Test report no.: **106404/13**

Customer: InterVilza
Savanoriu pr. 151
03150 Vilnius
LITHUANIA

Order: Initial test acc. to Quality and Testing Specifications for Terrace Decking made from Wood-Polymer Composites (version of 2013-01-01) of the Qualitätsgemeinschaft Holzwerkstoffe e.V.

Product: WPC hollow profiles
Nomination: "INO DECK"

Letter of: 2013-04-24 **Ref:** Mr. Aurelius Rudys

Receipt of samples: 2013-07-04 **Sampling:** ---

Test period: 2013-07-04 to: 2013-10-15

This test report comprises 8 pages.

Würzburg, September 23rd 2013
Krü/hn

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International akkreditiert SKZ - TeConA GmbH

i. A.

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The original language of the test report is German. In case of doubt, the German version is obligatory.

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Deutscher Akkreditierungs Rat
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SKZform 1020 - 10/12

1. Order

By letter of April 24th 2013 the company InterVilza, Savanoriu pr. 151, 03150 Vilnius, LITHUANIA, placed an order to SKZ - TeConA GmbH to run the initial test acc. to Quality and Testing Specifications for Terrace Decking made from Wood-Polymer Composites (version of 2013-01-01) of the Qualitätsgemeinschaft Holzwerkstoffe e.V.

2. Test material

Test material was sent by the customer to SKZ - TeConA GmbH on July 4th 2013.

The test material consisted of 30 segments of grey hollow profiles with a cross section of approx. 145 mm x 28 mm and a length of 1 m. The color acc. to the manufacturer is "Color 08".

The profile has one structured, brushed service face.

Acc. to the customer, the material is a wood plastic composite based on PVC. The SKZ - TeConA GmbH had no influence on the selection of the test material.

3. Test procedure

Usually we carry out tests according to standards for which we have an accreditation. The list of all standards for which we are accredited is shown on the homepage at www.skz.de.

If not otherwise mentioned, the tests were carried out in standard atmosphere 23/50, class 1 according to DIN EN ISO 291: 2008-08 "Plastics - Standard atmospheres for conditioning and testing" after a minimum of 48 hours storage in this atmosphere.

The tests comply with Quality and Testing Specifications for Terrace Decking made from Wood-Polymer Composites (version of 2013-01-01) of Qualitätsgemeinschaft Holzwerkstoffe e.V.

The following tests were carried out:

3.1 Bending properties acc. to DIN EN 310:1993-08 "Wood-based panels; determination of modulus of elasticity in bending and of bending strength "

Number of specimens:	5
Specimens:	600 mm x 145 mm x approx. 28 mm
Distance between the supports:	500 mm
Preload:	50 N
Testing speed:	20 mm/min
Climate:	23 °C / 50 % r. h.
Distance measurement:	Traverse
Accuracy of the test equipment:	Class 1
Load cell:	250 kN

The deflection at 500 N and the force at rupture were determined.

3.2 Immersion in boiling water (boil test) acc to DIN EN 1087-1:1995-04 "Particleboards - Determination of moisture resistance - Part 1: Boil test"

Number of specimens:	3
Specimens:	100 mm x 145 mm x approx. 28 mm
Storage period:	5 h at 100 °C in water 15 min in cold water

The swelling in thickness, width and length and the water uptake were determined.

3.3 Slip resistance acc. to DIN 51097:1992-11 "Testing of floor coverings; determination of the anti-slip properties; wet-loaded barefoot areas; walking method; ramp test"

The tests on slip resistance were carried out in an external laboratory.

3.4 Bending performance under long time loading acc. to prEN 15534-1: 2012-08 "Composites made from cellulose-based materials and thermoplastics (usually called wood-polymer composites (WPC) or natural fibre composites (NFC)) - Part 1: Test methods for characterisation of compounds and products"

Number of specimens:	3
Specimens:	600 mm x 145 mm x approx. 28 mm
Distance between the supports:	500 mm
Climate:	50 °C / 50 % r. h.
Storage period:	168 h
Load:	85 kg
Distance measurement:	Gauge

The specimens were conditioned for 2 hours without load.
The difference between deflection at the beginning and at the end of the test and the residual deflection were determined.

3.5 Performance under cyclic climatic stress acc. to DIN EN 321:2002-03 "Wood-based panels - Determination of moisture resistance under cyclic test conditions"

Number of specimens:		5
Specimens:		600 mm x 145 mm x approx. 28 mm
Storage cycles:	1. cycle:	28 d cold water (20 °C)
		24 h freezing (-25 °C)
		72 h drying (70 °C)
	2nd and 3rd cycle:	72 h cold water (20 °C)
		24 h freezing (-25 °C)
		72 h drying (70 °C)

After cyclic testing and before the bending tests, the test pieces were stored at standard atmosphere 23/50, class 1 according to DIN EN ISO 291: 2008-08 for 24 h. After the conditioning the bending test was carried out acc. to 3.1. The mean reduction of force at rupture was measured.

3.6 Performance under falling ball test acc. to EN 477: 1995-08 "Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors - Determination of the resistance to impact of main profiles by falling mass "

Number of specimens:	3
Specimens:	300 mm x 145 mm x approx. 28 mm
Climate:	23 °C / 50 % r. F.
Drop weight:	1000 ± 5 g
Ball radius:	25 ± 0,5 mm
Height of fall:	700 ± 5 mm
Distance between the supports:	200 mm

For each service face the test was carried out on the surface of 3 profiles each as well as on the longitudinal edges of 3 profiles each (9 tests in total per service face).

3.7 Linear thermal expansion coefficient acc. to DIN 53752:1980-12 "Testing of plastics; determination of the coefficient of linear thermal expansion"

Number of specimens:	3
Specimens:	400 mm x 145 mm x approx. 28 mm
Storage:	48 h at 60 °C and 48 h at -20 °C

The change in length was determined.

3.8 Weathering resistance was conducted via xenon arc light ageing acc. to EN ISO 4892-2: 2013-06 "Methods of exposure to laboratory light sources" by using a xenon tester, type BETA LM, method A, testing cycle 1.

Type of apparatus:	Xenotest Beta +
Light source:	Xenon lamp
Irradiance $E_{UV, 300-400nm}$:	60 ± 2 W/m^2
Operating mode:	continuous mode
Sprinkling:	18 min
Dry cycle:	102 min
Relative humidity:	65 ± 10 %
Expostion time:	300 h
Position:	Service face exposed to the lightsource

The differences in color ΔE, ΔL, Δa and Δb were determined with colorimeter acc. to ISO 7724 Part 1-3.

3.9 Storage in cold water acc. to EN 317: 1993-08 "Particleboards and fibreboards; determination of swelling in thickness after immersion in water "

Number of specimens:	3
Specimens:	100 mm x 145 mm x approx. 28 mm
Storage period:	28 d at 20 °C in water

The swelling in thickness, width and length and the water uptake were determined.

3.10 Dimensional accuracy acc. prEN 15534-1: 2012-08 "Composites made from cellulose-based materials and thermoplastics (usually called wood-polymer composites (WPC) or natural fibre composites (NFC)) - Part 1: Test methods for characterisation of compounds and products"

Number of specimens:	3
Specimens:	1000 mm x 145 mm x approx. 28 mm

Measurements regarding longitudinal dimensions, profile width and thickness, deviation from straightness and warp were taken.

4. Test results

N°	Parameter	Unit	Value $\bar{x}$	Set Value
3.1	**Bending properties**			
	Deflection at 500 N	mm	1.14	≤ 2
	Force at rupture	N	5000	≥ 3200
3.2	**Immersion in boiling water**			
	Change in thickness	%	3.7	≤ 4,5
	Change in width	%	0.5	≤ 0,8
	Change in length	%	0.03	≤ 0,5
	Water uptake	%	5.2	≤ 8
3.3	**Slip resistance**			
	Average angle of inclination α	°	> 30	min. rating group C (α ≥ 24°)
3.4	**Bending performance under long term loading**			
	Deflection Δs	mm	3.0	≤ 10
	Residual deflection Δsr	mm	0.6	≤ 5
3.5	**Performance under cyclic climatic stress**			
	Reduction of force at rupture	%	11.4	≤ 20
3.6	**Performance under falling ball test**			
	Longest surface crack	mm	no crack	≤ 10
3.7	**Linear thermal expansion coefficient**			
	Linear thermal length expansion coefficient	K^{-1}	1.48×10^{-5}	$\leq 4{,}0 \times 10^{-5}$

$\bar{x}$ = average value

N°	Parameter	Unit	Value $\bar{x}$	Set Value
3.8	**Waethering resistance**			
	Change in color	ΔL	-1.18	---
		Δa	0.40	---
		Δb	-1.07	---
		ΔE	1.65	≤ 10
3.9	Cold water immersion			
	Change in thickness	%	4.4	≤ 4.5
	Change in width	%	0.9	≤ 1
	Change in length	%	0.31	≤ 0.45
	Water uptake	%	6.2	≤ 9
3.10	**Dimensional accuracy**			
	Longitudinal dimensions	g/m	2795	--- *
	Width	mm	144.9	--- *
	Thickness	mm	28.2	--- *
	Deviation from straightness	mm	0.1	--- *
	Warp	mm	0.3	--- *

$\bar{x}$ = average value
* = the tolerances declared by the manufacturer shall be adhered to

5. Judgment of the results

The profiles fulfill the requirements of Quality and Testing Specifications for Terrace Decking made from Wood-Polymer Composites (version of 2013-01-01) of the Qualitätsgemeinschaft Holzwerkstoffe e.V..