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Evaluation of moisture resistance under cyclic test conditions of WPC-Decking according to EN 15534-4

Scope

The main impact to decking boards is bending cause by humans or heavy objects. The bending strength of WPC is influenced by the weathering. This behaviour is evaluated by measuring the flexural properties after a cyclic change of moisture and temperature. Moisture resistance under cyclic test conditions of decking boards made from WPC is evaluated according EN 15534-4 and EN 15534-1. The standard EN 15534-4 requires a maximal reduction of bending strength in a 3-point bending test.

Client

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Material:

Material is a WPC-decking board in form of a hollow profile. Product name declared from IDECK is “DURO”.

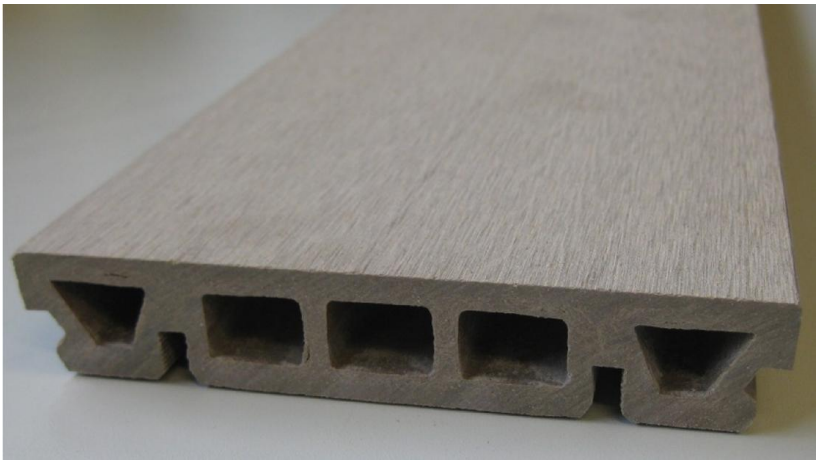

Figure 1: Example of WPC decking profile DURO.

Methods:

Test is designed according EN 15534-4 chapter 4.5.5 for decking boards and carried out according EN 15534-1 8.3.2 and Annex A. General principle is cyclic loading of temperature and moisture followed by a 3-point bending test. Following cycle is used:

Table 1: Used test cycle

Step	First cycle	Second and third cycle
Submersion in water at 20°C	672 h (28 days)	72 h
Freezing at -20°C	24 h	24 h
Drying at 70°C	72 h	72 h

After the last cycle specimens are stored at 20°C and 65% relative humidity for at least 72 h before bending test is started. Distance of supporters is 400 mm. Length of boards is 1000 mm. Climate during test is 20°C and 65% relative humidity. Crosshead speed is 11,84 mm/min. 10 replicates are used.

Results:

Results are summarised in table 2. All replicates exhibited lower reductions in bending forces as required from EN 15534-4. Therefore the material passes the test regarding moisture resistance under cyclic test conditions. Mean values and single value are within the required limitations.

Table 2: Flexural properties of WPC decking boards.

	original material	after cyclic loading
mean value bending force [N]	3889	3679
minimal single value bending force [N]	3784	3539
mean reduction		5,4%
maximal reduction		9,0%
requirement (single)		≤20% (≤30%)
evaluation		pass