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1 Purpose

Assessing the surface swelling of a finished floor panel where there is contact with water, using an assembled joint

2 Scope of application

QA Laboratory

3 Definitions and Abbreviations

Term / Abbreviation	*Explanation*

4 Workflow

A. Material required:

1. Two boards with undamaged profile edges are required. The test is performed twice. Each test requires one board.

2. Glass beaker with a capacity of at least 100 ml water

3. Distilled or deionized water, room temperature 23 °C +/- 3 °C

4. Transfer pipette 10 ml

5. A possible measuring device comprises a flat supporting frame with two or three supporting feet and a comparative measurement display, with the aid of which changes in the surface thickness can be measured at given points. See Figure 1. The device must be equipped with a micrometer measurement display capable of performing measurements to a nominal 25 mm in increments of 0.02 mm. The foot/stands of the display must have a diameter of 10 mm + 1 mm with an acting force of 100 g + 14 g. Other suitable devices may be used where they exhibit at least a comparable capacity for measurement.

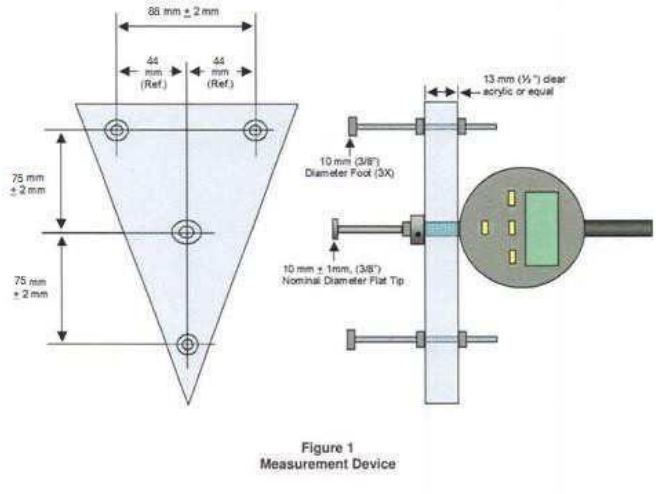

Figure 1: Measuring device

B. Preparatory treatment:

Before testing the swelling properties of the surface, the test sample must be acclimatized in accordance with the manufacturer's instructions. If no conditions are specified for acclimatization, the test samples must be prepared for 24 hours at 23 °C +/- 3 °C and 50 % RH +/- 5 % RH.

C. Procedure:

1. Check each test board and ensure that all four sides are undamaged.

2. Cut off at least 200 mm at both ends of the floor board (Parts A and C) and use a central part at least 400 mm in length (Part B).

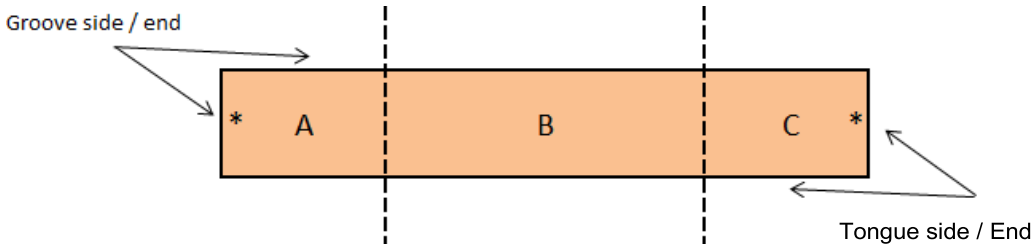

*Figure 2: Structure of the board (*Reference for the structure of the boards)*

3. Prior to assembly, ensure that the profile edges of each test sample (A, B & C) are cleaned thoroughly. Ideally, blow over the profile edges using a compressed air gun, and then clean the edges using a suitable small brush.

4. Connect Parts A and C, and ensure that the tongue and groove are correctly put together. Connect Part B (groove side) with the joined Parts C & A (tongue side), in order to obtain an inverted T joint – see Figure 3. Note: Check the connection to ensure that there are no visible gaps between the panels. The assembly, the test, the visual check and evaluation must take place in a well-lit area. The test samples must be placed on a stable, flat workbench or on a solid table, offering good inspection at normal workbench or table height.

5. If gaps are identified when assembling the test sample, the sample must be taken apart, cleaned again and reassembled prior to testing.

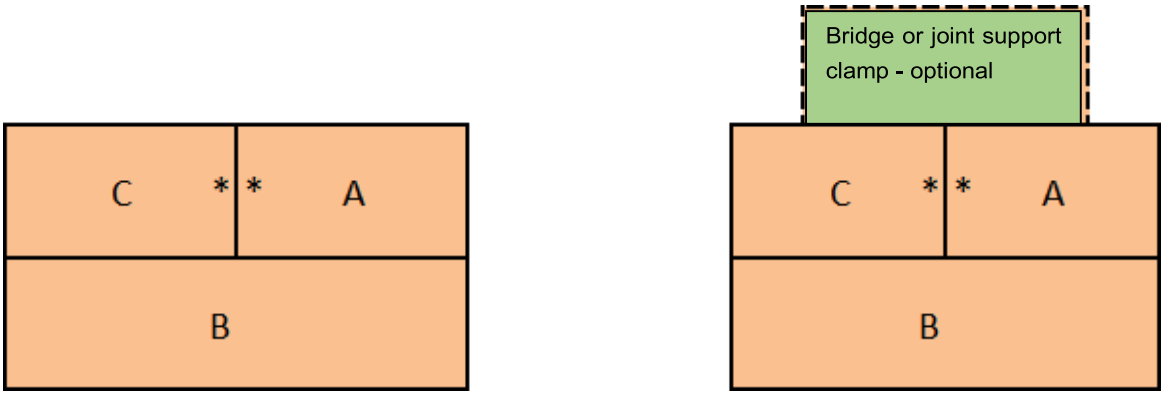

Figure 3: Structure of the assembled board

Note: A bridge or a joint support clamp may be used in order to ensure the correct seating of Parts C & A and a flat position during the test.

6. Mark the test points at 15 mm on the three sides of the central longitudinal marking. See Figure 4.

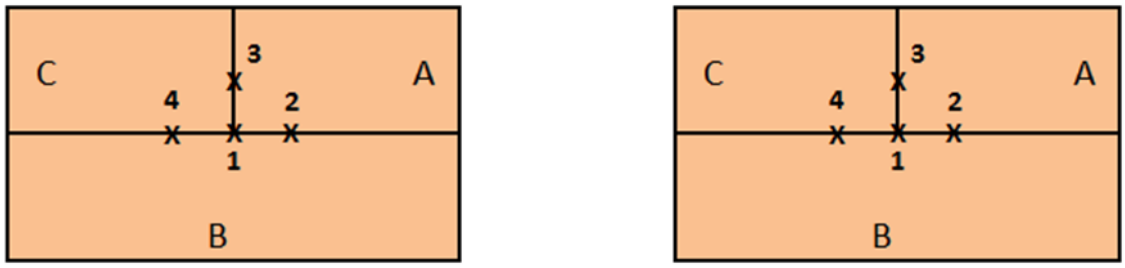

Figure 4: Test positions on the assembled boards - Sample 1 (left) and 2 (right) side by side

Test Position 1	Intersection point of inverted T joint
Test Position 2	15 mm to the right, adjacent to Test Position 1
Test Position 3	15 mm above Test Position 1
Test Position 4	15 m to the left, adjacent to Test Position 1

7. Zero the measuring device on a granite plate or a similar flat surface.

8. Measure the height at each test point in mm, and record the values in a worksheet.

Note: Ensure that the supporting feet of the measuring device are not standing on a joint. When you record the initial measured values for each test position, mark the position of the feet in order that the measuring device can be placed at precisely the same place for the follow-up measurements of the wet swelling and of the height following re-drying (optional). Ensure that the measuring device is placed precisely at the marked positions for subsequent measurements. Check that the feet of the measuring device are sitting flat on the surface when the test positions are measured. See Figure 5.

Figure 5: Example showing the markings for the supporting feet of the measuring device

9. Apply 10 ml of room temperature distilled or deionized water to the marked T-piece. See Figure 6.

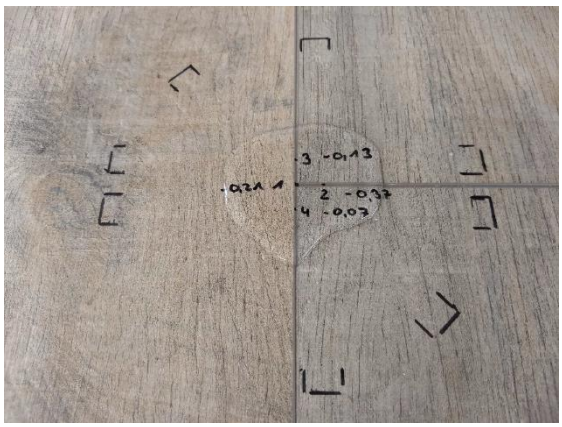

Figure 6: Final arrangement for testing the effects of water on the surface

10. Leave the test arrangement to stand for 60 minutes. After the end of the 60-minute period, remove the water (with a clean sponge). Dab the surface dry with a paper towel, and perform a quality assessment (see section 11) and a quantity assessment (see section 12). Leave the test arrangement unchanged while you remove the water and carry out the assessment.

11. Quality assessment for assessing swelling when wet – see section D. Carry out the assessment within 15 minutes following the end of the 60-minute period.

12. Quantity assessment for assessing swelling when wet – see section E. Carry out the assessment within 15 minutes following the end of the 60-minute period.

13. Steps 7 to12 are repeated on the prepared samples daily for at least 48 days.

14. Quality assessment after 48 days for assessing swelling following re-drying – see section D. Carry out the assessment within 15 minutes following the end of the 24-hour period.

15. Quantity assessment after 48 days for assessing swelling following re-drying – see section E. Carry out the assessment within 15 minutes following the end of the 24-hour period.

D. Assessment

For the quality assessment: Visually assess the various forms of appearance of the joints, i.e. the visible swelling and the nature of it (gently touching it can help to recognize differences) with the area wetted with water compared to the non-wetted areas of the test sample. Assess the test arrangement according to the following criteria:

1 = No change: no noticeable change through swelling of the edges and lifting of the board surface

2 = Slight swelling: slight swelling, modest raising to one or more joints, very slight lifting of the board surface

3 = Noticeable swelling of the edge and partial lifting of the board surface away from the joint (not permitted)

4 = Significantly raised edge and considerable swelling beneath the surface of the board (not permitted)

5 = Supporting panel is breaking up, covering layer is freeing itself (not permitted)

Illustrative photos can be found in the Appendix B – Quality Assessment

The test is deemed to have been passed if the quality assessment is 1 or 2.

If the sample fails (Assessment 3 or above), repeat the test with a board from the same pack or the same production period.

a. If the new sample passes the test, the whole test is considered passed.
b. If the new sample does not pass the test, the whole test is considered not passed.

In order to determine the quantitative swelling values when wet, measure the height at Position 1 to Position 4 to determine the swelling after 60 minutes contact with water in accordance with Steps 7 & 8. Record the values on the worksheet, and refer to section E – Calculations to determine the values for swelling when wet.

In order to determine the quality assessment of the swelling following re-drying, at the end of 24-hour re-drying period perform Section D for specifying the quality assessment.

E. Calculation

In order to determine the quantitative swelling values when wet, measure the height at Position 1 to Position 4 to determine the swelling after 60 minutes of contact with water in accordance with Steps 7 & 8. Record the values on the worksheet, and refer to the following calculations to determine the values for swelling when wet

In order to determine the quantitative values of the swelling following re-drying, at the end of 24-hour re-drying period perform Steps 7 & 8 for the quantitative measurements. Record the values on the worksheet, and refer to section E - Calculations to determine the values for swelling following recovery.

Calculating the surface swelling

Position	Calculation step
1	Position 1 Height when wet – Position 1 starting height
2	Position 2 Height when wet – Position 2 starting height
3	Position 3 Height when wet – Position 3 starting height
4	Position 4 Height when wet – Position 4 starting height
Mean value 2 – 4	(Result 2 + Result 3 + Result 4) / 3

1. Print out the average value of the sample for swelling when wet as the mean value of the swelling values for Positions 2 to 4 in mm. The measured values at Position 1, the wet swelling value at the inverted T joint, is to be recorded separately and similarly in mm. The results are to be shown rounded to 2 decimal places

2. The "final average value for wet swelling" is the average value determined after 48 days for the two test measurement groups (Position 1 and mean value Positions 2 to 4 respectively) if valid values are obtained from both test samples.

The test is deemed passed if the result of the "final average value for wet swelling" is ≤ 0.2 mm.

3. It is recommended to determine the swelling following re-drying on the seam 24 hours after determining the swelling when wet in order to identify whether re-drying has occurred on the swollen joint (reversal of swelling following drying).

Calculation of re-drying

Position	Calculation step
1	Position 1 Height after re-drying – Position 1 starting height
2	Position 2 Height after re-drying – Position 2 starting height
3	Position 3 Height after re-drying – Position 3 starting height
4	Position 4 Height after re-drying – Position 4 starting height
Mean value 2 – 4	(Result 2 + Result 3 + Result 4) / 3
Final value	((Mean value 2 to 4) + Position 1) / 2

4. Print out the "Average value of the sample for swelling following re-drying" as the mean value of the swelling values after re-drying for Positions 2 to 4 in mm. The measured values at Position 1, the post-recovery swelling value at the inverted T joint, is to be recorded separately and similarly in mm.

5. The "final average value of swelling following re-drying" is the average value of the two test measurement groups if valid values are obtained from both test samples.

The test is deemed passed if the result of the "final average value following re-drying" is ≤ 0.2 mm.

Appendix A
Report

Swelling test for flooring surfaces - connected joint

Product ID_____ Date _____

Information on determining the consolidated values can be found in the calculation in Section E.

Test Position 1 (inverted T-joint) Starting measurement	
Test Position 2 Starting measurement	
Test Position 3 Starting measurement	
Test Position 4 Starting measurement	
Test Position 1 (inverted T-joint) Measurement of swelling	
Test Position 2 Measurement of swelling when wet	
Test Position 3 Measurement of swelling when wet	
Test Position 4 Measurement of swelling when wet	
Test Position 1 (inverted T-joint) Measurement of swelling following re-drying	
Test Position 2 Measurement of swelling following re-drying	
Test Position 3 Measurement of swelling following re-drying	
Test Position 4 Measurement of swelling following re-drying	

Appendix B

Quality assessment

Illustrative photos as a comparison with the subjective assessment

1 – No change or no noticeable change through swelling of the edges and lifting of the board surface

2 – Slight swelling, modest raising to one or more joints, very slight lifting of the board surface

3 – Noticeable swelling of the edge and partial lifting of the board surface away from the joint (not permitted)

4 – Significantly raised edge and considerable swelling beneath the surface of the board (not permitted)

5 – Supporting panel is breaking up; covering layer is freeing itself (not permitted)

Appendix C

Summary of test results

Swell-Test for flooring surface – connected joints

Product-ID _____

Date _____

Qualitative test result:

pass ☐ fail ☐

Quantitative test result wet swelling and re-drying:

pass ☐ fail ☐

Name, Surname of testing personnel: _____

5 Other applicable documents

ID number	*Title*