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Wood flooring and wood panelling and cladding — Determination of dimensional stability

bsi.

National foreword

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English Version

Wood flooring and wood panelling and cladding - Determination of dimensional stability

Planchers en bois et lambris et bardages en bois - Détermination de la stabilité dimensionnelle

Holzfußböden und Wand- und Deckenbekleidungen aus Holz - Bestimmung der Dimensionsstabilität

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European foreword

This document (EN 1910:2016) has been prepared by Technical Committee CEN/TC 175 “Round and sawn timber”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

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1 Scope

This European Standard specifies a method of test to determine the dimensional changes and warp of the elements of wood flooring and wood panelling and cladding.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13183-1, *Moisture content of a piece of sawn timber — Part 1: Determination by oven dry method*

EN 13183-2, *Moisture content of a piece of sawn timber — Part 2: Estimation by electrical resistance method*

EN 13647, *Wood flooring and wood panelling and cladding — Determination of geometrical characteristics*

EN 13756:2002, *Wood flooring — Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13756:2002 and the following apply.

3.1
twist
deformation of the element lengthwise with a helical pattern

[SOURCE: EN 844-3:1995]

4 Principle

Measure the dimensional changes of the test specimen after initial conditioning in a standard atmosphere and again after conditioning in a specified climate. The test specimen shall be lying in horizontal position in the test chamber. Express the results as a percentage of variation of the relevant dimension measured in the initial standard climatic conditions.

Record the warp and relate to the basis of measurement.

5 Test equipment

5.1 Conditioning room or enclosure

The conditioning room or enclosure shall be equipped with monitoring thermometers and hygrometers. It shall be suitable to condition the test specimen either in:

— climate A, defined by a relative humidity of (65 ± 5) % and a temperature of (20 ± 2) °C;

or

— climate B, defined by a relative humidity of (50 ± 5) % and a temperature of (23 ± 2) °C.

5.2 Stabilizing room or enclosure

The stabilizing room or enclosure shall be equipped with monitoring thermometers and hygrometers. It shall be capable of maintaining the conditions specified in Table 1:

Table 1 — Conditions maintained by a stabilizing room or enclosure

	Condition No. 1	Condition No. 2
Temperature[a]	20 °C	23 °C
Relative humidity[b]		
Dry climate:	30 %	30 %
Humid climate:		
H1:	75 %	75 %
or		
H2:	85 %	85 %

[a] The permitted deviation for temperature is ± 2 °C.

[b] The permitted deviation for relative humidity is ± 5 %.

It shall be possible to change from one climate to the other within 24 h.

5.3 Trays

The trays shall provide non-continuous support to the test specimen in the conditioning and stabilizing rooms.

The clearance between supports shall be sufficient to allow the ventilation between the test specimens.

5.4 Measuring equipment

All the dimensions shall be measured as defined in EN 13647.

5.5 Scales

Scales shall be accurate to 0,1 % of the masses to be measured.

5.6 Oven

The oven shall be able to operate at (103 ± 2)°C to bring the test specimens to the dry state.

6 Test specimens

6.1 Dimensions and shape

Tests specimens are elements at the time of the first delivery.

Measurements are made on the element.

Elements more than 2000 mm require no end sealing.

Elements between 2000 and 1000 mm shall have one end sealed.

Elements less than or equal to 1000 mm shall have both ends sealed.

The shortest length of a reduced element is 250 mm.

6.2 Sampling

The method of installation has impact on the dimensional stability.

Unless otherwise specified, 10 test specimens selected at random shall be taken.

6.3 Conditioning

Prior to exposure in the specified climate (5.2), the test specimen shall be conditioned to equilibrium either in climate A or in climate B as defined in 5.1.

7 Measurements

7.1 Mass

Record the mass of each test specimen after initial conditioning (6.3) and after conditioning in the specified climate (5.2).

7.2 Dimensions of the test specimen

Measure the dimensions as defined in EN 13647.

7.3 Warp

7.3.1 General

Measure the cup, the bow and the spring as defined in EN 13647.

The forces applied to the test specimen with the apparatus shall not modify the measurements beyond the permitted deviations defined in this standard.

7.3.2 Twist

Measure the twist as defined below.

7.3.2.1 Principle

Determine twist by measuring the gap between the reference surface and the deformed corners of the element.

7.3.2.2 Apparatus

a) Dial gauge.

It shall give readings accurate to the nearest 0,01mm and have a cylindrical flat end with a diameter of 5 ± 1 mm.

b) Reference plane support.

Horizontal rigid plane support (e.g. marble, granite or steel made) with smooth surface.

7.3.3 Procedure

Place the element with its upper surface in contact with the reference plane support.

Prior to testing, mark measuring points on the element at 10 mm from the edges of the deformed corners.

A mass of 1 kg shall be positioned as show in Figure 1 on to one deformed corner (if present).

Reset the dial of the gauge, on the surface of the reference plane support, and place the gauge at the diagonal opposite side above the mark measuring point.

Measure and note the Z value (see Figure 2) with an accuracy to the nearest 0,1 mm.

Move the mass to the diagonally opposite corner and by the gauge repeat the measure at the diagonal opposite point of the mass.

Measure and note the Z value (see Figure 2) with an accuracy to the nearest 0,1 mm.

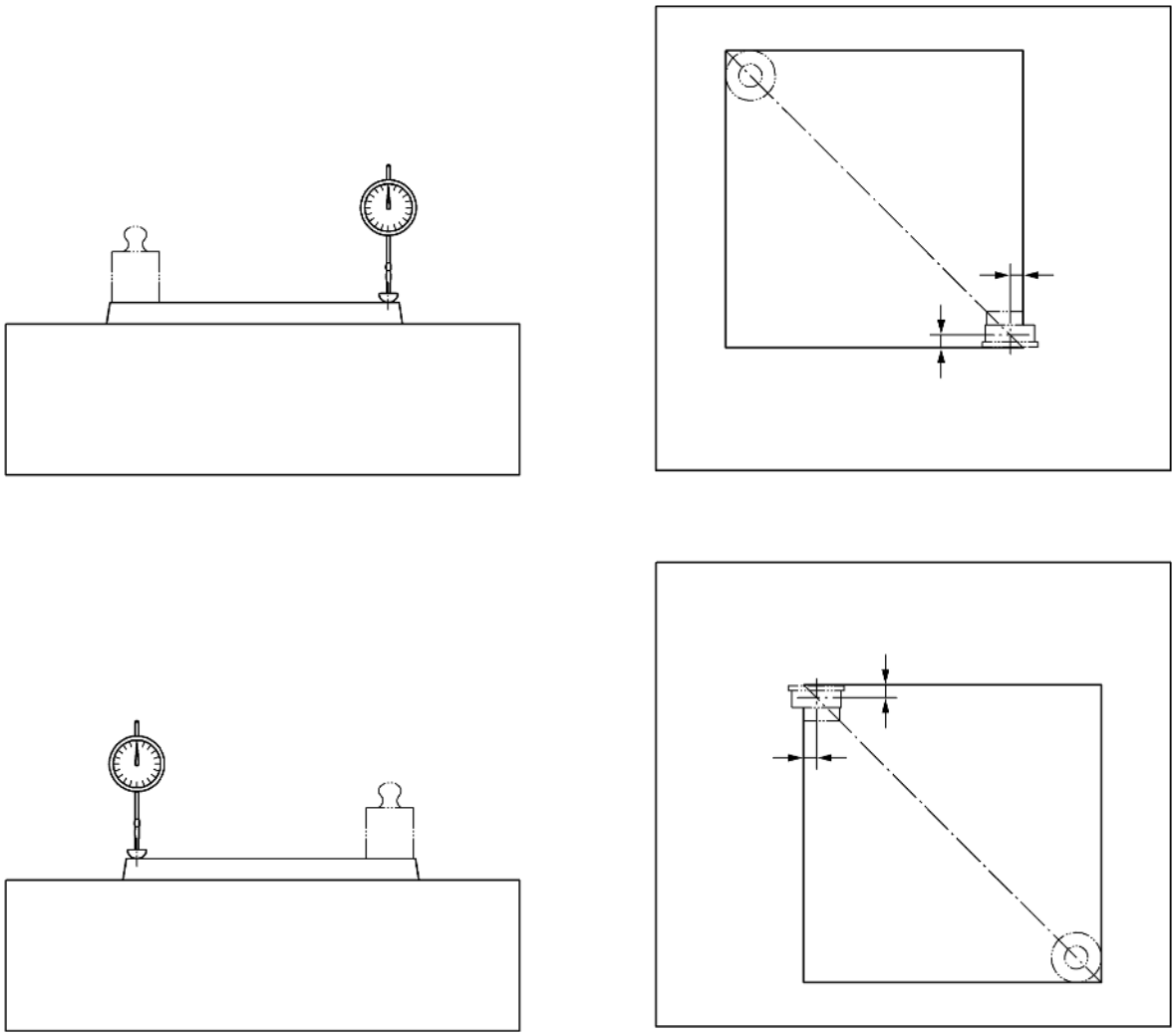

Figure 1 — Positioning of one kg mass onto different corners

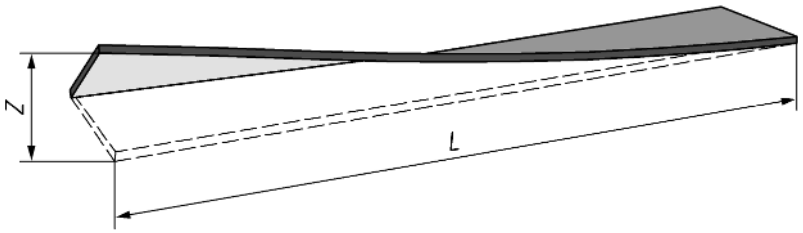

Figure 2 — Twist – Z and L values

7.3.4 Expression of results

Twist is expressed as a percentage of the length and it is calculated as follow:

$$Twist(\%) = 100 \cdot \frac{Z}{L}$$

where

Z is the maximum value measured – thickness of the single element (mm);

L is th length of the element (mm).

Thickness and length of single element shall be measured according to EN 13647 clauses.

7.4 Moisture content

If required, the moisture content of an element is measured in its initial state at the equilibrium either in climate A or in climate B as defined in 5.1 and after the conditioning in dry and humid climates with one of the following methods:

— by determination of mass loss during oven drying, as specified in EN 13183-1. The moisture content is calculated according to 9.1;

— with an electrical device, by measuring wood resistance, as specified in EN 13183-2.

NOTE Be aware of higher deviation when measuring moisture content below 6 % by electric resistance method.

8 Procedure

8.1 Initial measurements

Once the initial conditioning according to 6.3 is achieved, carry out the measurements defined in Clause 7.

8.2 Exposure to the humid climate

After the initial measurements, expose the test specimen to the specified humid climate, as defined in 5.2, for 4 weeks.

Achieve the correct conditions according to Table 1 within 24 h.

Carry out the measurements defined in 7.1.

The duration of each conditioning period can be reduced if variation of mass does not exceed 0,1 % between two successive measurements made in any 24 h interval.

8.3 Measurements after stabilization in the humid climate

Carry out the measurements defined in Clause 7.

8.4 Exposure to the dry climate

Once the measurements in 8.3 are recorded, expose the test specimen in the specified dry climate as defined in 5.2 for 4 weeks.

Achieve the correct conditions within 24 h.

Carry out the measurements defined in 7.1.

The duration of each conditioning period can be reduced if variation of mass does not exceed 0,1 % between two successive measurements made in any 24 h interval.

8.5 Measurements after stabilization in the dry climate

Carry out the measurements defined in Clause 7.

8.6 Oven drying

Once the test specimen has been through all the prescribed climates, proceed to its oven drying with the oven specified in 5.6. The test specimen may not be reduced to less than 250 mm. Oven dry state is reached if mass variation is not more than 0,1 % between two successive measurements made in any 24 h interval.

9 Calculation and expression of the results of a test specimen

9.1 Moisture content

Calculate using the following formula:

$$\omega = 100\frac{m_s - m_d}{m_d}$$

where

ω is the moisture content of the test specimen, after each stabilization process, in % to significant decimal;

m_d is the mass of the test specimen after oven drying, in g;

m_s is the mass of the test specimen after each stabilization, in g.

9.2 Dimensional changes

In each direction, the cumulative relative change is calculated with the following formula:

$$d_{cr} = 100\frac{(\frac{18}{h})D_h - D_d}{D_i}$$

where

d_{cr} is the cumulative relative dimensional change, in % to two decimals;

D_i is the dimension after initial stabilization, with an accuracy of 0,01 mm;

D_d is the dimension after dry conditioning, with an accuracy of 0,01 mm;

D_h is the same dimension after humid conditioning, with an accuracy of 0,01 mm.

h 15 for climate H1, h = 18 for climate H2.

NOTE The values for h are derived from tables giving the moisture content of solid timber in relation to temperature and relative humidity.

9.3 Warp

9.3.1 Cup

Determine the absolute warp for each climate and express with an accuracy of 0,05 mm.

For each climate, express the relative warp as a percentage of the actual surface width derived from the absolute averaged ones with an accuracy of 0,01 %.

9.3.2 Spring

Determine the absolute warp for each climate and express with an accuracy of 0,25 mm.

For each climate, express the relative warp as a percentage of the test specimen length derived from the absolute averaged ones with an accuracy of 0,01 %.

9.3.3 Bow

Determine the absolute warp for each climate and express with an accuracy of 1 mm.

For each climate, express the relative warp as a percentage of the test specimen length derived from the absolute averaged ones with an accuracy of 0,01 %.

Bow should be measured only if required in the product standard.

9.3.4 Twist

Determine the absolute warp for each climate and express with an accuracy of 0,1 mm.

For each climate, express the relative warp as indicated in 7.3.4 with an accuracy of 0,01 %.

10 Accuracy of the 10 test specimens

10.1 Dimensional changes

For the cumulative relative change defined in 9.2, the mean and the coefficient of variation, expressed to two decimals, shall be calculated in each direction.

10.2 Warp

The average of the absolute and relative values of the test specimens shall be given to two significant figures.

11 Test report

The test report shall contain the following information:

— the name and address of the climate chamber;

— the name and address of the company ordering the test;

— the sampling procedure and the identification of the sample;

— the date of delivery;

— the date of the test(s) and the test period;

— the duration of conditioning (four weeks or less as stated in 8.2 and 8.4)

— the type (the brand if any) and the full description of the elements (with their possible characteristics at delivery time), face view and cross sections in a suitable scale;

— the reference to the implemented test method(s) and, if any, the deviations;

— the conditioning applied to the elements prior to testing;

— the climatic conditions within the laboratory during the test(s);

— a short description of the apparatus involved in the test(s);

— each individual result according to the test method(s);

— the mean value and the coefficient of variation of the sample as defined in this standard and, if specified, the characteristic value of the property;

— and, if relevant, the classifications or the attributions regarding the conformity of the sample to the corresponding standard.

Bibliography

[1] EN 844-3:1995, *Round and sawn timber — Terminology — Part 3: General terms relating to sawn timber*

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