Test report no.: **212047/21**

Client: Woodplast Company

Order: T esting of WPC decking profiles acc. to EN 15534-1 /-4

Letter of: 2021-02-22 **Reference:** ---

Receipt of samples: 2021-03-29
2021-04-14
2021-05-27
2021-06-09

Date of sampling: ---

Test period: 2021-04-26 to 2021-08-04

This test report comprises 11 pages.

Würzburg, 9. August 2021
Krü/For/hn

i. V.

Dr.-Ing. Marcus Heindl
Head of Testing Laboratory

International akkreditiert
SKZ - Testing GmbH

i. V.

Dipl.-Ing. Martin Krüger
Group Manager Testing Laboratory Components

SKZ - Testing GmbH
Prüfung, Überwachung, Zertifizierung
Friedrich-Bergius-Ring 22
97076 Würzburg

Geschäftsführer
Dr.-Ing. Gerald Aengenheyster
HRB 7840
Amtsgericht Würzburg

Tel. +49 931 4104-0
Fax +49 931 4104-477
testing@skz.de
www.skz.de

1. Order

By letter of 22 February 2021 the company Easy Standart Ltd, 1a Stoletova st, 220037 Minsk, BELARUS, placed an order with SKZ - Testing GmbH to test WPC decking profiles acc. to EN 15534-1/-4 produced by Woodplast Company, Shota Rustaveli Street 20, 61001 Kharkiv, UKRAINE.

2. Test material

The following test materials, solid WPC decking profiles "BRUGGAN MULTICOLOR", were sent to SKZ - Testing GmbH by the customer:

Date	Quantity	Dimensions [mm]	Colour [1)]
2021-03-29	5	1000 x 140 x 20	grey
	5	1000 x 160 x 20	wenge
	5	1000 x 140 x 20	wenge
	5	1000 x 140 x 20	cedar
2021-04-14	5	1000 x 140 x 20	smoke white
2021-05-27	8	1000 x 140 x 20	grey
	5	1000 x 120 x 20	wenge
2021-06-09	8	1000 x 140 x 20	grey

[1)] according to client

According to the client, the profiles were made of Polyethylene and 60 % wood. Further information about the materials or the manufacturing process was not available to SKZ - Testing GmbH.

The SKZ - Testing GmbH had no influence on the selection of the test material.

Picture 1: WPC profile BRUGGAN MULTICOLOR - wenge

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. All non-accredited procedures are marked with a *.

If not otherwise mentioned, the tests were carried out at 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 24 hours storage at this atmosphere.

The following tests were conducted acc. to DIN EN 15534-1: 2018-02 "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" and DIN EN 15534-4: 2014-04 "Composites made from cellulose-based materials and thermoplastics (usually called wood-polymer composites (WPC) or natural fibre composites (NFC)) - Part 4: Specifications for decking profiles and tiles".

3.1 Bending properties acc. to chapter 7.3.2 of DIN EN ISO 15534-1 and chapter 4.5.2 of DIN EN ISO 15534-4

Number of specimens:	min. 5 each
Specimens:	Profile cross-section x 500 mm
Distance between the supports:	360 mm
Support:	Ø = 15 mm
Loading head:	Ø= 30 mm
Preload:	50 N
Testing speed:	13.5 mm/min
Climate:	23 °C / 50 % r. h.
Distance measurement:	Traverse
Load cell:	250 kN

The ribbed side was in the pressure zone during the test.

First all profile colours and widths were tested. Based on the results the colour "grey" and width 140 mm were chosen for all further test set-ups.

3.2 Test of slipperiness acc. to chapter 6.4.3 of DIN EN ISO 15534-1 and chapter 4.4 of DIN EN ISO 15534-4

The inclination plan test was carried out by an external, herefor accredited laboratory.

3.3 Dimensional accuracy acc. to chapter 6.5 and 6.6 of DIN EN ISO 15534-1 and chapter 4.4 of DIN EN ISO 15534-4

Number of specimens:	3
Specimens:	Profile cross-section x 1000 mm

Measurements regarding longitudinal dimensions, profile width and thickness, deviation from straightness and warp were taken on the specimens. And the mass per unit length was determined.

3.4 Falling mass impact test acc. to chapter 7.1.2 of DIN EN ISO 15534-1 and chapter 4.5.1 of DIN EN ISO 15534-4

Number of specimens:	10
Specimens:	Profile cross-section x 300 mm
Climate:	23 °C / 50 % r. h.
Drop weight:	1000 ± 5 g
Radius ball surface:	25 ±0,5 mm
Drop height:	700 ± 5 mm
Distance between the supports:	200 mm

3.5 Creep behaviour acc. to chapter 7.4 of DIN EN ISO 15534-1 and chapter 4.5.3 of DIN EN ISO 15534-4

Number of specimens:	3 each
Specimens:	Profile cross-section x 500 mm
Distance between the supports:	360 mm
Climate:	50 °C / 50 % r. h.
Test duration:	168 h with load + 24 h without load
Test load:	85 kg
Distance measurement:	analogue dial gauge

The change in deflection at the beginning and end of the test period under load was determined on the single profile and the difference between the deflection 24 h after the load return and the deflection before the application of the load was determined.

3.6 Resistance to artificial weathering acc. to chapter 8.1 of DIN EN ISO 15534-1 and chapter 4.5.5 of DIN EN ISO 15534-4

Artificial weathering acc. to DIN EN ISO 4892-2: 2013-06

Method:	A
Cycle number:	1
Type of apparatus:	Xenotest Beta+
Light source:	Xenon lamp
Relative spectral irradiance:	$E_{UV(300-400nm)}$: 60 ± 2 W/m²
Operating mode:	continuous mode
Sprinkling:	18 min
Dry cycle:	102 min
Relative humidity:	65 ± 5%
Exposition time:	300 h
Specimens:	100 x 60 x 20 mm each
Colour:	grey, wenge, smoke white, cedar

The colour differences ΔL*, Δa*, and Δb* were determined acc. to EN ISO 11664-4 / ISO 18314-1 as the difference between the measurements taken prior to and after 300 h of artificial weathering at 5 different positions.

3.8 Moisture resistance under cyclic conditions acc. to chapter 8.3.2 of DIN EN ISO 15534-1 and chapter 4.5.3 of DIN EN ISO 15534-4

Number of specimens:	8
Specimens:	Profile cross-section x 500 mm
Storage cycles:	1. cycle: 28 d immersion in water at 23°C 24 h freezing (-20 °C) 72 h drying (70 °C) 2. and 3. cycle: 72 h immersion in water at 23°C 24 h freezing (-20 °C) 72 h drying (70 °C)

After the last cycle the profiles were stored for 72 h at standard atmosphere 23/50 class 1 acc. to DIN EN ISO 291 and afterwards tested acc. to the bending test of chapter 3.1.

3.9 Cold water immersion test acc. to chapter 8.3.1 of DIN EN ISO 15534-1 and chapter 4.5.5 of DIN EN ISO 15534-4

Number of specimens:	5
Specimens:	Profile cross-section x 100 mm
Storage period:	28 days at 23°C in water

Afterwards the changes in dimensions and weight were determined.

3.10 Boiling water test acc. to chapter 8.3.3 of DIN EN ISO 15534-1 and chapter 4.5.5 of DIN EN ISO 15534-4

Number of specimens:	5
Specimens:	Profile cross-section x 100 mm
Storage period:	5 h at 100°C in water

Immediately after taking the specimens out of the boiling water they were put in cold water (23°C). Afterwards the changes in dimensions and weight were determined.

After the test the test specimens were examined visually to detect any presence of surface cracks and to measure the residual indentation.

3.11 Linear thermal expansion coefficient acc. to chapter 9.2 of DIN EN ISO 15534-1 and chapter 4.5.6 of DIN EN ISO 15534-4

Number of specimens:	3 (2 measurements per specimens)
Specimens:	6 x 6 x 6 mm
Temperature range:	-70 °C to 110 °C
Heating rate:	2.5 °C / min
Test direction:	profile longitudinal direction
Evaluation range:	-30 ° to 80 °C

4. Test results

Bending properties

Profile / Colour Parameter	**Unit**	**Required Value** MW / EW	**Result** MV / SV
120 x 20 - Wenge			
Deflection at 500 N	mm	≤ 2.0 / ≤ 2.5	1.36 / 1.40
Maximum bending load	N	≥ 3300 / ≥ 3000	3460 / 3210
140 x 20 - Wenge			
Deflection at 500 N	mm	≤ 2.0 / ≤ 2.5	1.13 / 1.16
Maximum bending load	N	≥ 3300 / ≥ 3000	4460 / 4430
140 x 20 - Grey			
Deflection at 500 N	mm	≤ 2.0 / ≤ 2.5	1.07 / 1.11
Maximum bending load	N	≥ 3300 / ≥ 3000	3330 / 3090
140 x 20 - Cedar			
Deflection at 500 N	mm	≤ 2.0 / ≤ 2.5	1.10 / 1.13
Maximum bending load	N	≥ 3300 / ≥ 3000	4840 / 4650
140 x 20 - Smoke white			
Deflection at 500 N	mm	≤ 2.0 / ≤ 2.5	1.28 / 1.30
Maximum bending load	N	≥ 3300 / ≥ 3000	3370 / 3180
160 x 20 - Wenge			
Deflection at 500 N	mm	≤ 2.0 / ≤ 2.5	0.98 / 0.99
Maximum bending load	N	≥ 3300 / ≥ 3000	4180 / 3990

MV = arithmetic mean value; SV = single value

Further properties of profile 140 x 20 in colour grey

Parameter	**Unit**	**Required Value** MW / EW	**Result** MV / SV
Slip resistance			
Average angle of inclination α (ribbed side)	°	Rating group C ($\alpha \geq 24°$)	Rating group C > 30 °
Dimensional accuracy			
Mass per length unit	g/m	3200 [1)]	3282 / 3280
Width	mm	140 ± 2 [1)]	139 / 139
Thickness	mm	18 ± 1 [1)]	19.0 / 18.9
Deviation from straightness	mm	≤ 0,5 [1)]	0.3 / 0.4
Warp	mm	≤ 3 [1)]	0.1 / 0.2
Falling mass impact test			
Longest perceptible surface crack	mm	no crack	no crack
Maximum depth of residual indentation	mm	< 0.5	--- / ≤ 0.5
Creep behaviour			
Deflection Δs	mm	≤ 10 / ≤ 13	6.3 / 6.7
Residual deflection Δs_r	mm	≤ 5 / ---	4.6 / 4.8

MV = arithmetic mean value; SV = most critical single value

[1)] Manufacturer's specifications

Parameter	Unit	Required Value MW / EW	Result MV / EW
Weathering resistance			
Change in colour "wenge"	ΔL*	--- / ---	4.33 / 4.97
	Δa*	--- / ---	1.11 / 1.21
	Δb*	--- / ---	-0.06 / -0.12
Change in colour "grey"	ΔL*	--- / ---	5.20 / 6.07
	Δa*	--- / ---	-0.05 / -0.32
	Δb*	--- / ---	-1.73 / -2.43
Change in colour "cedar"	ΔL*	--- / ---	7.50 / 7.71
	Δa*	--- / ---	1.96 / 2.11
	Δb*	--- / ---	0.79 / 1.09
Change in colour "smoke white"	ΔL*	--- / ---	8.61 / 9.57
	Δa*	--- / ---	-1.71 / -1.92
	Δb*	--- / ---	-5.80 / -6.16
Moisture resistance under cycling climatic stress			
Reduction of maximum bending load	%	≤ 20 / ≤ 30	3.6 / 8.9
Cold water immersion test			
Change in thickness	%	≤ 4 / ≤ 5	0.8 / 0.9
Change in width	%	≤ 0.8 / ≤ 1.2	0.7 / 1.7
Change in length	%	≤ 0.4 / ≤ 0.6	0.1 / 0.3
Change in weight	%	≤ 7 / ≤ 9	0 / 0.2

MV = arithmetic mean value; SV = most critical single value

Parameter	Unit	Required Value MW / EW	Result MV / EV
Boiling water test			
Change in weight	%	≤ 7 / ≤ 9	0.4 / 1.0
Linear thermal expansion coefficient			
Linear thermal length expansion coefficient; longitudinal direction	K^{-1}	--- / ≤ 50 x 10^{-6}	--- / 36.4 x 10^{-6}
Linear thermal length expansion coefficient; transverse direction	K^{-1}	---	--- / 127 x 10^{-6}

MV = arithmetic mean value; SV = most critical single value

5. Evaluation of the results

The profiles fulfil the requirements of DIN EN ISO 15534-1/-4.

The proof of resistance to biological attack (Basidiomycetes) for use class UC3 (external use, above ground) has not been assessed and, if necessary, must be proven separately.