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# **Tech-Wood® front cladding (rabat)**

## **Evaluation after BRL 4103**

### **Summary of SHR-Report 20.289**

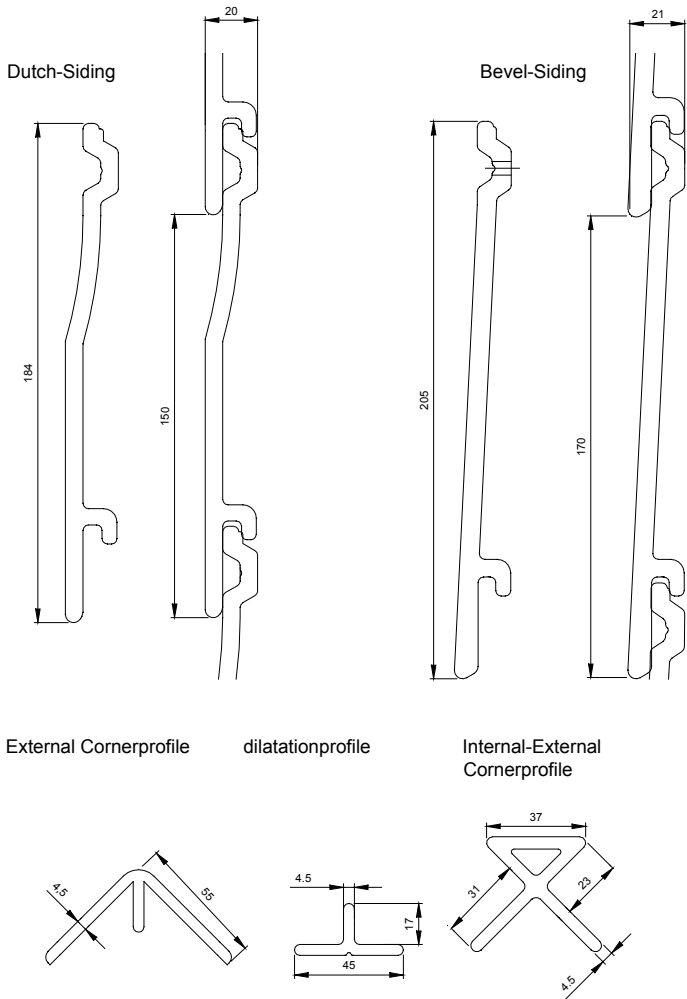
For Tech-Wood® Nederland BV, Rijssen (The Netherlands) the material properties and product performance were investigated for Tech-Wood® front cladding following BRL 4103: "Nationale beoordelingsrichtlijn voor het KOMO attest-met-productcertificaat voor houten en houtachtige gevelbekledings-systemen". The results of these investigations and the evaluation according to BRL 4103 have been described in SHR-report 20.289, 16 November 2001. The present document is a summary of this report.

The above-mentioned Dutch evaluation specification, BRL 4103, is the specification that is valid in The Netherlands for the evaluation of wooden and woodlike front cladding systems for obtaining a KOMO product certificate. With the KOMO product certificate this building system fulfills the legal requirements for building systems in The Netherlands, as described in the so-called 'Bouwbesluit'.

**Description of the product: Tech-Wood® front cladding (rabat).**

Tech-Wood® is a material built up from wood chips that are processed into a thermoplastic PolyPropylene (PP) Matrix. The wood chips serve as a fibre reinforcement of the PP-matrix in which they are embedded. This gives the Tech-Wood® material a significantly higher stiffness, strength and dimensional stability than unfilled PP. By means of an extrusion process endless profiles are made out of Tech-Wood®, in which the wood structure is compressed in the transverse direction. The density of Tech-Wood® is about 1000 kg/m<sup>3</sup>.

The front cladding system of Tech-Wood® consists of two types of profile (so-called 'rabat'). These are extruded Tech-Wood® profiles with a geometry that enables a simple and reliable connection with the backstructure and that connects with the following profile. Cross-sections of the two types of profile, together with additional Tech-Wood® profiles are as follows (measurements in mm):



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### **Tests performed for the determination of material properties.**

- 1 Flexural strength and E-modulus following EN 310
- 2 Expansion behaviour after immersion in water following EN 317
- 3 Shrinkage and expansion behaviour by changing humidities following EN 318
- 4 Through-thickness strength, dry following EN 319
- 5 Through-thickness strength, after cyclic test following EN 321
- 6 Coefficient of linear thermal expansion following the method in BRL 1309
- 7 UV-sensitivity following section 7.6 of SKH publication 97-04

### **Tests performed for the determination of product performance.**

- 1 Watertightness test of the front cladding following NEN 2778
- 2 Sandbag impact test following EN 949
- 3 Steelball impact test following EN 950
- 4 Determination of the strength of the connecting element to the back structure. Both tensile strength and shear strength have been determined.
- 5 The behaviour of a test panel at cyclic loading. The cyclic loading was applied in two manners:
  - cyclic expansion and shrinkage of the cladding as compared to the back structure by moisture and temperature changes in the SHR accelerated weathering test.
  - mechanical fatigue by cyclic windpressure loading following NEN 3665 with the test set-up as described in NEN 3660.

### **Evaluation of the results following BRL 4103.**

After the tests the results have been evaluated using the criteria stated within BRL 4103. In summary this evaluation is as follows:

As a result of the investigation that has been performed it can be concluded that the Tech-Wood® front cladding system fulfills the requirements that are stated in BRL 4103, both with respect to material properties and product performance.

A summary of results and requirements in BRL 4103 is given in the following table:

Property	Result	Requirement (BRL 4103)
<b>Mechanical property</b>		
E-modulus, EN 310 (longitudinal direction)	7227 N/mm <sup>2</sup>	> 3000 N/mm <sup>2</sup>
Flexural strength, EN 310 (longitudinal direction)	73 N/mm <sup>2</sup>	> 30 N/mm <sup>2</sup>
Through-thickness strength, dry, EN 319	1,8 N/mm <sup>2</sup> (adhesive fracture)	> 1,0 N/mm <sup>2</sup> (cohesive fracture)
Through-thickness strength, after cyclic test, EN 321	1,9 N/mm <sup>2</sup> (adhesive fracture)	> 0,2 N/mm <sup>2</sup> (cohesive fracture)
Connecting element, tensile strength, BRL 4103	455 N	-
Connecting element, shear strength, BRL 4103	875 N	-
<b>Moisture behaviour</b>		
Expansion behaviour, EN 317	2,4 %	< 7 %
Shrinkage and swelling behaviour under different humidities, EN 318,		
From 65 % to 35 %, longitudinal	-0,02 %	> -0,3 %
From 65 % to 35 %, thickness	-0,31 %	> -6 %
From 65 % to 85 %, longitudinal	0,07 %	< 0,3 %
From 65 % to 85 %, thickness	1,7 %	< 6 %
<b>Temperature behaviour</b>		
Coefficient of thermal expansion, BRL 1309	13 x 10 <sup>-6</sup> K <sup>-1</sup>	< 100 x 10 <sup>-6</sup> K <sup>-1</sup>
<b>UV-sensibility</b>		
UV-sensibility after SKH publication 97-04	No defects	-
<b>Performance of a test panel</b>		
Watertightness test after NEN 2778	500 Pa (seams 300 Pa)	Being raintight (at 0 Pa)
Watertightness test after cyclic loading after NEN 2778	400 Pa (seams 300 Pa)	Being raintight (at 0 Pa)
Sandbag impact test, EN 949	No deformation/ fracture	No deformation/ fracture
Steel ball impact test, EN 950	No deformation/ fracture	No deformation/ Fracture
Behaviour of the testpanel after cyclic loading using the SHR accelerated weathering test and NEN 3665	No damage or fracture	No damage/ fracture