

NOVA ORMAN ÜRÜNLERI SAN. TIC. A.Ş.
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GEREDE OSB NO:101/1-2
14900 GEREDE, BOLU
TURKEY

Dresden, 13.11.2013
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Inspection report 2213002 "Certification Mark TMT" Novawood TMT ash 200

Client: NOVA ORMAN ÜRÜNLERI SAN. TIC. A.Ş.
GEREDE OSB NO:101/1-2
14900 GEREDE, BOLU
TURKEY

Order no.: 2213002

Order of: 27th February 2013

Contractor: Entwicklungs- und Prüflabor Holztechnologie GmbH
(EPH)
Zellescher Weg 24
01217 Dresden
GERMANY

Inspection Body: Dr. Wolfram Scheiding

Head of Certification Body: Dr.-Ing. Bernd Devantier

The inspection report includes 8 pages. Copies of selected parts of the report have to be permitted in writing by EPH. The test results are only referring to the tested materials.

Introduction

The Certification Mark TMT is awarded basing on the awarding guidelines, issued June 15th 2012. The Certification is referring to products

- which refer to the definition for thermally modified timber given in § 1,
- whose production is subject to a certified factory production control,
- whose properties are determined by tests and accepted test methods (see § 5),
- which fulfil the criteria of requirement profile according to § 6 and
- which fulfil criteria for wood quality and further properties and specifications within determined ranges of tolerance which are self-declared by the manufacturer.

This inspection report summarises the results of both inspection of factory production control and initial type test.

1 Production plant audit

The TMT to which the Certification is referring to, originates from a regular production with certified factory production control. This is proved by an audit of the production facilities, basing on a check list. The audit of the production facilities was carried out March 20th 2013 by Wolfram Scheiding at the production facilities of NOVA ORMAN ÜRÜNLERİ SAN. TIC. A.Ş., GEREDE OSB NO:101/1-2, 14900 GEREDE, BOLU.

Following statements were made:

- Production process is subject to a factory production control (FPC) which is certified according to ISO 9001.
- Raw material is controlled according to determined rules.
- Process and plant ensure a constant product quality.
- Process parameters are registered automatically.
- Kiln batches are specified by date and batch number.
- Modifications and deviations at plant of process are documented in writing.
- The manufacturer has determined rules to deal with complaints.

In result, all requirements to production facilities and FPC were fulfilled completely.

2 Initial type test

2.1 Material and sampling

The material was ash (White Ash; *Fraxinus Americana* L.), thermally modified according to the process Thermowood Thermo-D. The sampling was done according to the awarding guidelines from three kiln batches:

Batch 1: production date 03.01.2013

Batch 2: production date 17.02.2013

batch 3: production date 31.03.2013

The selected and labelled test material was shipped on April 5th 2013 to the EPH test laboratory.

2.2 Test scope and application areas

Tests were carried out for category "TMT exteriorPlus", which is specified as follows:

Table 1: Application area Certification Mark TMT and required tests

Application in use classes according to EN 335:2013	Specification	Required tests			
		Physical properties	Emission	Durability	
				CEN/TS 15083-1	CEN/TS 15083-2
Exterior use up to use class 3 (out of ground contact)	TMT exterior	X		X	
Exterior use up to use class 4 (in ground contact)	TMT exteriorPlus	X		X	X

For all tests, reports and signed test protocols are available. The test results are summarised afterwards.

2.3 Wood quality and self-declared property values

The assessment of wood quality was carried out at 15 samples taken for the mechanical and physical tests from the kiln batches. The inner cracks were assessed visually after sample cutting to prepare specimens. Within the assessment was stated that

- the samples did not contain pith,
- at least 80 % of the samples were free from inner cracks,
- at least 80 % of the length of the samples were free of visible drying cracks.

Thus, the investigated material met the requirements on the wood quality.

No further criteria for the wood quality were determined or self-declared by the manufacturer.

2.4 Physical and mechanical properties

Within the tests of physical and mechanical properties, following results were obtained:

Table 2: Physical and mechanical properties

(n = number of replicates; x = mean value; s = standard deviation; V = coefficient of variation)

Property	Material	n	x	s	V [%]
Raw density [kg/m ³]	batch 1	5	616	8,4	1,4
	batch 2	5	589	3,4	0,6
	batch 3	5	665	10,8	1,6
	mean	15	623	7,5	1,2
	untreated	5	556	6,5	1,1
MOR modulus of rupture (bending strength) [N/mm ²]	batch 1	5	74,1	13,3	17,9
	batch 2	5	74,1	13,3	17,9
	batch 3	5	85,8	32,6	37,9
	mean	15	78,0	19,7	24,6
	untreated	5	118,2	32,2	27,3

Property	Material	n	x	s	V [%]
MOE modulus of elasticity [N/mm ²]	batch 1	5	24083	4367	18,1
	batch 2	5	19609	2596	13,2
	batch 3	5	22565	3669	16,3
	mean	15	22086	3544	16
	untreated	5	23718	7048	29,7
Impact bending strength [N/mm ²]	batch 1	5	41	12	29,4
	batch 2	5	31	12	12,7
	batch 3	5	57	13	22,9
	mean	15	43	12,3	21,7
	untreated	5	74	10	13
Brinell hardness (surface) [N/mm ²]	batch 1	5	32,2	2,9	9,0
	batch 2	5	29,5	3,3	11,2
	batch 3	5	29,8	5,5	18,3
	mean	15	30,5	3,9	12,8
	untreated	5	23,4	2,7	11,6
EMC 20/30 equilibrium moisture content in constant climate 20 °C / 30 % r. H. [%]	batch 1	5	2,7	0,5	17,4
	batch 2	5	2,9	0,2	7,1
	batch 3	5	2,8	0,1	5,2
	mean	15	2,8	0,3	9,9
	untreated	5	5,8	0,0	0,7
EMC 20/65 equilibrium moisture content in constant climate 20 °C / 65 % r. H. [%]	batch 1	5	4,3	0,5	12,6
	batch 2	5	4,3	0,2	4,8
	batch 3	5	4,2	0,1	3,1
	mean	15	4,3	0,3	6,8
	untreated	5	10,1	0	0,5
EMC 20/85 equilibrium moisture content in constant climate 20 °C / 85 % r. H. [%]	batch 1	5	6,5	1,2	18,9
	batch 2	5	6,5	0,5	8,3
	batch 3	5	6,6	0,3	5,2
	mean	15	6,5	0,7	10,8
	untreated	5	15,8	0,1	0,7
Differential swelling radial [%/%]	batch 1	5	0,22	0,02	7,8
	batch 2	5	0,17	0,01	6,7
	batch 3	5	0,20	0,02	8,7
	mean	15	0,20	0,02	7,73
	untreated	5	0,25	0	1,9
Differential swelling tangential [%/%]	batch 1	5	0,36	0,06	15,8
	batch 2	5	0,31	0,04	14,3
	batch 3	5	0,34	0,03	8,8
	mean	15	0,34	0,04	13,0
	untreated	5	0,35	0,02	5,6

Property	material	n	x	s	V
Max. swelling radial (14 d water storage) [%]	batch 1	20	4,3	0,6	14,1
	batch 2	20	3,3	0,4	12,4
	batch 3	20	2,9	0,5	16,6
	mean	60	3,5	0,8	21,9
	untreated	20	6,7	0,8	12,2
Max. swelling tangential (14 d water storage) [%]	batch 1	20	7,6	0,9	11,3
	batch 2	20	6,0	0,6	9,5
	batch 3	20	5,6	0,4	7,8
	mean	60	6,4	1,1	16,9
	untreated	20	13,7	1,5	10,7
ASE anti-swelling efficiency radial [%]	batch 1	20	36,4		
	batch 2	20	51,0		
	batch 3	20	56,6		
	mean	20	48,0		
ASE anti-swelling efficiency tangential [%]	batch 1	20	44,6		
	batch 2	20	56,1		
	batch 3	20	59,1		
	mean	20	53,3		

NOTE: If TMT shall be used for floorings, the mean Brinell hardness of the tested samples shall be at least 10 N/mm² (see requirements for a free class for hardwood flooring boards according to EN 13629:2012). This requirement was fulfilled.

2.5 Durability against wood decay fungi

2.5.1 Durability against Basidiomycetes

Test specification

Test method	CEN/TS 15083-1:2005 Durability of wood and wood products – determination of natural durability of solid wood against wood decay fungi, test methods – Part 1: basidiomycetes.
Test material:	TMT Ash, 12 boards from 3 batches; oven-dry density 626 kg/m ³
Reference:	<i>Pinus sylvestris</i> L. (Scots pine); oven-dry density 475 kg/m ³ <i>Fagus sylvatica</i> L. (European beech); oven-dry density 670 kg/m ³
Test procedure:	according to CEN/TS 15083-1:2005
Test fungi:	<i>Coniophora puteana</i> (Schumacher ex Fries), Karsten, strain BAM Ebw. 15 = DSM 3085 <i>Coriolus versicolor</i> (Linnaeus) Quélet, strain CTB 863A (syn. <i>Trametes versicolor</i>)
Replicates:	3 specimens from each board 36 specimens for each test fungus
Specimen size:	50×25×15 mm ³
Ageing prior to test:	Leaching according to EN 84:1997 (13/05/2013 – 27/05/2013)

Sterilisation:	Water damp
Test duration:	16 weeks
Inoculation:	05/06/2013
Emplacement:	20/06/2013
Removal:	10/10/2013
Validity:	Test was valid: demanded values of mean mass losses were exceeded by all test fungi.

Results

Table 3: Results of the durability test according to CEN/TS 15083-1 (basidiomycetes)

Median mass loss with <i>Coniophora puteana</i> DSM 3085 (n = 35)	0.8
Median mass loss with <i>Coriolus versicolor</i> CTB 863A (n = 35)	0.8
Preliminary durability classification (see scheme table 4)	1 "very durable"

Table 4: Scheme for preliminary classification of durability (CEN/TS 15083-1:2005 Annex D)

Durability class	Description	Median mass loss
1	very durable	≤ 5 %
2	durable	> 5 % up to ≤ 10 %
3	moderately durable	> 10 % up to ≤ 15 %
4	slightly durable	> 15 % up to ≤ 30 %
5	not durable	> 30 %

The basis for the classification is the result of that fungus, which caused the highest mass loss. According to the durability test according to CEN/TS 15083-1:2005 (wood destroying basidiomycetes), the tested material can be preliminarily allocated to durability class 1 "very durable".

NOTE: Test details and single data are specified in test report 2213002-1.

2.5.2 Durability against soft rot

Test specification

Test method	CEN/TS 15083-2:2005 Durability of wood and wood products – determination of natural durability of solid wood against wood destroying fungi, test methods – Part 2: soft rot
Ageing prior to test	Leaching according to EN 84:1997 (13/05 – 27/05/2013)
Substrate	Mixture from pot soil, sand and compost Water holding capacity: 44 %

Test climate	Temperature 28 ± 2 °C, rel. humidity 75 ± 5 %
Specimen size	100×10×5 mm ³
Replicates	30
Duration of the test	16 weeks (16/07 – 05/11/2013)
Validity:	Test was valid; demanded value (20 %) for mass loss of control specimens (beech wood) was exceeded with 29 %.

Results

Table 5: Results of the durability test according to CEN/TS 15083-2 (soft rot)

average mass loss TMT ash (n=36)	0.8 %
x-value	0.03
Preliminary durability classification (see scheme table 6)	1 "very durable"

Table 6: Scheme for preliminary classification of durability (CEN/TS 15083-2:2005 Annex E)

Durability class	Description	x-value
1	very durable	≤ 0.10
2	durable	> 0.10 up to ≤ 0.20
3	moderately durable	> 0.20 up to ≤ 0.45
4	slightly durable	> 0.45 up to ≤ 0.80
5	not durable	> 0.80

NOTE: Test details and single data are specified in test report 2213002-2.

2.5.3 Summary of durability tests

In result of durability test according to CEN/TS 15083-1:2005 (basidiomycetes), the tested material can be preliminarily allocated to durability class 1 "very durable".

In result of durability test according to CEN/TS 15083-2:2005 (soft rot), the tested material can be preliminarily allocated to durability class 1 "very durable".

According to the guideline requirements for category "exteriorPlus" (use in exterior applications up to use class 4 in ground contact), the test material must reach at least durability class 1 after test according to CEN/TS 15083-1 and CEN/TS 15083-2.

These requirements were fulfilled by the tested Novawood TMT product thermally modified ash (Thermo-D).

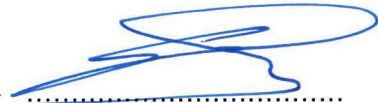
2.6 Further declared properties

No further properties were tested or are declared by the manufacturer.

3 Summary

In result of the inspection of factory production control, wood quality and initial type test, the Certification Mark TMT, category "TMT exteriorPlus", can be awarded to Novawood TMT ash Thermo-D.

Dresden, 13 November 2013



Dr. Wolfram Scheiding
Inspection Body

Report and conditions confirmed:



Dr.-Ing. Bernd Devantier
Head of Certification Body