



MPA | Eberswalde

Materialprüfanstalt
Brandenburg GmbH

Prüfung, Überwachung,
Zertifizierung, Gutachten,
Forschung und Entwicklung

Test report

32/20/10362/01

Two authentic copies

Client: Biotanex New Zealand Limited
Mr Paul Duncan
2670 Omaha Road
Hastings 4154
New Zealand

Alfred-Möller-Straße 1, H 13
D-16225 Eberswalde

Fon +49 (0) 33 34. 65 560
Fax +49 (0) 33 34. 65 550

www.mpaew.de
office@mpaew.de

Geschäftsführer:
Dr. Peter Schumacher

HRB 10408 FF

Date of order: 17.06.2020

Received: 19.06.2020

Test procedure: Determination of the durability of modified wood according against wood destroying basidiomycetes according to CEN/TS 15083-1 (2005)
- without ageing procedure -

Test product: Modified timber made from *Pinus radiata*, one variant of "Sicaro timber"
Three boards, each ca 24 x 150 x 600 mm

Date of delivery: 04.05.2020

Persons in charge: Dr. E.-M. Fennert, Frau S. Hoffmann

Period of testing: 08/2020 – 01/2021

This test report comprises 7 pages. It refers exclusively to the material submitted for testing and remains property of MPA until completion of full payment. The test material is being stored for 2 years and may be given back to the contractor at his expense. Publication of test reports is only permissible if published as a whole. Publication of excerpts, references to tests for purposes of advertising and the use of contents of test reports require in every single case the revocable written consent of MPA.

Average density of all modified test blocks (e_1) used: at $(20 \pm 2)^\circ\text{C}$ / $(65 \pm 5)\%$ humidity	Board 1: 0,66 g/cm ³ (min: 0,63 g/cm ³ ; max: 0,68 g/cm ³) Board 2: 0,65 g/cm ³ (min: 0,61 g/cm ³ ; max: 0,68 g/cm ³) Board 3: 0,74 g/cm ³ (min: 0,72 g/cm ³ ; max: 0,76 g/cm ³)
Equilibrium moisture content of modified pine blocks at $20^\circ\text{C}/65\%$ (e_2):	Board 1: 9,7 % Board 2: 8,6 % Board 3: 8,7 % single data see table 1
Species of reference timber/ average density:	<i>Pinus sylvestris</i> / 0,49 g/cm ³
Species and strain number of fungi used:	<i>Coniophora puteana</i> / BAM Ebw 15 <i>Rhodonia placenta</i> / FPRL 280
Conditioning of test blocks: at $(20 \pm 2)^\circ\text{C}$ / $(65 \pm 5)\%$ humidity	04.05.2020 – 01.09.2020
Ageing test carried out:	none
Method of sterilization used:	Ionising irradiation (⁶⁰ Co) between 25 and 50 kGy; carried out by BBF Sterilisationservice GmbH in 71394 Kernen-Rommelshausen
Start of incubation:	18.09.2020
End of incubation:	08.01.2021
Median mass loss of modified test blocks (e_1):	single data see tables 2 – 3 The test was conducted according to CEN/TS 15083-1(2005); section 7.2. So, in each test vessel (Kolle-flasks) two test blocks (e_1) of either modified pine or reference timber were installed
Mean mass losses of reference timber:	<i>C. puteana</i> (<i>Pinus sylvestris</i>): 31,7 % <i>R. placenta</i> (<i>Pinus sylvestris</i>): 39,0 % single data see table 4 The virulence of the test fungi is sufficient see CEN/TS 15083-1 (2005), section 5.1.1

Validity of results:

The mean mass loss of reference timbers is equal or higher than the minimum required in CEN/TS 15083-1 (2005); section 5.1.1
Therefore, the test is valid

Median mass loss and provisional assessment of inherent or enhanced durability according to CEN/TS 15083-1 annex D

Test product	Median mass loss in %		Durability class
	<i>Coniophora puteana</i>	<i>Rhodonia placenta</i>	
Sicaro timber	1,4	1,4	DC 1

Durability class	Description	Percentage median mass loss
DC 1	Very durable	≤ 5
DC 2	durable	>5 to ≤ 10
DC 3	Moderately durable	>10 to ≤ 15
DC 4	Slightly durable	>15 to ≤ 30
DC 5	Not durable	> 30

NOTE:

The test results refer only to the material submitted for testing. The interpretation of this test report as well as the practical conclusions that may be drawn from it require specialized knowledge of wood preservation and timber.

MPA Eberswalde
Materialprüfanstalt Brandenburg GmbH
- Wood and wood preservation

Eberswalde, 14.01.2021


Dr. Peter Schumacher
Head of institute

Annex: 3 sheet




Dr. Eva-Maria Fennert
Specialist

Annex

Table 1: Determination of moisture content of modified pine (e₂)
(e₂ = test blocks for moisture content according to CEN/TS 15083-1, section 6.5)

Modified pine: Sicaro timber

test block no	board No	m ₁ 20°C/65% [g]	density 20°C/65% [g/m ³]	m ₀ 103°C [g]	calculated moisture content [%]
61	1	11,891	0,63	10,837	9,7
62		12,322	0,66	11,229	9,7
63		12,029	0,64	10,939	10,0
64		12,200	0,65	11,153	9,4
mean			0,65	9,7	
65	2	12,312	0,66	11,332	8,6
66		11,876	0,63	10,935	8,6
67		11,713	0,62	10,777	8,7
68		11,401	0,61	10,500	8,6
mean			0,63	8,6	
69	3	13,418	0,72	12,351	8,6
70		13,558	0,72	12,461	8,8
71		13,751	0,73	12,641	8,8
72		13,445	0,72	12,369	8,7
mean			0,72	8,7	
mean			0,66	9,0	

m₀ oven dry mass of modified test blocks only used for indirectly determined moisture
m₁ mass of modified test block after conditioning
density of modified test blocks after conditioning

Table 2: Mass losses of modified pine (e₁)(e₁ = test blocks for determination of enhanced durability according to CEN/TS 15083-1, section 6.5)Modified pine: Sicaro timber
Test fungus: *Coniophora puteana*

test block No	board No	m ₁ 20°C/65% [g]	m ₀ calculated [g]	density 20°C/65% [g/cm ³]	calculated moisture content [%]	m ₂ mass (wet) [g]	final moisture content [%]	m ₃ oven dry (103°C) [g]	mass loss [%]
1	1	12,783	11,652	0,68	9,7	20,422	79,5	11,380	2,3
2		12,585	11,472	0,67	9,7	20,386	82,0	11,200	2,4
3		12,483	11,379	0,67	9,7	20,170	81,7	11,101	2,4
4		12,429	11,330	0,66	9,7	19,779	79,0	11,047	2,5
5		12,311	11,222	0,66	9,7	19,886	80,8	10,998	2,0
6		12,200	11,121	0,65	9,7	20,359	86,4	10,923	1,8
7		12,465	11,363	0,66	9,7	19,913	78,0	11,189	1,5
8		12,274	11,188	0,65	9,7	19,963	79,4	11,130	0,5
9		12,289	11,202	0,66	9,7	20,132	82,0	11,063	1,2
10		12,139	11,065	0,65	9,7	19,468	78,5	10,906	1,4
mean:		0,66			80,7			1,8	
median:								1,9	
11	2	11,937	10,989	0,64	8,6	20,023	84,9	10,831	1,4
12		12,334	11,354	0,66	8,6	19,936	78,0	11,202	1,3
13		12,299	11,322	0,66	8,6	20,626	85,1	11,145	1,6
14		11,909	10,963	0,64	8,6	20,001	85,0	10,810	1,4
15		12,523	11,528	0,67	8,6	20,755	82,1	11,397	1,1
16		12,400	11,415	0,66	8,6	20,737	83,8	11,285	1,1
17		12,659	11,653	0,68	8,6	19,905	73,1	11,501	1,3
18		12,169	11,202	0,65	8,6	20,006	79,7	11,131	0,6
19		11,751	10,817	0,63	8,6	19,707	84,3	10,694	1,1
20		11,955	11,005	0,64	8,6	19,590	79,9	10,889	1,1
mean:		0,65			81,6			1,2	
median:								1,2	
21	3	13,999	12,875	0,75	8,7	22,131	74,7	12,667	1,6
22		14,035	12,908	0,75	8,7	22,056	73,7	12,701	1,6
23		13,784	12,677	0,74	8,7	21,840	74,6	12,509	1,3
24		14,099	12,967	0,75	8,7	20,918	63,5	12,790	1,4
25		13,722	12,620	0,73	8,7	21,857	75,3	12,465	1,2
26		14,292	13,144	0,76	8,7	22,081	70,4	12,957	1,4
27		14,117	12,983	0,75	8,7	21,369	66,7	12,821	1,3
28		14,329	13,178	0,76	8,7	21,721	67,3	12,987	1,5
29		13,972	12,850	0,75	8,7	22,005	72,8	12,732	0,9
30		13,998	12,874	0,75	8,7	21,635	70,3	12,707	1,3
mean:		0,75			70,9			1,3	
median:								1,3	
mean:		0,69			77,74			1,5	
median:								1,4	

m₀ indirectly determined oven dry mass
m₁ mass of modified test blocks after conditioning
density of modified test blocks after conditioning
m₂ mass (wet) at the end of the test
m₃ oven dry mass at the end of the test

Table 3: Mass losses of modified pine (e₁)
(e₁ = test blocks for determination of enhanced durability according to CEN/TS 15083-1, section 6.5)

Modified pine: Sicaro timber
Test fungus: *Rhodonia placenta*

test block No	board No	m ₁ 20°C/65% [g]	m ₀ calculated [g]	density 20°C/65% [g/cm ³]	calculated moisture content [%]	m ₂ mass (wet) [g]	final moisture content [%]	m ₃ oven dry (103°C) [g]	mass loss [%]
31	1	12,022	10,959	0,64	9,7	17,267	59,3	10,838	1,1
32		12,534	11,425	0,67	9,7	18,814	68,0	11,197	2,0
33		12,379	11,284	0,66	9,7	16,893	52,9	11,051	2,1
34		12,067	11,000	0,64	9,7	17,833	64,1	10,867	1,2
35		12,256	11,172	0,65	9,7	18,851	71,5	10,990	1,6
36		12,226	11,145	0,65	9,7	17,585	61,4	10,892	2,3
37		12,410	11,312	0,66	9,7	17,923	61,5	11,097	1,9
38		12,319	11,229	0,66	9,7	18,483	68,5	10,971	2,3
39		12,273	11,187	0,65	9,7	17,146	55,8	11,004	1,6
40		12,586	11,473	0,67	9,7	16,921	50,4	11,248	2,0
mean:		0,66			61,4			1,8	
median:								1,9	
41	2	11,972	11,021	0,64	8,6	16,598	52,7	10,872	1,4
42		12,277	11,302	0,65	8,6	17,339	56,1	11,111	1,7
43		12,260	11,286	0,65	8,6	17,731	59,2	11,136	1,3
44		11,955	11,005	0,64	8,6	17,517	61,4	10,850	1,4
45		12,614	11,612	0,67	8,6	17,615	53,6	11,469	1,2
46		12,508	11,514	0,67	8,6	18,238	60,5	11,364	1,3
47		12,702	11,693	0,68	8,6	18,134	57,3	11,531	1,4
48		11,947	10,998	0,64	8,6	17,904	65,1	10,847	1,4
49		11,814	10,875	0,63	8,6	18,859	75,5	10,743	1,2
50		12,362	11,380	0,66	8,6	17,843	59,1	11,216	1,4
mean:		0,65			60,0			1,4	
median:								1,4	
51	3	13,867	12,754	0,74	8,7	19,756	57,0	12,585	1,3
52		13,776	12,670	0,73	8,7	20,047	60,5	12,494	1,4
53		14,096	12,964	0,75	8,7	21,378	67,2	12,788	1,4
54		13,928	12,810	0,74	8,7	19,547	55,5	12,570	1,9
55		14,201	13,061	0,76	8,7	21,367	65,7	12,892	1,3
56		13,957	12,836	0,74	8,7	20,544	62,3	12,660	1,4
57		13,986	12,863	0,75	8,7	20,650	63,0	12,668	1,5
58		13,630	12,536	0,73	8,7	18,916	52,6	12,395	1,1
59		13,631	12,536	0,73	8,7	19,557	57,6	12,407	1,0
60		14,003	12,879	0,75	8,7	19,191	51,4	12,679	1,5
mean:		0,74			59,3			1,4	
median:								1,4	
mean:		0,68			60,22			1,5	
median:								1,4	

m₀ indirectly determined oven dry mass
m₁ mass of modified test blocks after conditioning
density of modified test blocks after conditioning
m₂ mass (wet) at the end of the test
m₃ oven dry mass at the end of the test

Table 4: Losses in mass of reference timbers

test block no.	m ₁ 20°C/65% [g]	density 20°C/65% [g/cm ³]	m ₀ oven dry (103°C) [g]	m ₂ mass (wet) [g]	final moisture content [%]	m ₃ oven dry (103°C) [g]	mass loss [%]
<i>Coniophora puteana</i>							
73	9,327	0,50	8,376	10,779	88,67	5,713	31,8
74	9,212	0,49	8,248	10,568	85,18	5,707	30,8
75	9,411	0,50	8,445	9,936	84,96	5,372	36,4
76	9,394	0,50	8,433	9,509	82,62	5,207	38,3
77	9,306	0,50	8,345	10,149	89,28	5,362	35,7
78	9,091	0,48	8,173	11,077	81,68	6,097	25,4
79	9,476	0,51	8,494	10,827	86,13	5,817	31,5
80	9,417	0,50	8,443	11,104	81,94	6,103	27,7
81	9,264	0,49	8,331	11,096	80,01	6,164	26,0
82	9,317	0,50	8,366	10,436	87,23	5,574	33,4
<i>mean</i>		0,50			84,8		31,7
<i>median</i>							31,7

<i>Rhodonia placenta</i>							
83	9,153	0,49	8,221	7,718	62,18	4,759	42,1
84	9,372	0,50	8,413	8,530	64,39	5,189	38,3
85	8,531	0,45	7,663	8,694	89,95	4,577	40,3
86	9,207	0,49	8,260	11,132	105,69	5,412	34,5
87	9,379	0,50	8,439	10,878	123,60	4,865	42,4
88	9,376	0,50	8,432	10,176	123,30	4,557	46,0
89	9,260	0,49	8,316	7,799	64,33	4,746	42,9
90	9,419	0,50	8,457	8,731	65,02	5,291	37,4
91	9,316	0,50	8,370	10,911	103,98	5,349	36,1
92	9,147	0,49	8,200	11,276	95,59	5,765	29,7
<i>mean</i>		0,49			89,8		39,0
<i>median</i>							39,3

m₀ oven dry mass
 m₁ untreated test block after conditioning
 density of untreated and conditioned test block
 m₂ mass (wet) at the end of the test
 m₃ oven dry mass at the end of the test