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SFI
SHELTER FOREST INTERNATIONAL

To: Ryan Loe, Shelter Forest Products
From: Scott Leavengood
Re: Results of panel testing

Ryan:

We have completed the tests of the plywood that April dropped off a couple weeks ago. Results are as follows:

Bending:
As before, we first ripped the panels into 3, 3"x12" strips leaving a 4th strip that was 2 to 2½" wide. Therefore, there were 360 pieces total, 40 pieces from each panel type. There were calculation errors (values reported by the testing software as ******) for one C and one E specimen and hence the sample sizes were 39 for these two panel types. All tests were conducted on an 11" span with a head speed of 0.1 in/min. The results are as follows in the table and figure (note: MOE is divided by 100 vs. 1000 in the figure so as to be able to use the same y-axis as MOR) below:

Core ID	Average MOR - bending strength [psi] (std. dev.)	Average MOE - bending stiffness [1000 psi] (std. dev.)
A	6338 (584)	667 (74)
B	4317 (326)	493 (21)
C	6543 (373)	747 (25)
D	5340 (1018)	735 (80)
E	5460 (598)	606 (30)
F	5472 (1017)	615 (53)
G	4177 (701)	504 (55)
H	5542 (592)	618 (51)
I	4945 (564)	632 (34)

There was noticeably high variability in the MOR for D and F and for A and D on MOE, as highlighted in the table.

We ran statistical analysis (ANOVA) on the results and all the samples are significantly different than each other with the exception of the following:

MOR	MOE
A and C	B and G
B and G	C and D
D, E, F, and H	E, F, and H
	F, H, and I

Column1	Core Matieral	Description2
A	Poplar	EDGE Core
B	Okoume	Marine Grade
C	Rubberwood	Rubberwood
D	Falcata	Red Oak TigerLITE
E	XTR	NZ Pine XTR
F	Fir	Domestic
G	Poplar	Hoop Pine #1 Core
H	MLH	Birch Mixed Light Hardwood
I	Sande	South American Sande

Dimensions	Core	face/back species	Glue	Total ply	Thickness tolerance	Weight	Application
4'x8'x19mm	poplar	C/D radiata pine. (1mm before sanding, 0.5mm+ after final sanding)	Fortified E0	11	.+/- 0.3mm. (Max 0.25mm variance in the same panel)	71 lbs per sheet 570 ks/m3	Severe machining, interior framing, not for surfacing, nor roll-laminating or paper laminating
	pressure	temperature	Moisture	Bending strength (Longitudinal Grain)	Bending strength (Cross grain)	sanding	
	160 psi	115 °C	8%-12%	20-40	10~~30	Calibrate sanding @60# grit, 220~320# for final sanding per request	

Data Sheet for 12.5mm radiata pine plywood for furniture framing

Dimensions	Core	face/back species	Glue	Total ply	Thickness tolerance	Weight	Application
4'x8'x12.5mm	poplar	C/D radiata pine. (1mm before sanding, 0.5mm+ after final sanding)	Fortified E0	9	.+/- 0.3mm. (Max 0.25mm variance in the same panel)	58 lbs per sheet 570 ks/m3	Severe machining, interior framing, not for surfacing, nor roll-laminating or paper laminating
	pressure	temperature	Moisture	Bending strength (Longitudinal Grain)	Bending strength (Cross grain)	Sanding	
	160 psi	115 °C	8%-12%	20-40	10~~30	Calibrate sanding @60# grit, 220~320# for final sanding per request	