BUYING LUMBER

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When a log is cut into lumber, some of the boards may be clear and free of defects while others from the same log may contain knots, stains, pitch pockets, checks or shakes, which may lower the grade. The grade of each board is determined at the sawmill by highly skilled lumber graders who follow strict national grade rules based on the species of wood and the use for which the lumber is intended.

Lumber which will be under stress, such as timbers, beams, posts, stringers and some decking, is stress graded. What counts here is whether a knot, split, grain direction or other defect weakens the lumber. Lumber to be used under stress is graded visually or by mechanical equipment.

Lumber is graded according to its intended use. Uses are structural light framing, light framing, studs, structural joists and planks and etc. The grades can be designated by letter (A,B,C,D), number (1,2,3), words (construction, standard, utility, economy) or a combination (#1 common). Designed building plans specify lumber grade needs. See an engineer or your lumber dealer to determine the grade needed for your particular job. Plans for different farm buildings and equipment are available through the Extension Service.

For a more detailed description of lumber grades, see the Midwest Plan Service - 1, **Structures and Environment Handbook**, available through the Extension Agricultural Engineer or extension agent's office for $25. Table 1 is from this reference.

Another technical reference about western softwood lumber is the **Product Use Manual** prepared by the Western Wood Products Association, 1500 Yeon Bldg., Portland, OR 97204.

Buying Lumber

A buyer of lumber need not know the complicated rules that determine a specific grade but should remember that better grades will cost more.

Look at the lumber and determine which will suit the job. When asking prices be sure to ask the species of wood and the grade.

Lumber varies in price at various yards, but if a specific species of wood and a particular grade is requested, the price difference may be small.

Softwoods include the various evergreens or conifers such as pine, fir, larch, spruce and hemlock (Table 2). Softwoods are widely used for building construction. All softwood lumber is sold by the board foot and in length multiples of 2 feet. If a 1-foot wide by 5 foot-long by 1-inch board is purchased, the billing may reflect the price of a 6-foot board. If two 5-foot long boards are needed the lumberyard may cut a 10-foot long board in half and charge for one 10-foot board.

Hardwood species have broad leaves and are usually deciduous. Oak, birch, maple and walnut are hardwoods which may be bought locally. Hardwood lumber is sold by the board foot. If a 12-inch wide by 7-foot long by 1-inch thick board is purchased, the billing will be for 7 feet. Hardwood lumber is graded differently than softwood lumber. Most hardwood is used for furnitures, craftwork, flooring and special projects where good appearance is important.

Lumber Sizes

Lumber is described by its full size before planing and drying, not by its actual size. Thus a board described as 1" × 2" is actually ¾" × 1½", and a board described as 2" × 4" is actually 1½" × 3½" after planing and drying. All lumber described as 1 inch thick is actually ¾ inch thick. This means a board described as 1" × 6" × 8' is really ¾" × 5½" × 8' (Table 3).

Plywood, particle board and flake board are exactly the size they are described to be. Standard sheets are 4' × 8' and thicknesses are ¼", 3/8", ½", 5/8", and ¾". Prices can be quoted per square foot or per standard 4' × 8' sheet. Information on grades and strengths of these different types of panels is available from the American Plywood Association.

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Figuring Board Feet

Abbreviations used are: Bd. Ft. or B.F. or bd ft = Board Feet (or Foot); M = 1000.
Prices of lumber are quoted by 1000 B.F., so $500.00/1000 Board Feet = $500.00/MBF.
Inches = ", Feet = '. 2 inches × 4 inches × 8 feet = 2" × 4" × 8'

Lumber is typically sold by the board foot. However, skillful advertisers may try to sell by foot length.

One B.F. is a board 1" thick × 12" wide and 1' long.

Total B.F. = $\frac{\text{thickness}" \times \text{width}" \times \text{length}'}{12}$. Thus, $\frac{1" \times 12" \times 1'}{12} = \frac{12}{12} = 1$ Bd. Ft.,

or one $2" \times 4" \times 8' = \frac{2 \times 4 \times 8}{12} = \frac{64}{12} = 5.33$ Bd. Ft.,

or one $1" \times 4" \times 8' = \frac{1 \times 4 \times 8}{12} = \frac{32}{12} = 2.66$ Bd. Ft.,

or one $2" \times 6" \times 10' = \frac{2 \times 6 \times 10}{12} = \frac{120}{12} = 10$ Bd. Ft.,

or one $1" \times 6" \times 10' = \frac{1 \times 6 \times 10}{12} = \frac{60}{12} = 5$ Bd. Ft.

Learn to cancel where possible, or at least reduce fractions to simplify arithmetic.

one $2" \times 6" \times 10' = \frac{2 \times 6 \times 10}{12} = 10$ Bd. Ft.

8 pcs of $2" \times 6" \times 12' = \frac{2 \times 6 \times 12}{12} = 12 \times 8 = 96$ Bd. Ft.,

or $\frac{8 \times 2 \times 6 \times 12}{12} = 96$ Bd. Ft.

Sometimes one calculation can lead to a fraction while another calculation of the same problem will not, and consequently lead to two slight different answers. For instance, if we calculate 48 pieces of 2" × 4" × 8' and figure the board foot volume of the 2 × 4's and multiply by 48 pieces the result is:

$\frac{2 \times 4 \times 8}{12} = 5.33 \times 48$ pcs. = 255.84 Bd. Ft.

However, if we put the number of pieces in the formula and divide the 48 pieces by 12 we eliminate the fraction, and the need to round off the 5.3333 decimal, and so arrive at a slightly different answer.

$\frac{4}{\cancel{48} \times 2 \times 4 \times 8}{\cancel{12}} = 4 \times 2 \times 4 \times 8 = 256$ Bd. Ft.

Figuring Cost

Lumber prices are quoted by the 1000 Bd. Ft.

Example: 8-foot 2 × 4s are quoted at $400.00/MBF.

A person orders 200 of these 8-foot 2 × 4s. What is the cost?

$200 \times \frac{2 \times 4 \times 8}{12} = 1{,}066$ Bd. Ft. in this order.

Since the price is quoted not per board foot but per thousand board feet, convert 1,066 to 1.066 thousands: 1.066 × $400 = $426.40.

Other Examples

20 pieces of 8-foot 2 × 6s at $400.00/MBF
160 Bd. Ft. × $400.00/MBF
.160 × $400 = $64.00

4 pieces of 10-foot 2 × 6s at $400.00/MBF
40 Bd. Ft. × $400.00/MBF
.040 × $400 = $16.00

1 piece of 8-foot 2 × 6 at $400.00/MBF
8 Bd. Ft. × $400
.008 × $400 = $3.20

The tables in this publication are from the Midwest Plan Service - 1 **Structures and Environment Handbook**, 13th Ed.

Table 1. Grades of Lumber.

Classification	Grades	Description or Use
Dimension		
2" to 5" thick	Structural Light Framing (2"-4" thick, 2"-4" wide)	• For engineered use where higher strength is needed.
2" or more wide	Select Structural	• Use where high strength and stiffness and good appearance are needed.
	No. 1	• Use about the same as SEL STR, a little lower in quality.
	No.2	• Recommended for most general construction uses.
	No. 3	• Use for general construction where appearance is not a factor.
	Light Framing (2"-4" thick, 2"-4"wide)	• Provides good appearance where high strength and high appearance are not needed.
	Construction	• Recommended and widely used for general framing purposes.
	Standard	• About same uses as CONSTRUCTION but a little lower in quality.
	Utility	• Used for studding, blocking, plates, etc., where economy and good strength are desired.
	Economy	• Suitable for crating, bracing and temporary construction.
	Studs (2"-4" thick, 2" wide)	• Only one grade; suitable for all stud uses.
	Structural Joists & Planks 2"-4" thick, 6" & wider)	• For engineering applications.
	Select Structural	• Use where high strength and stiffness and good appearance are needed.
	No. 1	• Use about same as SEL STR; a little lower quality.
	No. 2	• Recommended for most general construction use.
	No. 3	• For use in general construction where appearance is not a factor.
	Appearance Framing 2"-4" thick, 2" & wide) A	• Use exposed in housing and light construction for high strength and finest appearance.
Timbers 5" or more in least dimension	Select Structural	• Use where superior strength and good appearance are needed.
	No. 1	• Similar uses to SEL STR; a little lower in quality.
	No. 2	• Recommended for general construction.
	No. 3	• Use for rough general construction.
Boards		• Graded for suitability for use in construction.
up to 1½" thick, 2" or more wide	SEL MER or 1	• Use in housing and light construction for exposed paneling, shelving, etc.
	CONST 2	• Use for subfloors, roof sheathing, etc.
	STD 3	• Used about the same as #2 but a little lower in quality.
	UTIL 4	• Combines usefulness and low cost for general construction purposes.
	ECON 5	• Use for low grade sheathing, crating and bracing.
Finish or Selects		• Graded on basis of appearance.
up to 1½" thick, 2" or more wide	B & BTR	• Nearly clear with only minor defects; suitable for natural finish.
	C	• More and larger defects than B & BTR but suitable for paint finish.
	D	• A little lower in quality than C but still suitable for paint finish.

Table 2. Classification of characteristics and properties.

Kind of Wood	Characteristic					
	Ease of Working	Paint Holding	Nail Holding	Heartwood Decay Resistance	Strength	
					Bending	Stiffness
Softwoods						
Cedar, inland red	B	A	C	A	C	C
Cedar, western red	A	A	C	A	C	C
Fir, Douglas	C	C	B	B	A	A
Fir, white	B	B	C	C	B	B
Hemlock, western	B	B	B	C	B	A
Larch, western	C	C	A	B	A	A
Pine, western white	A	A	A	B	B	B
Pine, lodge pole	A	A	B	B	B	B
Pine, Ponderosa	A	B	B	B	C	C
Pine, southern yellow	C	C	A	B	A	A
Pine, sugar	A	A	A	B	C	C
Redwood	B	A	B	A	B	B
Spruce, Englemanns	B	B	C	C	C	C
Spruce, Sitka	B	B	C	C	B	A
Tamarack	C	B	B	B	B	B
Hardwoods						
Ash, white	C	C	A	C	A	A
Birch, yellow	C	B	A	C	A	A
Cottonwood	B	B	C	C	C	B
Elm, rock	C	C	B	B	A	A
Hickory, true	C	C	A	C	A	A
Maple, hard	C	B	A	C	A	A
Oak, red or white	C	C	A	A	A	A
Walnut	B	C	B	A	A	A

A, B, C and D are relative species ratings: A is high or desirable.

Table 3. Nominal and minimum dressed lumber sizes.

Thicknesses apply to all widths; widths apply to all thicknesses. Dressed sizes are for dry lumber.

Item	Thicknesses		Face widths	
	Nominal	Dressed	Nominal	Dressed
Boards	1	¾ in.	2	1½ in.
	1¼	1	3	2½
	1½	1¼	4	3½
			5	4½
			6	5½
			7	6½
			8	7¼
			9	8¼
			10	9¼
			11	10¼
			12	11¼
			14	13¼
			16	15¼
Dimension	2	1½	2	1½
	2½	2	3	2½
	3	2½	4	3½
	3½	3	5	4½
	4	3½	6	5½
	4½	4	8	7¼
			12	9¼
			12	11¼
Timbers (dressed green)	5 and thicker	½ off	5 and wider	½ off

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