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Resysta International GmbH
Herrn Fischer
Steinbuchstr. 3
83539 Pfaffing-Forsting

Dresden, 04 January 2013
70-em/we

Test report Order No. 272092

Customer: Resysta International GmbH
Herr Fischer
Steinbuchstr. 3
83539 Pfaffing-Forsting

Date of order: 01.03.2012

Order: Carrying out of an artificial weathering test

Institution: EPH - Laboratory Surface Testing

Engineer in charge: Dipl.-Ing. S. Wenk

Dr.-Ing. R. Emmler
Head of Laboratory Surface Testing

The test report contains 10 pages. Any duplication, even in part, requires written permission of EPH. These test results are exclusively related to the tested material.

1 Task

The laboratory for development and examination for wood technology Ltd. (EPH) was instructed by Resysta International GmbH to carry out an artificial weathering test of selected materials.

2 Test material

The customer has provided 20 different versions for the tests, each with 2 specimens with dimensions 145 mm x 65 mm x thickness.

The handover of the samples was carried out on 19.04.2012.

The test pieces of the customer were indicated as:

Variant	Name of samples provided by the client		Number of samples/ dimensions [mm]
1	2	Kovalex	2 / 145 x 65 x 26
2	5	Siberian larch	2 / 145 x 65 x 24
3	7	Thermo ash-tree	2 / 145 x 65 x 24
4	8	Mega Wood	2 / 145 x 65 x 21
5	12	Trex	2 / 145 x 65 x 28
6	13	Timbertex XLM	2 / 145 x 65 x 26
7	14	Timber Tech Twin Finish	2 / 145 x 65 x 24
8	15	IPE	2 / 145 x 65 x 24
9	17	Redwood	2 / 145 x 65 x 37
10	21	UPM - grey	2 / 145 x 65 x 28
11	22	Rehau - Relazzo	2 / 145 x 65 x 30
12	24	Werzalit Terraza brown	2 / 145 x 65 x 37
13	25	Terrawood Bangkirai	2 / 145 x 65 x 24
14	27	Cape Cod Victorian Grey	2 / 145 x 65 x 18
15	30	Terrawood Accoya silver patina	2 / 145 x 65 x 19
16	31	Twinson – Hazelnut Brown	1 / 145 x 65 x 28
17	32	Resysta untreated	2 / 145 x 65 x 21
18	33	Resysta + 2K lacquer	2 / 145 x 65 x 21
19	34	Resysta + glaze (Walnut)	2 / 145 x 65 x 21
20	35	Resysta + glaze (Walnut) + 2K	2 / 145 x 65 x 21

3 Test performance of the artificial weathering test

The artificial weathering test was carried about 5000 h (after 9,2 MJ / m² x nm irradiation) with a Xenon tester Weather Ometer Ci 3000 (test device KL 30) according to DIN EN 11341.

The artificial weathering was carried out with the following test conditions:

- water cooled equipment
- Black standard temperature (BST) of 50 °C

- Relative Humidity 40 %
- Radiation intensity 0.5 W / (m² x nm) at 340 nm
- Weathering cycle: spray cycle 18 min, 102 min of drying phase.

The following assessments were carried out to characterize the weathering resistance:

- Visual assessment of the colour change after exposure using the Grey scale according to EN ISO 105-A02 after 500 h, 1000 h, 1500 h, 2000 h, 2500 h, 3000 h, 3500 h, 4000 h, 4500 h and 5000 h (contrast)
- Visual assessment after 500 h, 1000 h, 1500 h, 2000 h, 2500 h, 3000 h, 3500 h, 4000 h, 4500 h and 5000 h (appearance)

Each one sample was used for the weathering test.

4 Test results

Visual assessment

Variant	Visual assessment	
	after 2000 h artificial weathering	after 5000 h artificial weathering
1	sporadic swelling of fibers, irregular surface,	sporadic swelling of fibers, irregular surface,
2	completely bleached surface, brittle surface, strong structural differences early wood / latewood	completely bleached surface, brittle surface, strong structural differences early wood / latewood
3	completely bleached surface, brittle and cracked surface	completely bleached surface, brittle, cracked and fibrous surface
4	clearly visible colour change (bleaching)	clearly visible colour change with increase the amount of red
5	very strong colour change (bleaching), rough surface, loss of gloss, some white particles selectively visible	very strong colour change (bleaching), rough surface, loss of gloss, some white particles selectively visible
6	strong greyed surface	strong greyed surface
7	clearly visible colour change (fading), brittle and cracked surface, some white particles selectively visible	clearly visible colour change (fading), brittle and cracked surface, some white particles selectively visible
8	completely bleached surface	completely bleached surface
9	completely bleached surface, strong structural differences earlywood / latewood	completely bleached surface, strong structural differences earlywood / latewood, fibrous surface
10	very strong colour change (bleaching), rough surface	very strong colour change (bleaching), rough surface

Variant	Visual assessment	
	after 2000 h artificial weathering	after 5000 h artificial weathering
11	strong colour change (bleaching), some white particles selectively visible	strong colour change with increase the amount of red, some white particles selectively visible
12	rough surface, loss of gloss, some white particles visible at points	rough surface, loss of gloss, some white particles visible at points
13	completely bleached surface, brittle and cracked surface	completely bleached surface, brittle and cracked surface
14	very slight colour change, loss of gloss	slight colour change, loss of gloss
15	patchy greying	patchy greying
16	clear change in colour (darker)	clear change in colour (darker)
17	distinct colour change (bleaching), rough surface	distinct colour change (bleaching), rough surface
18	very strong colour change (bleaching), some white particles visible	very strong colour change (bleaching), some white particles visible
19	very slight change in colour, single white particles visible	slight change in colour, single white particles visible
20	visible colour change, individual white particles visible	very strong colour change (bleaching), individual white particles visible













Colour change - Determined using grey scale according to DIN EN 20105-A02:













Variant	Change of sample colour in grey scale due to colour change after									
	500 h	1000 h	1500 h	2000 h	2500 h	3000 h	3500 h	4000 h	4500 h	5000 h
1	4,5	3,5	3	3	3	3	3	3	3	3
2	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	1
4	4,5	3,5	3,5	3	3	3	3	3	3	3
5	1,5	1	1	1	1	1	1	1	1	1
6	4	3	2,5	2	1,5	2,5	2,5	2,5	2,5	2,5
7	4	3	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
8	1	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1	1
10	4	3	2	1	1	1	1	1	1	1
11	3	2,5	2,5	2	2	2	2,5	2,5	2,5	2,5
12	3	3,5	3	3	3	3	3	3	3	3
13	1	1	1	1	1	1	1	1	1	1
14	5	5	4,5	4,5	4,5	4	4	4	4	4
15	2,5	2	1,5	1,5	1,5	1	1	1	1	1
16	3,5	3,5	3	2,5	2,5	2,5	2,5	2,5	2,5	2
17	3	2,5	2,5	2,5	2,5	2,5	2	2	2	2
18	4,5	3,5	2	1	1	1	1	1	1	1
19	4,5	4	4	4	4	3	3	3	3	3
20	5	4,5	4,5	3,5	2	1,5	1,5	1,5	1,5	1













Rating scale for assessing change in colour using the grey scale









Grey scale N° 5	no change of colour	Grey scale N° 3	clearly recognisable change of colour
Grey scale N° 4,5	very small change of colour	Grey scale N° 2,5	very clearly recognisable change of colour
Grey scale N° 4	small change of colour	Grey scale N° 2	strong change of colour
Grey scale N° 3,5	recognisable change of colour	Grey scale N° 1	very strong change of colour













Overview of variants before and after weathering (after 2000 hrs and 5000 hrs)

Var.	Initial state	Artificial weathering after 2000 hrs	after 5000 hrs
1			
2			
3			
4			

Var.	Initial state	Artificial weathering after 2000 hrs	after 5000 hrs
5			
6			
7			
8			

Var.	Initial state	Artificial weathering after 2000 hrs	after 5000 hrs
9			
10			
11			
12			

Var.	Initial state	Artificial weathering after 2000 hrs	after 5000 hrs
13			
14			
15			
16	no reference sample present		

Var.	Initial state	Artificial weathering after 2000 hrs	after 5000 hrs
17			
18			
19			
20			

The test samples were returned to sender.



Dipl.-Ing. S. Wenk
Engineer in charge