width, w, of the test specimen minus 10 mm. The tip of the gauge in contact with the face of the test specimen shall apply a force of (1,0 ± 0,5) N. The mass of the apparatus shall not affect the flatness of the test specimen beyond the limit of the accuracy of the gauge. See Figure 1. The instrument shall be set to zero against a suitable reference plate.



Key

1 dial gauge
2 T-groove
3 adjustable pin
4 adjustable bridge

Figure 1 — Apparatus for measuring width flatness, principle

3.5 **Calliper gauge** or **any other equivalent tool** with an accuracy of ± 0,01 mm.

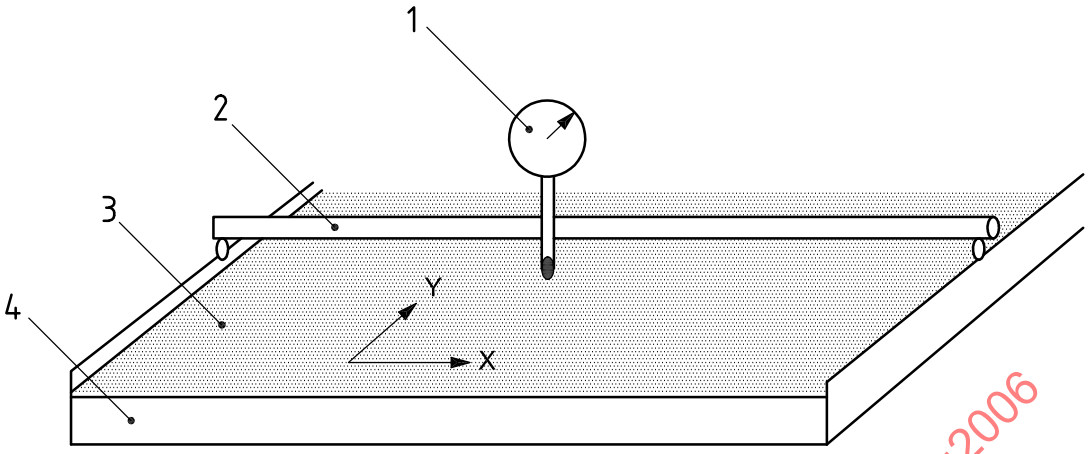
3.6 **Flexible steel ruler**, of length about 2 600 mm.

3.7 **Flexible steel ruler**, of length about 1 600 mm.

3.8 **Rigid ruler**, 1 500 mm long, with a bow less than 0,1 mm.

3.9 **Measurement bridge**, (movable in Y-axis), with a bow less than 0,1 mm equipped with a calliper gauge (movable in X-axis), with an accuracy of ± 0,01 mm.

The idea with this measurement bridge is to cover the entire test area with one instrument. See Figure 2.



Key

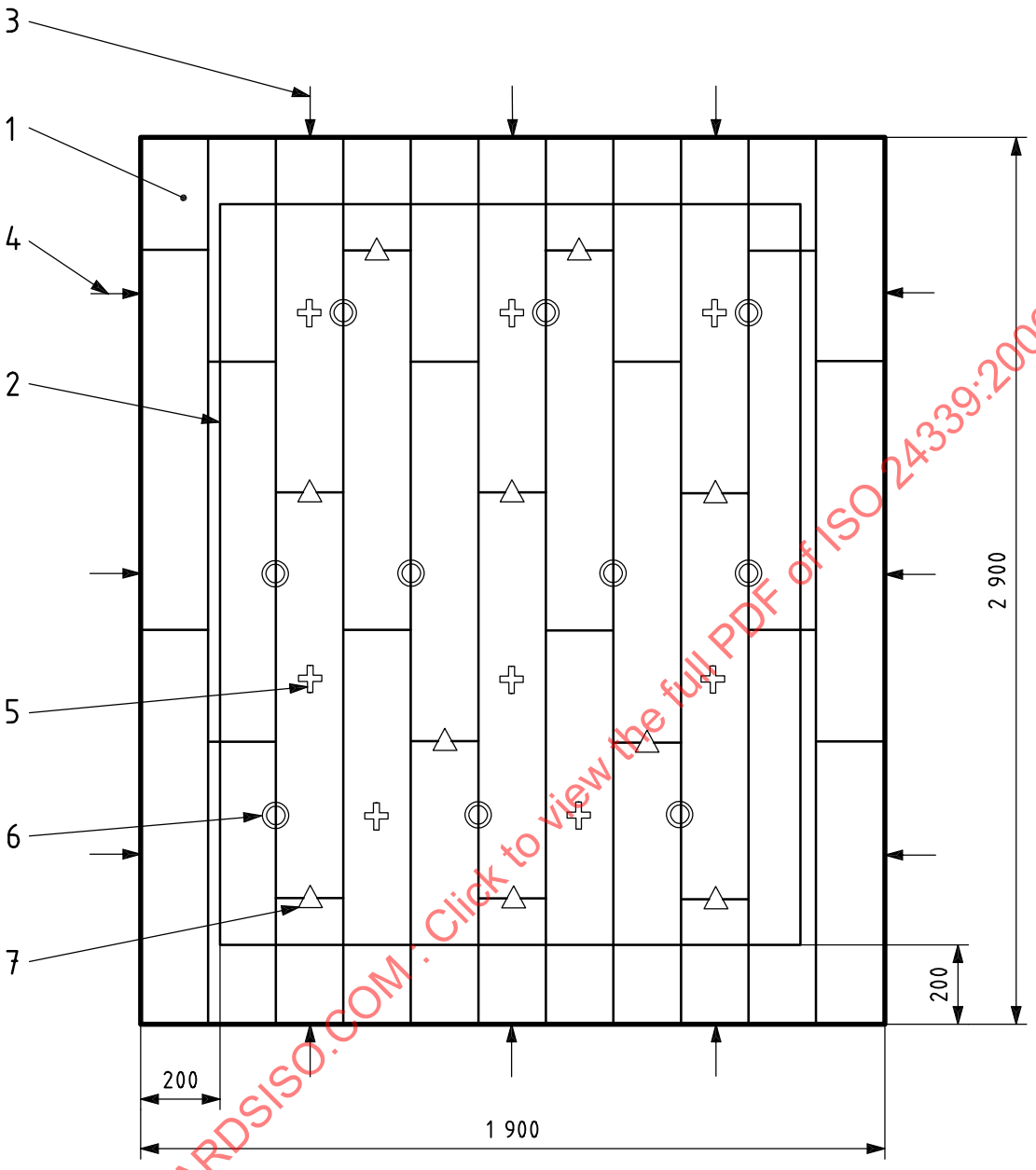
1 calliper gauge according to 3.5 (movable in X-axis)
2 measurement bridge (movable in Y-axis)
3 installed test floor covering
4 ridged frame (of, e.g. steel or aluminium)

Figure 2 — Principle of a measurement bridge

4 Test specimens

Take enough floor covering of the materials to be tested to be able to cover a test area of 1 900 mm × 2 900 mm according to the drawing in Figure 3. If applicable, the materials shall be sampled so that the long sides of the elements are aligned as shown in Figure 3. If the elements are equipped with an factory applied underlay, all tests shall be carried out with this material kept on, i.e. no pre-attached underlay material shall be taken off prior to testing. Sample the necessary quantity of textile floor covering to cover a test area of 1 900 mm × 2 900 mm. The material shall be tested in accordance with the manufacturer instruction for installation in order to simulate as real *in situ* situations as possible. No conditioning is necessary prior to installation in the test chamber.

Dimensions in millimetres



Key

1 installed floor covering to be tested
2 measurement area
3 measuring-points, dimensional variations of the length (3)
4 measuring-points, dimensional variations of the width (3)
5 measuring-points of the width flatness (10)
6 measuring-points of the openings in the joints and the height difference between the elements at the long side of the elements (10)
7 measuring-points of the openings in the joints and the height difference between the elements at the short side of the elements (10)

Figure 3 — Measurement scheme, general principle

5 Procedure

5.1 Installation of the test floor

Following the principle drawing from Figure 3, install the floor covering elements to be tested on the subfloor in the climate chamber. The installation shall be in accordance with the instructions from the manufacturer and in a conditioned atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity. The installed floor shall have a minimum size of 1 900 mm × 2 900 mm. If applicable, the long sides of the floor covering elements shall be aligned with the long side of the test area. In the case of textile floor coverings, install the floor covering so that the longest side of the tested area corresponds to the direction of manufacture.

5.2 Climatic test periods

5.2.1 Conditioning atmosphere

After the installation of the floor covering in the climate chamber, the atmosphere is kept constant for 7 days at (23 ± 2) °C and with a (50 ± 5) % relative humidity (RH), conditioning atmosphere.

5.2.2 Humid atmosphere

Once the period in the conditioning atmosphere has passed, the atmosphere in the climate chamber shall be changed to a humid atmosphere at (23 ± 2) °C and with a (85 ± 5) % relative humidity (RH). This humid atmosphere is then kept constant for a period of four weeks.

5.2.3 Dry atmosphere

Once the period in the humid atmosphere has passed, the atmosphere in the climate chamber shall be changed to a dry atmosphere at (23 ± 2) °C and with a (30 ± 5) % relative humidity (RH). This dry atmosphere is then kept constant for a new period of four weeks.

5.3 Measurements

5.3.1 General

Perform the initial measurement after the 7 days conditioning period. Then repeat the measurements every 7 days until the end of the dry period. Except for measuring dimensional variations, all the measuring points shall be situated at a distance of at least 200 mm from the edges (see Figure 3). All measurements shall always be made at the same points. Each measuring point shall be clearly marked and numbered before the initial measurement. For examples of numbering, see Table 1 and Table 2.

5.3.2 Measuring dimensional variations

5.3.2.1 Dimensional variations — General

Only the dimensional variations are looked for. An easy measurement of the variations can be taken with a steel ruler, the length of which is slightly shorter (10 mm for example) than the total distance to measure. This difference of length is measured with a calliper gauge at the different steps of the test.

It is also possible to measure, with a calliper gauge, the distance of the test area to a fixed frame outside of the test area.

5.3.2.2 Dimensional variations across the width (Δw)

The measurements are taken at three points (see Figure 3). Each measurement needs to be taken between two thrusts fixed to the floor coverings, the distance of which is between 1 500 mm and 1 700 mm. For the

measurement against a fixed frame, no thrusts on the test area are necessary. Measure across the width of the elements for laminate floor coverings or over the smallest length of the tested surface for textile floor coverings.

5.3.2.3 Dimensional variations along the length (Δl)

Same procedure as in 5.3.2.2, but the distance between the three thrusts is between 2 500 mm and 2 700 mm. Measure along the width of the elements for laminate floor coverings or over the longest length of the tested surface for textile floor coverings.

5.3.3 Measuring the width flatness (only for laminate floor coverings) (C)

Choose each of the 10 points to measure the width flatness. These points shall be at least 50 mm from the end joint of the element. Measure the width flatness with the apparatus described in 3.4. Record all measured values, with its sign, to the nearest 0,01 mm.

5.3.4 Measuring the openings between the elements (only for laminate floor coverings) (J_L and J_S)

Chose each of the 10 points to measure the openings between the elements in the long side (J_L) and short side (J_S). Each of 10 measurements is taken where the opening between the elements initially seems the biggest.

To take the measurements, use the set of thickness gauges described in 3.3. The width of the opening is equal to the thickest thickness gauge that can be inserted applied with a minimum of force. Record all measured values with the result achieved from the appropriate thickness gauge.

5.3.5 Measuring the height difference between elements (only for laminate floor coverings) (h_L and h_S)

Choose each of the 10 points to measure the height difference between elements at the long (h_L) and short sides (h_S). Measure the h_L and h_S with the apparatus defined in 3.4. Move the apparatus across the joint between the two elements to have the height difference between the two elements. Record all measured values with the result achieved from the appropriate calliper gauge.

5.3.6 Measuring the flatness of the test area (only for laminate floor coverings) (f_l and f_w)

The flatness of the assembled floor covering can be measured by using the straight rigid ruler as described in 3.8. This ruler is moved along the floor in every direction [length (f_l); width (f_w)] with the aim of detecting the biggest flatness deviation which is then measured with the help of the set of thickness gauges described in 3.3 or any other apparatus giving the same result. A measurement bridge described in 3.9 that can be moved on a frame outside of the test area can also be used.

Table 1 — Guidance for the recording and documentation of the measured parameters

All values in millimetres except where indicated	Initial 50 % RH	Humid cycle 85 % RH				Dry cycle 30 % RH			
	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42	Day 49	Day 56	Day 63
Δw_1									
Δw_2									
Δw_3									
Δw_{avg}									
Δw_{avg} (%)									
Δl_1									
Δl_2									
Δl_3									
Δl_{avg}									
Δl_{avg} (%)									
C_1									
C_2									
C_3									
C_4									
C_5									
C_6									
C_7									
C_8									
C_9									
C_{10}									
C_{max}									
C_{avg}									
C_{avg} (%)									
$J_{L,1}$									
$J_{L,2}$									
$J_{L,3}$									
$J_{L,4}$									
$J_{L,5}$									
$J_{L,6}$									
$J_{L,7}$									
$J_{L,8}$									
$J_{L,9}$									
$J_{L,10}$									
$J_{L,max}$									
$J_{L,avg}$									
$J_{L,avg}$ (%)									

Table 2 — Guidance for the recording and documentation of the measured parameters

All values in millimetres except where indicated	Initial 50 % RH	Humid cycle 85 % RH				Dry cycle 30 % RH			
	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42	Day 49	Day 56	Day 63
$J_{S,1}$									
$J_{S,2}$									
$J_{S,3}$									
$J_{S,4}$									
$J_{S,5}$									
$J_{S,6}$									
$J_{S,7}$									
$J_{S,8}$									
$J_{S,9}$									
$J_{S,10}$									
$J_{S,max}$									
$J_{S,avg}$									
$J_{S,avg}$ (%)									
$h_{L,1}$									
$h_{L,2}$									
$h_{L,3}$									
$h_{L,4}$									
$h_{L,5}$									
$h_{L,6}$									
$h_{L,7}$									
$h_{L,8}$									
$h_{L,9}$									
$h_{L,10}$									
$h_{L,max}$									
$h_{L,avg}$									
$h_{S,1}$									
$h_{S,2}$									
$h_{S,3}$									
$h_{S,4}$									
$h_{S,5}$									
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$h_{S,7}$									
$h_{S,8}$									
$h_{S,9}$									
h_{S10}									
$h_{S,max}$									
$h_{S,avg}$									
f_l									
f_w									