



Test Report

Report No.: 262505-4

Assignor: Montana Wood Technologies
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Initials: JOSC/JLJ
Order no: 262505
No of appendices: 2

Item: Southern yellow pine (SYP) 180 °C, red oak 170 °C - Surface withdrawal capacity of fasteners

Sampling: The test material was treated and then sampled by Danish Technological Institute on 17-06-2024.

Method: EN 13446:2002 – Wood-based panels – Determination of withdrawal capacity of fasteners

The samples were conditioned at 65 %relative humidity and 20 °C prior to testing.

Period: August 2024

Equipment: Load cell: 5 kN Instron, IDD 80579
Dimensions: Calliper 216568
Scale: IID120892

Result:

Test	Nr of specimens	Withdrawal parameter [N/mm ²] (mean)	Fmax [N] (mean)	Density wood [kg/m ³] (mean)
SYP 180 °C	6	28,28	2929	574
Red Oak 170 °C	6	20,33	2089	544

The material and methods are described in appendix 1, the results in appendix 2.

Storage: The test material will be destroyed after 1 month, unless otherwise agreed.

Terms: This test was conducted accredited in accordance with international requirements (ISO/IEC17025:2017) and in accordance with the General Terms and Conditions of Danish Technological Institute. The test results solely apply to the tested item. This test report may be quoted in extract only if Danish Technological Institute has granted its written consent.

Signature: This document is only valid with a digital signature from Danish Technological Institute. The date of issue appears from the digital signature.

Joanna Schalnat
Consultant




DIGITALLY SIGNED DOCUMENT


16 August 2024



Materials & Methods



Materials & Methods

Material	:	Southern Yellow Pine, heat treated at 180°C
Identification No TI internal	:	14, 15, 18, 20, 23, 24
Thickness	:	Nominal 21 mm
Width and length	:	96 mm x 760 mm
Edges	:	Square
Image	:	
Number of panels	:	6

Material	:	Red oak, heat treated at 170°C
Identification No TI internal	:	60, 61, 66, 72, 73, 85
Thickness	:	Nominal 21 mm
Width and length	:	96 mm x 760 mm
Edges	:	Square
Image	:	
Number of panels	:	6

For the withdrawal test, one clear end pieces of each sample was chosen and cut to 80x100mm.

Materials & Methods

Material	:	Decking screw NKT Fasteners
Size	:	4,8 x 75
Class	:	A4
Image	:	
		

Materials & Methods

The test was executed according to EN13446, 7.4.3 surface withdrawal capacity.

Hole around the fastener	10 mm diameter
Depth of fastener	Through the entire wood



The fasteners were inserted with a handheld electric screw driver until the full thread was in and through the wood, except for the top 2 mm of the thread.

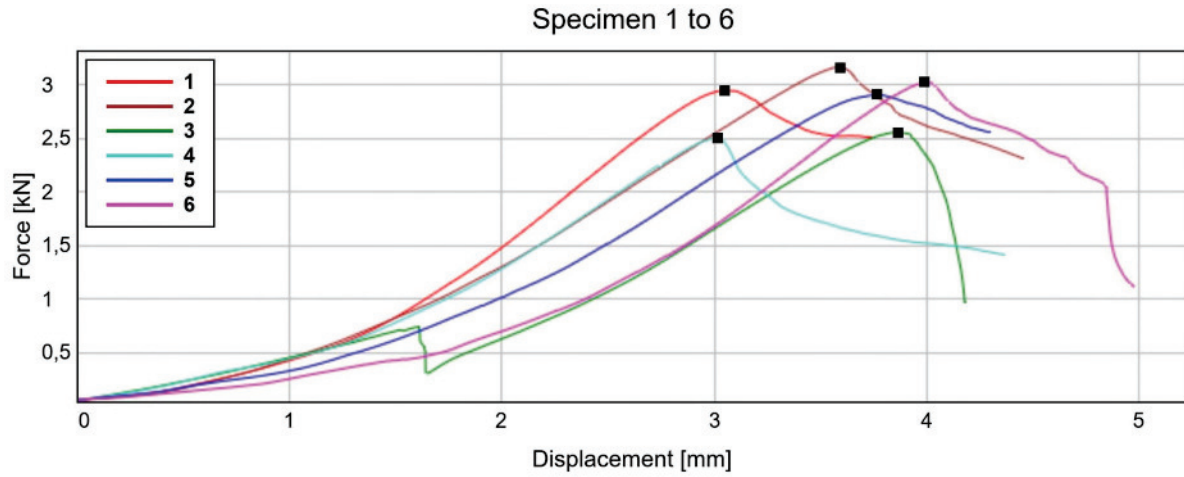


Picture of the test setup

Results 4PB

Results 4PB

Southern Yellow Pine 180 °C



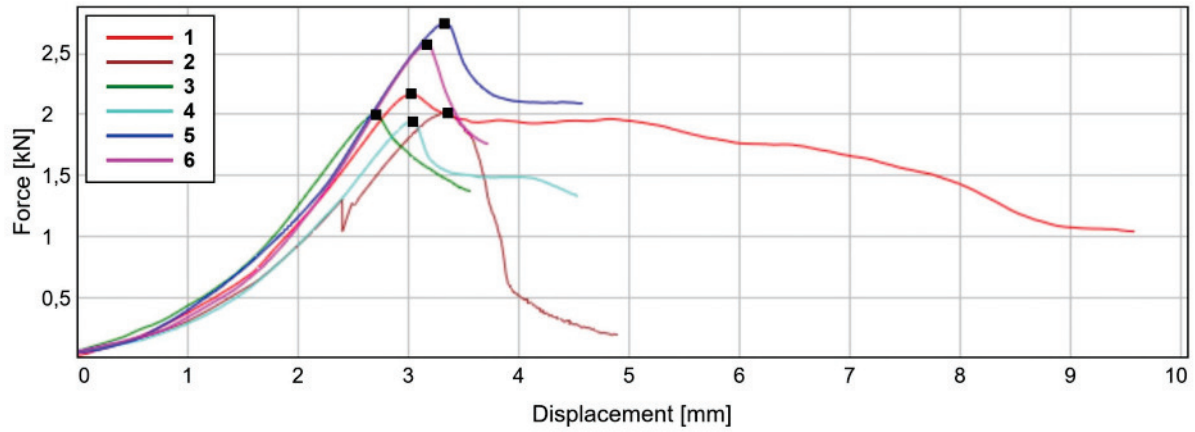
Specimen label	Length [mm]	Width [mm]	Thickness [mm]	Density [kg/m ³]	Depth Fastener [mm]	Maximum Force [N]	Time at Maximum Force [s]	Withdrawal parameter [N/mm ²]
1	95,86	79,78	21,38	689	21,4	2948	61	28,72
2	96,51	79,63	21,75	560	21,8	3168	72	30,34
3	96,93	79,51	22,55	564	22,6	2555	77	23,60
4	96,95	79,49	21,67	466	21,7	2501	60	24,05
5	96,07	79,48	21,79	585	21,8	2911	75	27,83
6	96,06	79,70	21,66	616	21,7	3031	80	29,16
Median	96,29	79,57	21,71	574	21,7	2929	74	28,28
Standard deviation	0,47	0,12	0,39	73,48	0,39	266,85	8,35	2,80

All samples failed with the fastener being pulled vertically out of the wood.

Results 4PB

Red oak, 170 °C

Specimen 1 to 6



Specimen label	Length [mm]	Width [mm]	Thickness [mm]	Density [kg/m ³]	Depth Fastener [mm]	Maximum Force [N]	Time at Maximum Force [s]	Withdrawal parameter [N/mm ²]
1	97,55	79,69	21,78	556	21,8	2166	37	20,72
2	96,48	79,54	21,02	669	21,0	2011	67	19,93
3	98,52	79,81	21,71	462	21,7	1999	54	19,18
4	97,53	79,00	21,58	517	21,6	1948	61	18,81
5	95,18	79,54	21,36	612	21,4	2752	67	26,84
6	96,50	79,88	21,20	533	21,2	2577	63	25,32
Median	97,02	79,62	21,47	544	21,5	2089	62	20,33
Standard deviation	1,16	0,31	0,30	73,28	0,30	339,52	11,65	3,41

All samples failed with the fastener being pulled vertically out of the wood.