

THE INTERNATIONAL RESEARCH GROUP ON WOOD PROTECTION

Section 2

Testing Methodology and Assessment

**Boron, ethanolamine, octanoic acid and QUAT
treated Norway spruce**

**Preservative treated timber – Field test results
IRG/WP Durability Database**

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Disclaimer

The responsibility for the data presented in this paper falls to the authors exclusively. The data presented are raw test data and intended to get used for scientific purposes only.

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AIMS AND SCOPE OF THE IRG-WP DURABILITY DATABASE

The overall aim of the IRG-WP durability data base is the allocation of wood durability test results for comparative studies and re-analyses. The data base shall serve as pool for service life prediction and modelling and shall contribute to an enhanced understanding of wood durability. It is an open web-based platform for scientific exchange in the field of wood durability and wood protection.

It is NOT the aim of the data base to promote or denigrate any product or material. The data base will contain raw data only; no statistical evaluation will be included. Thus it will be the exclusive responsibility of the user to interpret the test results published in the data base.

For each data set, the full range of information about the test method, the test material, and other relevant parameters, is required to guarantee reliability of the data. For this reason every data set submitted is reviewed and checked for completeness of all relevant data.

The database allows submission of assessment data from all kinds of standardized and non-standardized wood durability tests.

Records of the IRG/WP Durability data base shall be cited as in the following example:

Brischke C., Meyer L. (2013) Douglas fir. Natural durable timber - Field test results. IRG/WP Durability Database. Stockholm: The International Research Group on Wood Protection, IRG/WP/DDB 13-00001.

INFORMATION

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TESTED TIMBER

Preservative product name Boron, ethanolamine, octanoic acid and QUAT treated Norway spruce – high retention
Botanical name *Picea abies* Karst.
Origin Slovenia
Active ingredients/concentration 0.39 % B; 2.05 % ethanolamine; 0.29 % octanoic acid; 0.39 % QUAT
Treatment process Vacuum-pressure treatment
Process parameters vacuum: -0.7 bar 1 h
pressure: 9 bar 3 h
vacuum: -0.7 bar 15 min
normal: 0 bar 30 min
Dimension and shape of impregnation specimens 25 x 50 x 500 mm³ (EN 252, 1989)
Sealing
Number of replicates 10
Sampling (optional)

Timber quality (optional)

REFERENCE TIMBER

Trade name	Norway spruce
Botanical name	<i>Picea abies</i> Karst.
Origin	Slovenia
Number of replicates	10
Sampling (optional)	
Timber quality (optional)	

TEST METHODS

Standard method	
Alteration of standard (optional)	
Non-standard method	Double layer test
Reference	Rapp, A.O.; Augusta, U. (2004) The full guideline for the “double layer test method” – A field test method for determining the durability of wood out of ground. Stockholm: The International Research Group on Wood Protection, IRG/WP/04-20290.
Specimen dimension and shape	25 x 50 x 500 mm ³ (EN 252, 1989)
Sealing	
Rating scheme	0 (sound), 1 (slight decay), 2 (moderate decay), 3 (severe decay), 4 (failure) after EN 252 (1989)
Address of test site	University of Ljubljana, Jamnikarjava 101, SI-1000 Ljubljana, Slovenia
Geographic coordinates (optional)	46°2'55,57"N, 14°28'44,66"E
Start of test	April 07 2006
Last evaluation	July 02 2013
Status of test	still running

RESULTS

Additional data

Material	Boron, ethanolamine, octanoic acid and QUAT treated Norway spruce – High retention					
	Solution uptake	Retention	Concentration	Concentration	Concentration	Concentration
	[kg/m ³]	[kg/m ³]	[% B]	[% EA]	[% OA]	[% QUAT]
Replicate ID						
1	178.4	6.26	0.39	2.05	0.29	0.39
2	436.9	15.33	0.39	2.05	0.29	0.39
3	160.4	5.63	0.39	2.05	0.29	0.39
4	270.3	9.49	0.39	2.05	0.29	0.39
5	300.8	10.56	0.39	2.05	0.29	0.39
6	488.4	17.14	0.39	2.05	0.29	0.39
7	259.1	9.09	0.39	2.05	0.29	0.39
8	182.3	6.40	0.39	2.05	0.29	0.39
9	193.6	6.79	0.39	2.05	0.29	0.39
10	140.0	4.91	0.39	2.05	0.29	0.39

Assessment

Material	Boron, ethanolamine, octanoic acid and QUAT treated Norway spruce – High retention					
Date	28.05.2007	19.06.2008	03.06.2009	07.06.2010	31.05.2011	10.07.2012
Assessment	1	2	3	4	5	6
Replicate ID	[0-4]	[0-4]	[0-4]	[0-4]	[0-4]	[0-4]
1	0	0	1	1	1	1
2	0	0	1	1	1	1
3	0	0	1	1	1	1
4	0	0	1	1	1	1
5	0	0	1	1	1	1
6	0	0	0	0	0	1
7	0	0	0	0	1	1
8	0	0	0	0	0	0
9	0	0	0	0	1	0
10	0	0	0	0	0	1

Material	Boron, ethanolamine, octanoic acid and QUAT treated Norway spruce – High retention					
Date	02.07.2013					
Assessment	7	8	9	10	11	12
Replicate ID	[0-4]	[0-4]	[0-4]	[0-4]	[0-4]	[0-4]
1	1					
2	1					
3	1					
4	2					
5	1					
6	0					
7	0					
8	1					
9	2					
10	1					

Decay types

Material	Boron, ethanolamine, octanoic acid and QUAT treated Norway spruce – High retention					
Date	28.05.2007	19.06.2008	03.06.2009	07.06.2010	31.05.2011	10.07.2012
Assessment	1	2	3	4	5	6
Replicate ID						
1			B	B	B	B
2			B	B	B	B
3			B	B	B	B
4			B	B	B	B
5			B	B	B	B
6						B
7					B	B
8						
9					B	
10						B

Material	Boron, ethanolamine, octanoic acid and QUAT treated Norway spruce – High retention					
Date	02.07.2013					
Assessment	7	8	9	10	11	12
Replicate ID						
1	B					
2	B					
3	B					
4	B					
5						
6						
7						
8	B					
9	B					
10	B					

W = White rot, B = Brown rot, S = Soft rot

Assessment Reference

Material	<i>Picea abies</i> Karst.					
Date	28.05.2007	19.06.2008	03.06.2009	07.06.2010	31.05.2011	10.07.2012
Assessment	1	2	3	4	5	6
Replicate ID	[0-4]	[0-4]	[0-4]	[0-4]	[0-4]	[0-4]
1	0	1	2	3	3	4
2	0	1	1	3	3	3
3	0	1	2	3	3	4
4	1	1	2	4	4	4
5	0	2	2	3	3	4
6	0	0	1	1	3	3
7	0	0	1	3	3	3
8	1	0	2	2	4	4
9	0	2	3	3	3	3
10	0	0	2	3	3	4

Material	<i>Picea abies</i> Karst.					
Date	02.07.2013					
Assessment	7	8	9	10	11	12
Replicate ID	[0-4]	[0-4]	[0-4]	[0-4]	[0-4]	[0-4]
1	4					
2	4					
3	4					
4	4					
5	4					
6	4					
7	4					
8	4					
9	4					
10	4					

Decay types reference

Material	<i>Picea abies</i> Karst.					
Date	28.05.2007	19.06.2008	03.06.2009	07.06.2010	31.05.2011	10.07.2012
Assessment	1	2	3	4	5	6
Replicate ID						
1		B	B	B	B	B
2		B	B	B	B	B
3		B	B	B	B	B
4	B	B	B	B		
5		B	B	B	B	B
6			B	B	B	B
7			B	B	B	B
8	B		B	B	B	
9		B	B	B	B	B
10			B	B	B	B

Material	<i>Picea abies</i> Karst.					
Date	02.07.2013					
Assessment	7	8	9	10	11	12
Replicate ID						
1	B					
2	B					
3	B					
4	B					
5	B					
6	B					
7	B					
8	B					
9	B					
10	B					

W = White rot, B = Brown rot, S = Soft rot

REFERENCES

Humar M, Thaler N (2014) Performance of copper treated and naturally durable wood in laboratory and outdoor conditions. International Conference on Durability of Building Materials and Components. September 02-05 2014, Sao Paulo, Brazil. In press.