FACT SHEET

L-1224

GUIDE FOR SPECIFYING AND BUYING SOFTWOOD PLYWOOD

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Plywood is likely to be used if you are building, remodeling, redecorating or making toys and furniture in a home workshop. Plywood is readily available from building materials dealers. In buying plywood, however, knowledge of types and grades is essential to specify the kind of plywood that meets use requirements most economically.

Plywood is manufactured by bonding together thin sheets of wood called veneers. The grain of each veneer layer (ply) is at right angles to adjacent plys. An odd number of plys—3, 5, 7—is used, giving a finished plywood with face and back grain running in the same direction, figure 1.

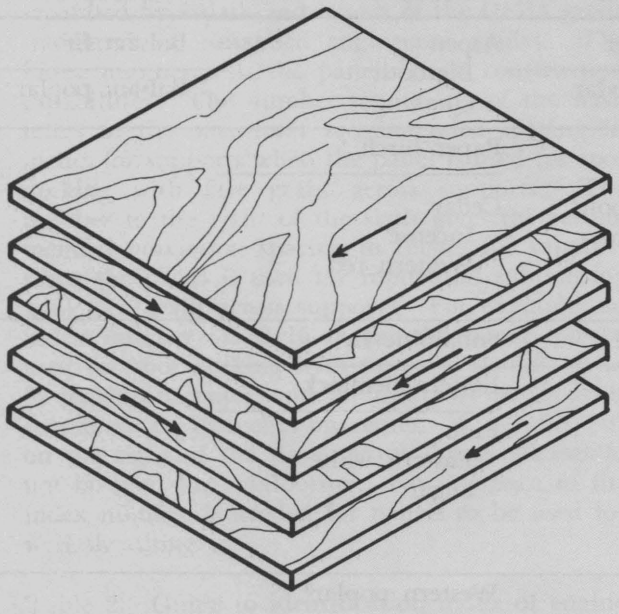

Fig. 1. Plywood construction. Arrows show wood grain direction of each veneer sheet (ply).

The two basic types of softwood plywood are ***appearance grade*** and ***engineered grade.*** When the number one priority is appearance, as in cabinet work, appearance grade is used. When strength is of primary importance, as in wall and roof sheathing and subflooring, engineered grade is used. Both plywood types are manufactured using 100 percent waterproof glue or highly moisture-resistant glue, depending on exposure to moisture. Most engineered grade plywood is manufactured using 100 percent waterproof glue. Plywood panels made with 100 percent waterproof glue are labeled ***exterior type*** and those using highly moisture-resistant glue, ***interior type.***

Softwood plywood is manufactured from more than 50 wood species of varying strength. Woods with similar strength properties have been grouped to help identify plywood. Five basic groups, shown in Table 1, are listed progressively with the strongest woods in group 1 and the weakest in group 5.

Appearance Grades

Appearance grade plywood is identified primarily by the quality (grade) of the veneer used for the face and back of the panel. The face and back grades, from highest to lowest, are N, A, B, C, C-plugged and D. Appearance grade plywood with a face grade N and back face grade A would be stamped N–A.

Selection of appearance grade plywood face and back grades depends on use. For example, if both sides of the plywood are to be exposed and to have a quality natural finish, (waxed, sealed, or varnished), the choice would be N–N grade. N–A grade would be suitable if the back face would not show but needed to be solid and smooth. If the back face will not show or require a smooth solid surface, select grade N–B. If the plywood is to be used for natural finish paneling, specify N–D.

If the appearance grade plywood is to be painted rather than have a natural finish, grades A–A, A–B or A–D are suitable. The back face grade again depends on whether it is exposed, needs to be smooth and solid but not exposed or will not show and does not need to be smooth. Although grades A–A, A–B and A–D are usually selected for painted surfaces, fine grain panels in these grades are also suitable for natural finishing.

Grades B–B and B–D are also paintable. Grade B–B is a utility panel used where two smooth sides are desired, but circular plugs are acceptable. (A circular plug is a patch applied to removed knots.) Grade B–D is a utility panel used where one smooth side is required; for backing, sides of built-ins, industry shelving and separator boards and bins.

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For superior results with painted surfaces, such as siding, built-ins, signs and displays, specify Medium Density Overlaid (MDO) plywood. This grade has a smooth resin-treated fiber surface, heat-fused to the panel face, which takes paint beautifully and holds it longer.

Appearance grade plywood is available in both exterior and interior types. The choice is based on whether the plywood will come in contact with moisture. If plywood used inside will be subjected to periods of high humidity, select exterior type.

The way to specify appearance grade plywood is to designate the species group, number of pieces, width, length, number of plys, type, grade, finished thickness and agency certification of quality as follows:

Group 2 plywood: 100 pcs., 48″ × 96″, 3-ply Interior Type, A–D grade, sanded 2 sides to ¼ inch thickness, DFPA grade-trademarked.

For help in making decisions about interior or exterior type, grade, thickness and species group, write the American Plywood Association, 10300 North Central Expressway Bldg., Suite 160, Dallas, Texas, for the publication "Guide To Plywood Grades."

The letters DFPA, found on the grade trademark stamped on plywood panels, is an agency certification of quality identification which indicates the plywood has been subjected to the rigid testing and inspection program of the American Plywood Association.

When you want the color tone and grain pattern associated with a particular species, specify species preference, Table 1. For example, if you want yellow birch to build cabinet doors, specify yellow birch rather than group 1.

Table 1 does not contain the fine hardwoods such as walnut, oak and cherry. These species come under the Hardwood Plywood Manufacturers Association. To obtain information on buying hardwood plywood, write to the Hardwood Plywood Manufacturers Association, P. O. Box 6246, Arlington Virginia 22206.

Table 1. Classification of species by strength. Group 1 species are strongest; group 5, weakest

Group 1	Group 2	Group 3	Group 4	Group 5
Yellow birch	Port Orford cedar	Red alder	Aspen	Balsam fir
Sweet birch	Douglas fir 2[2]	Alaska cedar	Bigtooth Quaking	Balsam poplar
Douglas fir[1]	Fir	Pine	Paper birch	
Western larch	California red	Jack		
	Grand	Lodgepole	Cedar	
Sugar maple	Noble	Ponderosa	Incense	
	Pacific silver	Spruce	Western red	
Caribbean pine	White			
	Western hemlock	Redwood	Subalpine fir	
Southern pine	Lauan	Spruce	Eastern hemlock	
Loblolly	Almond	Black		
Longleaf	Bagtikan	Red	Pine	
Shortleaf	Red	White	Eastern white	
Slash	Tangile		Sugar	
	White			
Tanoak				
	Black maple		Western poplar[3]	
	Mengkulang		Engelmann spruce	
	Pine			
	Pond			
	Red			
	Western white			
	Sitka spruce			
	Sweet gum			
	Tamarack			

[1]Douglas fir 1—Washington, Oregon, California, Idaho, Montana, Wyoming, British Columbia, Alberta.
[2]Douglas fir 2—Nevada, Utah, Colorado, Arizona, New Mexico.
[3]Also known as black cottonwood.

Engineered Grades

Engineered grade plywood is defined as Structural I and II. Structural I is limited to group 1 species, Table 1, for face, back and all inner plys. Structural I and II are unsanded grades of C–D sheathing plywood made only with exterior glueline. They are recommended for heavy load applications where strength properties are of maximum importance.

Interior standard C–D sheathing plywood is another engineered grade, available with intermediate glue or fully waterproof adhesives. These unsanded panels are excellent for subflooring, wall sheathing and roof decking where prolonged moisture may occur during construction. However, the presence of D grade veneers for inner plys and backs could result in localized glueline weakness when panels are subject to prolonged wet or highly humid conditions.

Another engineered grade is C–C exterior which is unsanded plywood manufactured to meet all the requirements of exterior type. Like Structural I and II and standard grades, it has "identification index" numbers based on species used.

The identification index is a pair of numbers separated by a slash and is part of the DFPA grade trademark on unsanded engineered grades. The index number tells the panel's basic construction capabilities. The number to the left of the slash refers to the *maximum* recommended spacing in inches for supports when the panel is used for roof decking with face grain across supports. The number to the right of the slash gives the recommended *maximum* spacing in inches for supports when the panel is used for residential subflooring with face grain across supports. For example, an index number of 32/16 means the panel can be used for roof decking with supports spaced up to 32 inches on center, and for subfloors on supports spaced up to 16 inches on center. A number "0" on the right of the slash means the panel should not be used for subflooring. No reference to the index number is needed for panels to be used for wall sheathing.

The guide to identification index numbers for engineered grades given in Table 2 shows how maximum support spacing varies by plywood thickness, species group and grade.

Table 2 summarizes the various combinations of thickness and identification index numbers on the grades shown. Suppose you want to use standard interior grade plywood for *roof decking* over supports 24 inches on center. Look in the columns under this grade for identfication indexes with 24 on the left side of the slash mark. You will find 24/0 for both 3/8 and 1/2 inch thickness. If you want to use the same grade for subflooring with supports 16 inches on center, look for identification indexes with the number 16 on the right. You'll find 32/16 for the 1/2, 5/8 and 3/4 inch thicknesses.

To specify engineered grade plywood, designate grade, identification index, number of pieces, width, length, number of plys, thickness and agency certification of quality:

> Standard, 24/0, 100 pcs., 48″×96″, 3 ply, 3/8-inch thick, DFPA grade-trademarked. (If exterior or intermediate glue is desired, note glue markings.)

Grade Trademarks

Descriptive terms such as grade, exterior or interior type, identification index and group number made up grade trademarks which provide useful information for the consumer. A typical appearance plywood grade trademark would look like this:

A–C GROUP 1 EXTERIOR ps 1–66	TESTED DFPA QUALITY

Using information from this report, the important parts of this grade stamp can be interpreted.

1. "A–C" means that panel face is grade A and the panel back is grade C.
2. "Group 1" tells the species group, Table 1.

Table 2. Guide to identification index of engineered grades

Thickness	Standard (C–D) interior or C–C exterior			Structural I C–D interior or structural I C–C exterior	Structural II C–D interior or structural II C–C exterior	
	Group 1	Group 2 or 3	Group 4	Group 1 only	Group 1	Group 2 or 3
5/16	20/0	16/0	12/0	20/0	20/0	16/0
3/8	24/0	20/0	16/0	24/0	24/0	20/0
1/2	32/16	24/0	24/0	32/16	32/16	24/0
5/8	42/20	32/16	30/12	42/20	42/20	32/16
3/4	48/24	42/20	32/16	48/24	48/24	42/20
7/8	.....	48/24	42/20	.....	.....	48/24

3. "Exterior" means that this panel was bonded using 100 percent waterproof adhesive.
4. "DFPA" means that this panel was manufactured according to American Plywood Association specifications.

If the plywood panel is in group 1, it has high stiffness and strength. "Exterior" tells you it can be used out-of-doors without glue line failures. The A–C grade indicates that this panel would be used where appearance of only one side is important such as for siding or soffit. A face side is suitable for painting but could be naturally finished if it has a fine grain.

Some examples of engineered grade stamps are as follows:

STRUCTURAL I 48/24 Interior PS 1–66	TESTED DFPA QUALITY
Exterior Glue A.	
STRUCTURAL II 32/16 Interior PS 1–66	TESTED DFPA QUALITY
Exterior Glue B.	

Engineered grade stamp A means this is structural I grade in which the face, back and inner plys are limited to group 1 species, Table 1. This is a high-strength panel used where plywood strength properties are of maximum importance. The 48/24 tells the maximum support spacing for roof decking and subfloors; respectively, 48 inches on center for roof decking and 24 inches on center for residential subflooring. "Interior" means an interior type plywood. But, because structural grades are used where maximum strength is required and often subjected to periodic high humidity conditions, only exterior glue is used. This is why "exterior glue" appears on the grade stamp.

Grade stamp B is structural II grade plywood for which group 1, 2 or 3 species is permitted for face, back or inner plys. The support spacing has decreased to 32/16 because use of species in group 2 or 3 will decrease the strength properties as compared to group 1 species.

Grade trademarks inform the consumer that plywood has been subjected to rigid inspection and testing requirements. Look for these trademarks before you buy to insure getting the proper quality product.

Cooperative Extension Work in Agriculture and Home Economics, The Texas A&M University System and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.
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