Treatment, Exposure and Evaluation of NOWA Test Samples in Malaysia

CEN/TS 12037 (Lap-joints)

28-05-2025

DANISH
TECHNOLOGICAL
INSTITUTE

Title:
Treatment, Exposure and Evaluation of NOWA Test Samples in Malaysia CEN/TS 12037 (Lap-joints)

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1. Introduction

As agreed with OrganoWood AB, Danish Technological Institute, Building and Construction has conducted preparation, treatment, installation and evaluation of NOWA test samples according to CEN/TS 12037. This report describes a part of the study and documents it with pictures.

2. Background

The technical standard CEN/TS 12037:2003 "Wood preservatives – Field test method for determining the relative protective effectiveness of a wood preservative exposed out of ground contact – Horizontal lap-joint method" determines the testing procedure for wood impregnations without ground contact. Samples of a certain size (30 cm x 8.5 cm x 3.8 cm) are treated and exposed horizontally above the ground. Each sample consists of two parts, mechanically held together (overlapping).

3. Scope

According to agreement with the client, the objective of the documentation is following:

- Overview over Samples and Treatment
- Overview over field installation
- Overview over the first evaluations

4. Material, Impregnation and After Treatment

There was used sapwood from Scots pine (*Pinus sylvestris* L.) for all the samples.

The samples according to CEN/TS 12037 were impregnated with the product called "NOWA", provided by the assignor. After that a heat treatment at 60 °C was applied:

Tabel 1: Overview over Impregnations and Heat Treatments for the CEN/TS 12037-samples (lap-joints)

Impregnation Product	After Treatment	Amount of samples (Malaysian test site)
NOWA	Heat Treatment "0" (max. 60 °C)	10
-	Heat Treatment "0" (max. 60 °C)	10
CCA	-	10
untreated	-	10
	∑	**40***

*Amount of whole lap-joints. Every lap-joint consists out of two parts.

The product contains Zirconium salt.

The samples were exposed after CEN/TS 12037:2003

UNIMAS test site near Kuching, Malaysia: 18-06-2021

5. Evaluations

Tabel 2: Evaluation of the samples is performed after CEN/TS12037:2003.

Rating	Description	Definition
0	Sound	No evidence of decay.
1	Slight attack	Visible signs of decay, but no significant softening or weakening of the wood.
2	Moderate attack	Areas of decay (softened, weakened wood); typically not more than 3 cm^3 and to a depth of 2 to 3 mm.
2+	Moderate attack +	Approaching 3, severe attack.
3	Severe attack	Marked softening and weakening of the wood typical of fungal decay; distinctly more than 3 cm^3 affected and to a depth of 3 or 5 mm or 5 to 10 mm over a few cm^2.
3+	Severe attack+	Approaching 4, failure
4	Failure	Very severe and extensive rot, joint member(s) often capable of being easily broken.

In 2024, three annual evaluations were performed:

Tabel 3: Evaluations since installation

	MALAYSIA
1 year	30-04-2022
2 years	17-04-2023
3 years	24-02-2024
4 years	06-05-2025

Tabel 4: Overview over Rating

Type of stake (Product used)	After Treatment (highest temperature) [°C]	Median of Decay Rating in Lap				
		Year 1	Year 2	Year 3	Year 4	Year 5
Form. 1	60	0	0	0	0	
no impregnation	60	2	2	3	3+	
References (CCA)	-	0	0	0	0	
untreated	-	2	2	4	4	

NOWA Test samples, after treatment: Heat treatment at max. 60 °C

Lap-joint no.	Decay ratings for external upper side surface (UD) Exposure period. Years					Decay ratings for external lower side surface (LD) Exposure period. Years					Decay ratings for joint surface (JD) Exposure period. Years				
	1st year	2nd year	3rd year	4th year	6th year	1st year	2nd year	3rd year	4th year	6th year	1st year	2nd year	3rd year	4th year	6th year
16951-952	0	0	0	1		0	0	0	0		0	0	0	1	
16953-954	0	0	0	1		0	0	0	0		0	0	0	0	
16955-956	0	0	1	1		0	0	0	0		0	0	0	0	
16957-958	0	0	0	1		0	0	0	0		0	0	0	0	
16959-960	0	0	0	0		0	0	0	0		0	0	0	0	
16961-962	0	0	0	1		0	0	0	0		0	0	0	1	
16963-964	0	0	0	0		0	0	0	0		0	0	0	0	
16965-966	0	0	0	1		0	0	0	0		0	0	0	1	
16967-968	0	0	0	1		0	0	0	0		0	0	0	0	
16969-970	0	0	1	1		0	0	0	0		0	0	0	0	
***Median**	**0**	**0**	**0**	**1**		**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**	
Max	**0**	**0**	**1**	**1**		**0**	**0**	**0**	**0**		**0**	**0**	**0**	**1**	
Min	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**	
Std dev	**0.00**	**0.00**	**0.42**	**0.42**		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.48**	

References: Heat Treatment at max. 60 °C

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Lap-joint no.	Decay ratings for external upper side surface (UD) Exposure period. Years					Decay ratings for external lower side surface (LD) Exposure period. Years					Decay ratings for joint surface (JD) Exposure period. Years				
	1st year	2nd year	3rd year	4th year	6th year	1st year	2nd year	3rd year	4th year	6th year	1st year	2nd year	3rd year	4th year	6th year
16971-972	1	2+	3	4		2	2	2	4		2	2	2	4	
16973-974	2	2	3	3+		2	2+	3	3+		2	2+	3	3+	
16975-976	1	2	3	3+		2	2	3	3+		2	2	3	3+	
16977-978	2	3	4	4		2	2	4	4		2	2	4	4	
16979-980	1	2+	4	4		2	2	4	4		1	1	4	4	
16981-982	2	2+	3	3+		2	2	3	3+		2	2	3	3+	
16983-984	2	2+	2+	3+		2	3	3	3+		2	2+	2+	3+	
16985-986	1	2	2	4		2	2	3	3+		2	2	3+	3+	
16987-988	2	3	4	4		2	2	4	4		2	2	4	4	
16989-990	1	2+	4	4		2	2	4	4		2	3	4	4	
***Median**	**1.5**	**2.5**	**2.5**	**3.5**		**2**	**2**	**3**	**3.5**		**2**	**2**	**3**	**3.5**	
Max	**2**	**3**	**3**	**4**		**2**	**3**	**3**	**4**		**2**	**3**	**3.5**	**4**	
Min	**1**	**2**	**2**	**3.5**		**2**	**2**	**2**	**3.5**		**1**	**1**	**2**	**3.5**	
Std dev	**0.53**	**0.37**	**0.42**	**0.26**		**0.00**	**0.34**	**0.41**	**0.26**		**0.32**	**0.52**	**0.52**	**0.26**	

Lap-joint no.	Decay ratings for external upper side surface (UD) Exposure period. Years					Decay ratings for external lower side surface (LD) Exposure period. Years					Decay ratings for joint surface (JD) Exposure period. Years				
	1st year	2nd year	3rd year	4th year	6th year	1st year	2nd year	3rd year	4th year	6th year	1st year	2nd year	3rd year	4th year	6th year
17311-312	1	1	1	1		0	0	0	0		0	0	0	0	
17313-314	0	0	0	0		0	0	0	0		0	0	0	0	
17315-316	0	0	0	0		0	0	0	0		0	0	0	0	
17317-318	0	0	0	0		0	0	0	0		0	0	0	0	
17319-320	0	0	0	0		0	0	0	0		0	0	0	0	
17321-322	0	0	0	0		0	0	0	0		0	0	0	0	
17323-324	0	0	0	0		0	0	0	0		0	0	0	0	
17325-326	0	0	0	0		0	0	0	0		0	0	0	0	
17327-328	0	0	0	0		0	0	0	0		0	0	0	0	
17329-330	0	0	0	0		0	0	0	0		0	0	0	0	
***Median**	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**	
Max	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**	
Min	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**	
Std dev	**0.32**	**0.32**	**0.32**	**0.32**		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	

References: untreated

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Lap-joint no.	Decay ratings for external upper side surface (UD) Exposure period. Years					Decay ratings for external lower side surface (LD) Exposure period. Years					Decay ratings for joint surface (JD) Exposure period. Years				
	1st year	2nd year	3rd year	4th year	6th year	1st year	2nd year	3rd year	4th year	6th year	1st year	2nd year	3rd year	4th year	6th year
17331-332	2+	2+	4	4		2	2	4	4		1	1	4	4	
17333-334	2	2	4	4		1	2	4	4		1	1	4	4	
17335-336	2	2	4	4		2	2	4	4		2	2	4	4	
17337-338	2	2+	4	4		2	2	4	4		2	2	4	4	
17339-340	2	2	4	4		1	2	4	4		1	2	4	4	
17341-342	2	2+	4	4		2	2+	4	4		2	2	4	4	
17343-344	1	2	4	4		1	2	4	4		2	2	4	4	
17345-346	2	2	3	3		2	2	3	3		2	2	3	3	
17347-348	2	2+	4	4		2	2	4	4		1	1	4	4	
17349-350	2	2	4	4		2	2	4	4		2	2	4	4	
***Median**	**2**	**2**	**4**	**4**		**2**	**2**	**4**	**4**		**2**	**2**	**4**	**4**	
Max	**2**	**2.5**	**4**	**4**		**2**	**2.5**	**4**	**4**		**2**	**2**	**4**	**4**	
Min	**1**	**2**	**3**	**3**		**1**	**2**	**3**	**3**		**1**	**1**	**3**	**3**	
Std dev	**0.50**	**0.26**	**0.32**	**0.32**		**0.52**	**0.16**	**0.32**	**0.32**		**0.52**	**0.48**	**0.32**	**0.32**	

6. Annex

Figure 1: Exposure of the CEN/TS 12037 samples (lap-joints) at the UNIMAS test site in Malaysia

Figure 2: Exposure of the CEN/TS 12037 samples (lap-joints) at the test site in Malaysia