

TECHNICAL NOTES

FOREST PRODUCTS LABORATORY

U. S. FOREST SERVICE

MADISON, WISCONSIN

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No. F-29

THIN PLYWOOD

Thin plywood, made of two or three tissue-like sheets of veneer, is suggested by the Forest Products Laboratory, Madison, Wisconsin, as a material apparently having many possible applications. The new product is extremely light, strong, and flexible. It shrinks and swells very little with changes of moisture, and will withstand long continued soaking in hot or cold water. It can readily be made fire-resistant. Cloth, paper, or wire screen may be combined with the veneer to increase toughness and resistance to tearing, and the plies may be arranged with their grains running at any angle, to give the plywood more strength in a particular direction.

A method of manufacturing extremely thin plywood has been worked out by the laboratory and will be explained in detail to anyone upon request.

On account of its fragility, thin veneer is difficult to glue with wet glue by the ordinary methods. It cannot be run through a glue spreader without first being reinforced. If the glue is spread by hand, the veneer absorbs water and swells excessively, producing wrinkles and poor joints. Large sheets of thin veneer which are wet and heavy with glue are almost impossible to handle without tearing.

The method of gluing developed by the laboratory avoids all such difficulties. The glue used is of the blood-albumin type. Instead of being spread directly on the veneer, it is spread on sheets of tissue paper. After the coated tissue is dry it is inserted between the sheets of veneer, and the joint is made in a hot press. The practicality of this process has been demonstrated by the manufacture of several thousand feet of thin plywood from 1/120-inch veneer.

A number of tests on thin plywood of various thicknesses and combinations of material have been made at the laboratory, and the results are given in the following table:

STRENGTH PROPERTIES OF THIN PLYWOOD OF VARIOUS CONSTRUCTIONS

Description	W		Toughness:		Tearing Time in		Tension.		Max. Load	
	Weight:		Height of:		seconds for 1"		lbs. per inch width			
	oz. per		drop		Parallel		Perpen.		Parallel	
	sq. ft.		Inches		or 60°		or 30°		or 60°	
1/125 red gum faces at 60 degrees Grade A airplane cotton between faces	2.1	19	16	18	68	86				
2 plies 1/125 red gum glued to- gether at 60 degrees. Grade A Airplane cotton on one face.	---	18	22	61	88	40				
1/125 red gum faces parallel 1/64 yellow poplar core at right angles to faces	1.7	2	20	8	116	200				
1/125 red gum glued to 1/48 bass- wood at 90 degrees. Grade A air- plane cotton on basswood face	2.4	18	30	50	110	209				
2 plies 1/64 red gum at 60 degrees Grade A airplane linen between faces	2.3	11	67	97	95	115				
1/64 red gum faces at 90 degrees. Grade A airplane linen between faces	2.3	11	81	81	241	241				
1/55 Spanish cedar faces at 90 degrees. Grade A airplane linen between faces.	2.1	9	68	68	153	153				

STRENGTH PROPERTIES OF THIN PLYWOOD OF VARIOUS CONSTRUCTIONS
(CONTINUED)

Description	W Weight sq. ft.	Toughness Height of drop Inches	Tearing Time in seconds for 1" tear Parallel or 60°	Tension. Max. Load lbs. per inch width Parallel or 60°	Tension. Max. Load lbs. per inch width Perpen. or 30°
1/55 Spanish cedar faces at 60 degrees. Grade A airplane linen between faces.	2.0	15	71	73	166
1/110 Spanish cedar glued at 90 degrees to 1/48 basswood. Grade A cotton on basswood face	2.4	25	39	122	306
1/60 basswood faces at 90 degrees. Grade A airplane linen between faces.	2.0	11	64	255	255
1/60 basswood faces at 60 degrees. Grade A airplane linen between faces.	2.0	14	69	120	126
1/64 basswood faces at 90 degrees. Grade A airplane linen between faces.	2.1	11	43	180	180
1/64 basswood faces at 60 degrees. Grade A airplane linen between faces.	2.3	10	66	96	123
1/64 yellow poplar faces at 90 degrees. Grade A airplane linen between faces.	2.2	12	79	178	178

STRENGTH PROPERTIES OF THIN PLYWOOD OF VARIOUS CONSTRUCTIONS
(CONTINUED).

Description	W Weight: lbs. per sq. ft.	Toughness: Height of drop inches	Tearing: seconds for 1" tear Parallel x Perpen. x or 60° or 30°	Time in Perpen. x Parallel x or 30° or 60°	Tension, lbs. per inch width Parallel x Perpen. x or 60° or 30°	Max. Load Per inch width Parallel x Perpen. x or 60° or 30°
1/64 yellow poplar faces at 60 degrees. Grade A airplane linen between faces.	2.2	13	52	84	91	100
1/64 birch faces at 40 degrees. Grade A airplane cotton between faces.	2.6	25	120	120	---	---
1/64 birch faces at 60 degrees. Grade A airplane cotton between faces.	2.8	21	82	107	---	---
1/64 birch faces at 90 degrees. Grade A airplane linen between faces.	2.6	21	123	123	366	366
1/64 birch faces at 60 degrees. Grade A airplane linen between faces.	2.7	13	80	67	85	171
Two 1/64 birch plies glued together at 90 degrees. Grade A airplane linen on one face.	2.6	27	156	136	398	398
1/60 birch faces at 90 degrees. Grade A airplane linen glued between faces	2.5	14	167	167	350	350

STRENGTH PROPERTIES OF THIN PLYWOOD OF VARIOUS CONSTRUCTIONS
(CONTINUED)

Description	W. : Weight :	Toughness : Height of drop :	Tearing : seconds for 1" tear :	Time in : Perpen. X : Parallel X :	Tension. Max. Load. : lbs. per inch width :
1/60 birch faces at 60 degrees. Grade A airplane linen glued between faces.	2.6	18	105	157	63
1/100 black walnut faces at 60 degrees. Grade A cotton glued between faces.	2.0	24	14	25	66
1/100 sugar maple faces at 60 degrees. Grade A cotton glued between faces.	2.4	16	20	30	84
2 plies 1/100 sugar maple glued together at 60 degrees. Grade A airplane cotton on one face	2.4	29	26	36	86
Grade A airplane linen given 5 coats of dope.	.73	17	21	21	57

x Direction of face grain relative to the direction of application of the force.