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Initials: troj/elm/hbs  
Order no.: 681780  
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# Test Report

DS/CEN/TS 15083-1 in accordance with EN 84

Report no.: 681780-2

**Assignor:** WTT Holding ApS  
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7330 Brande  
Denmark

**Material:** Beech (*Fagus sylvatica*, L.) of Danish origin.

**Method:** Test according to DS/CEN/TS 15083-1 2005: *Durability of wood and wood-based products – Determination of the natural durability of solid wood against wood-destroying fungi, test methods - Part 1: Basidiomycetes.*

**Period:** The test was carried out from 12-12-2016 to 24-07-2017.

**Results:** Durability class according to DS/EN 350 (2016).

Fungi	Equilibrium moisture content @ 65 % RH		
	Low intensity 6.6 %	Medium intensity 7.0 %	High intensity 5.6 %
<i>Coniophora puteana</i> . BAM Ebw. 15	1	1	1
<i>Poria placenta</i> . FPRL 280	1	1	1
<i>Trametes versicolor</i> . CTB 863 A	1	1	1
<b>Durability class</b>	<b>1</b>	<b>1</b>	<b>1</b>

Detailed results are given in Appendix 2.

**Storage:** The test material will be destroyed after 3 month, unless otherwise agreed.

**Terms:** The accredited test was carried out according to DANAK's general conditions see [www.danak.dk](http://www.danak.dk) and according to the General Terms and Conditions regarding Commissioned Work Accepted by the Danish Technological Institute, which apply at the time of signing the agreement. The test is only valid for the tested specimen. The test report may only be extracted, if the laboratory has approved the extract.

**Date/place:** 28-08-2017, Teknologisk Institute, Wood and Biomaterials, Taastrup

**Signature:** Test-responsible

Co-signatory



## Detailed information

Order no.: 681780  
Appendix: 1  
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- Test-specimens/  
treatment:** The wood was modified in a laboratory autoclave resembling the WTT ThermoTreat 2.0 system, however at a lower gas-pressure than can be accomplished in industrial autoclaves. The differences in treatment intensities were accomplished at 4 bar gas pressure above the pressure resulting in water boiling at temperatures of 170, 180 and 190 °C. In industrial scale the modification levels can be reached at lower temperatures if a higher gas pressure is used. The results relate to the specific equilibrium moisture content reached; not the autoclave setting parameters as such.
- Ageing test:** EN 84. 1997: *Wood preservatives. Accelerated ageing of preservative treated wood prior to biological testing. Leaching.*  
The ageing was carried out at Technological Institute in the period from 03-01-2017 to 15-02-2017.
- Sterilization:** Ionising radiation (2 × 50 kGy).
- Test-fungi:** *Coniophora puteana*, BAM Ebw 15  
*Poria placenta*, FPRL 280  
*Trametes versicolor*, CTB 863 A
- Exposure to  
fungi:** 16 weeks in the period from 10-03-2017 to 19-07-2017.
- Evaluation date:** 24-07-2017.
- Evaluation:** Results are evaluated according to DS/EN 350 (2016): *Durability of wood and wood-based products – Testing and classification of the durability to biological agents of wood and wood-based materials.*

Durability class	Description	Percentage mass loss (ML) according to DS/EN 350 (2016)
1	Very durable	ML ≤ 5
2	Durable	5 < ML ≤ 10
3	Moderately durable	10 < ML ≤ 15
4	Slightly durable	15 < ML ≤ 30
5	Not durable	30 < ML
<b>ML= highest of the median mass losses (in %) determined for test specimens exposed to each of the used fungi</b>		

- Validity:** Accept criteria for mean loss in mass on reference control specimens were fulfilled for all test fungi. The test is valid.

Detailed results

Order no.: 681780  
Appendix: 2  
Side: 1 af 10  
Initialer: troj/elm/hbs

Low intensity

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Coniophora puteana</i>	6.6	11-1	30	3
		11-2	29	2
		11-3	31	1
		11-4	28	3
		11-5	32	4
		11-6	26	1
		11-7	28	1
		11-8	30	2
		11-9	29	3
		11-10	25	1
		11-11	25	2
		11-12	32	2
		11-13	28	4
		11-14	29	4
		11-15	25	1
		11-16	39	3
		11-17	28	1
		11-18	22	1
		11-19	32	5
		11-20	27	1
		11-21	35	1
		11-22	30	0
		11-23	31	3
		11-24	26	3
		11-25	18	5
		11-26	21	5
		11-27	26	2
		11-28	23	2
		11-29	21	1
		11-30	23	2
<b>Mean</b>			<b>28</b>	
<b>Median</b>				<b>2</b>

Detailed results

Order no.: 681780  
Appendix: 2  
Side: 2 af 10  
Initialer: troj/elm/hbs

Low intensity

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Poria placenta</i>	6.6	12-1	27	2
		12-2	26	2
		12-3	34	3
		12-4	32	3
		12-5	33	2
		12-6	33	1
		12-7	27	1
		12-8	38	2
		12-9	38	14
		12-10	30	0
		12-11	26	1
		12-12	32	2
		12-13	23	2
		12-14	28	2
		12-15	37	1
		12-16	40	2
		12-17	34	3
		12-18	30	4
		12-19	30	3
		12-20	35	2
		12-21	23	1
		12-22	27	2
		12-23	32	2
		12-24	38	3
		12-25	31	1
		12-26	29	1
		12-27	27	12
		12-28	28	1
		12-29	31	2
		12-30	30	1
<b>Mean</b>			<b>31</b>	
<b>Median</b>				<b>2</b>

Detailed results

Order no.: 681780  
Appendix: 2  
Side: 3 af 10  
Initialer: troj/elm/hbs

Low intensity

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Trametes versicolor</i>	6.6	13-1	33	3
		13-2	49	6
		13-3	79	3
		13-4	55	4
		13-5	109	7
		13-6	59	6
		13-7	47	6
		13-8	53	3
		13-9	33	5
		13-10	44	9
		13-11	33	2
		13-12	48	7
		13-13	39	3
		13-14	48	4
		13-15	71	2
		13-16	66	5
		13-17	35	2
		13-18	60	9
		13-19	46	6
		13-20	44	2
		13-21	53	5
		13-22	65	9
		13-23	43	4
		13-24	59	5
		13-25	52	6
		13-26	34	2
		13-27	56	11
		13-28	40	6
		13-29	72	9
		13-30	59	4
<b>Mean</b>			<b>53</b>	
<b>Median</b>				<b>5</b>

Detailed results

Order no.: 681780  
Appendix: 2  
Side: 4 af 10  
Initialer: troj/elm/hbs

Medium intensity

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Coniophora puteana</i>	7.0	11-1	20	0
		11-2	23	1
		11-3	29	0
		11-4	32	0
		11-5	18	1
		11-6	22	1
		11-7	37	1
		11-8	29	6
		11-9	23	3
		11-10	20	1
		11-11	17	1
		11-12	27	2
		11-13	32	2
		11-14	26	1
		11-15	21	1
		11-16	26	1
		11-17	26	10
		11-18	20	1
		11-19	30	1
		11-20	26	1
		11-21	34	0
		11-22	38	3
		11-23	31	3
		11-24	26	2
		11-25	25	2
		11-26	23	1
		11-27	27	1
		11-28	31	0
		11-29	33	3
		11-30	22	2
<b>Mean</b>			<b>26</b>	
<b>Median</b>				<b>1</b>

Detailed results

Order no.: 681780  
Appendix: 2  
Side: 5 af 10  
Initialer: troj/elm/hbs

Medium intensity

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Poria placenta</i>	7.0	12-1	53	3
		12-2	37	2
		12-3	33	1
		12-4	37	1
		12-5	27	0
		12-6	32	1
		12-7	44	1
		12-8	35	1
		12-9	34	2
		12-10	25	0
		12-11	40	1
		12-12	34	1
		12-13	20	0
		12-14	26	1
		12-15	56	1
		12-16	38	1
		12-17	30	5
		12-18	52	4
		12-19	29	3
		12-20	25	1
		12-21	30	2
		12-22	44	2
		12-23	36	3
		12-24	34	1
		12-25	36	2
		12-26	35	2
		12-27	47	1
		12-28	59	4
		12-29	23	0
		12-30	22	2
<b>Mean</b>			<b>36</b>	
<b>Median</b>				<b>1</b>

Detailed results

Order no.: 681780  
Appendix: 2  
Side: 6 af 10  
Initialer: troj/elm/hbs

Medium intensity

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Trametes versicolor</i>	7.0	13-1	44	4
		13-2	41	2
		13-3	42	3
		13-4	29	1
		13-5	47	3
		13-6	48	3
		13-7	44	3
		13-8	45	2
		13-9	37	2
		13-10	46	2
		13-11	44	2
		13-12	50	3
		13-13	53	3
		13-14	53	3
		13-15	33	1
		13-16	47	3
		13-17	43	2
		13-18	49	3
		13-19	36	2
		13-20	51	3
		13-21	42	2
		13-22	41	2
		13-23	48	4
		13-24	43	1
		13-25	45	2
		13-26	52	4
		13-27	37	1
		13-28	43	3
		13-29	62	6
		13-30	58	3
<b>Mean</b>			<b>45</b>	
<b>Median</b>				<b>3</b>



Detailed results

Order no.: 681780  
Appendix: 2  
Side: 7 af 10  
Initialer: troj/elm/hbs

High intensity

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Coniophora puteana</i>	5.6	11-1	15	2
		11-2	18	2
		11-3	15	2
		11-4	26	2
		11-5	29	3
		11-6	22	2
		11-7	18	2
		11-8	26	2
		11-9	23	3
		11-10	18	2
		11-11	19	0
		11-12	24	0
		11-13	27	1
		11-14	21	0
		11-15	22	3
		11-16	24	2
		11-17	20	2
		11-18	33	2
		11-19	25	2
		11-20	30	3
		11-21	33	3
		11-22	24	3
		11-23	20	2
		11-24	22	3
		11-25	26	2
		11-26	20	2
		11-27	27	3
		11-28	23	2
		11-29	24	2
		11-30	23	2
<b>Mean</b>			<b>23</b>	
<b>Median</b>				<b>2</b>

Detailed results

Order no.: 681780  
Appendix: 2  
Side: 8 af 10  
Initialer: troj/elm/hbs

High intensity

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Poria placenta</i>	5.6	12-1	23	2
		12-2	36	3
		12-3	26	3
		12-4	25	3
		12-5	20	2
		12-6	30	3
		12-7	34	3
		12-8	29	2
		12-9	28	2
		12-10	25	2
		12-11	13	2
		12-12	14	4
		12-13	33	3
		12-14	35	3
		12-15	26	3
		12-16	28	2
		12-17	27	2
		12-18	73	2
		12-19	32	2
		12-20	65	2
		12-21	16	2
		12-22	27	1
		12-23	31	2
		12-24	33	2
		12-25	26	2
		12-26	29	2
		12-27	20	2
		12-28	29	3
		12-29	19	2
		12-30	29	3
<b>Mean</b>			<b>29</b>	
<b>Median</b>				<b>2</b>

**Detailed results**

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Appendix: 2  
Side: 9 af 10  
Initialer: troj/elm/hbs

**High intensity**

Test-fungus	EMC <sub>65</sub> (%)	Test-specimen	Moisture content after exposure to fungi (%)	Mass loss (%)
<i>Trametes versicolor</i>	5.6	13-1	22	3
		13-2	33	3
		13-3	34	2
		13-4	34	2
		13-5	28	2
		13-6	39	6
		13-7	31	3
		13-8	36	5
		13-9	32	3
		13-10	36	3
		13-11	38	4
		13-12	41	3
		13-13	35	3
		13-14	36	3
		13-15	46	4
		13-16	31	3
		13-17	48	5
		13-18	41	3
		13-19	44	3
		13-20	37	5
		13-21	47	5
		13-22	36	4
		13-23	38	4
		13-24	31	3
		13-25	36	4
		13-26	43	6
		13-27	44	3
		13-28	39	5
		13-29	30	2
		13-30	37	2
<b>Mean</b>			<b>37</b>	
<b>Median</b>				<b>3</b>

**Detailed results**

Order no.: 681780  
Appendix: 2  
Side: 10 af 10  
Initialer: troj/elm/hbs

Reference specimens		
Fungus	Specimen	Mass loss (%)
<i>Coniophora puteana</i>	1	34
	2	29
	3	21
	4	22
	5	29
	6	35
	7	27
	8	30
	9	31
	10	29
<b>Mean</b>		<b>29</b>
<i>Poria placenta</i>	11	37
	12	32
	13	43
	14	33
	15	25
	16	41
	17	31
	18	40
	19	32
	20	40
<b>Mean</b>		<b>36</b>
<i>Trametes versicolor</i>	21	23
	22	22
	23	22
	24	16
	25	19
	26	21
	27	20
	28	17
	29	14
	30	21
<b>Mean</b>		<b>20</b>