

GENERAL SCOPE

This guide is designed to encourage the reader to become familiar with the grading rules for hardwood lumber established by the National Hardwood Lumber Association. The following photographs are examples of the range in appearance that the buyer may expect to receive when purchasing each grade. An effort was made to show the maximum and minimum clear yield for each grade. Each picture shows the "worst" side of the board since hardwood lumber is graded from the poor face.

INTRODUCTION TO GRADING

With some exceptions, hardwood lumber is graded on the basis of the size and number of cuttings (pieces) which can be obtained from a board when it is cut up and used in the manufacture of a hardwood product such as furniture, flooring, or architectural millwork. Usually the buyer intends to use only the clear (defect free) material in a board, so a higher grade would have a larger area of clear wood.

Because the grading rules are based on the yield of clear wood, many of the beautiful, natural characteristics which appear in a board are not included in the calculation of the yield. Often, the natural beauty and real bargains are not found in the most expensive grade of lumber. The keen buyer who will examine the #1 and #2A grades can discover that they may "yield" the prize pieces. Pages 5 to 18 display photographs of typical boards representing three of the commonly used NHLA standard grades in several species of lumber.

Basic Yield for FAS

FAS (Firsts and Seconds)—The FAS grade will provide the user with long, wide, clear cuttings. Best suited for high quality furniture, interior trim, millwork, and solid wood mouldings. The FAS grade includes a range of boards which yield from 83 1/3% (10/12ths) to 100% clear wood in cuttings at least 3" wide by 7' long or 4" wide by 5' long.

Note: Diagrams show two examples of the minimum clear yield (unshaded area) needed to make each grade. The shaded area contains defects and is not used in calculating the yield, although users may very well crosscut and rip the lumber in a different pattern and use portions of the board in the shaded area.

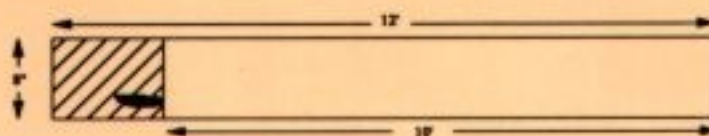


Diagram 1. FAS

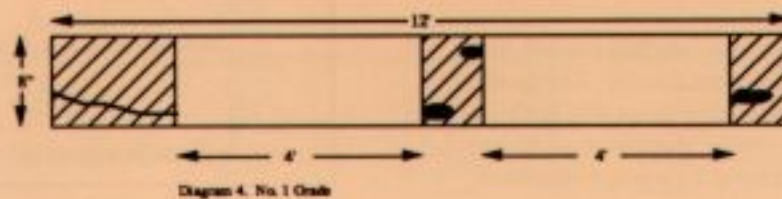
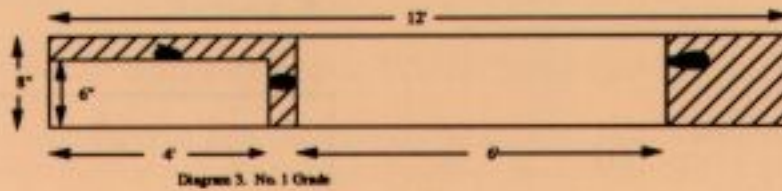


Diagram 2. FAS

FAS1F or Selects—In FAS1F ("FAS one Face") and Selects, the grade is established using both faces of the board. The best face must meet the requirements for FAS, and the reverse side must essentially grade No. 1. FAS1F and Selects are virtually the same grade, except for minimum width and length. The minimum board size for Selects is 4" x 6'; and for FAS1F it is 6" x 8'.

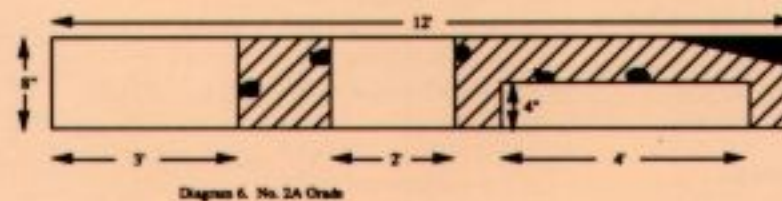
Basic Yield for No. 1 Grade

No. 1—Will provide the user with clear cuttings of medium length and width. Best suited for furniture, cabinets, and a multitude of solid wood manufactured products. The No. 1 grade includes a range of boards which will yield from 66 2/3% (8/12ths) to 83 1/3% (10/12ths) clear wood in cuttings at least 3' wide by 3' long or 4" x 2'.



Basic Yield for No. 2A Grade

No. 2A—Will provide the user with short, narrow clear cuttings economically priced, for use in unexposed furniture frames, picture frames, cabinet rails and frames, parquet or strip flooring, and many other smaller solid wood components. The No. 2A grade includes a range of boards which will yield from 50% (6/12ths) to 66 2/3% (8/12ths) clear wood in cuttings at least 3" wide by 2' long.



MEASURING HARDWOODS (Random Widths & Lengths)

Surface Measure—(SM) The surface area of a board in square feet. To determine surface measure multiply the width of the board in inches and fractions by the length in feet, and divide the product by 12, rounding off to the nearest whole number.

Some examples of surface measure calculations are as follows:

Examples:
 $6\text{-}1/2" \times 8' + 12 = 4\text{-}1/3 = 4 \text{ SM}$
 $8" \times 12' + 12 = 8 \text{ SM}$
 $10" \times 13' + 12 = 10\text{-}10/12 = 11 \text{ SM}$

Most board rules today (lumber scaling sticks), take this averaging into account automatically. The graduations on the board rule measure from the half-foot mark to the next half-foot mark, therefore all boards falling into the range are shown as a whole number.

Board Foot—(bd. ft. or BF) A board foot is the unit of measurement of lumber. A board foot is one foot long, one foot wide and one inch thick, or its equivalent. The formula for determining board feet in a board is:

(Width in inches and fractions \times length in feet \times thickness in inches) \div 12 = BF

Examples:
 $(12" \text{w} \times 12' \text{l} \times 1" \text{t}) \div 12 = 12 \text{ bd. ft.}$
 $(6" \text{w} \times 16' \text{l} \times 5/4" \text{t}) \div 12 = 10 \text{ bd. ft.}$
 $(8" \text{w} \times 6' \text{l} \times 2" \text{t}) \div 12 = 8 \text{ bd. ft.}$

The board foot measure of 1" thick boards is equal to the surface measure (note rounding convention):

Examples:
 $(9" \times 9' \times 1") \div 12 = 6\text{-}3/4 = 7 \text{ bd. ft.}$
 $(10" \times 10' \times 1") \div 12 = 8\text{-}1/3 = 8 \text{ bd. ft.}$
 $(7" \times 11' \times 1") \div 12 = 6.42 = 6 \text{ bd. ft.}$

Notes

1. Lumber measurement is based on thickness before surfacing.
2. When measuring hardwood lumber, lengths less than a full foot are measured as the next lower foot length. (A board 9' 9" is measured as just 9' long.)

Measuring With A Board Rule

1. Place the flange of the rule on edge of board, 1/3 of the length up from the narrow end.
2. Read to the right edge of the board, on the line indicating the board's length, for board feet in lumber 1" thick and less.

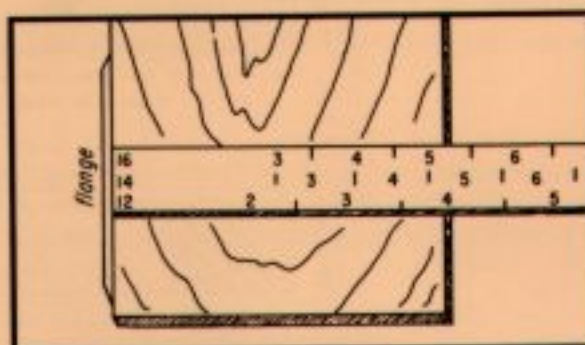


Diagram 7. Using a Board Rule

The board rule reads, for the example above:

16' length = 5 BF
 14' length = 5 BF
 12' length = 4 BF

For 8' lumber, read 1/2 the 16' scale: 8' length = 3 BF

Table 1. Standard Thickness for Surfaced Lumber¹

Rough	Surfaced	Rough	Surfaced
3/8"	S2S to 3/16"	1-3/4"	S2S to 1-1/2"
1/2"	S2S to 5/16"	2"	S2S to 1-3/4"
5/8"	S2S to 7/16"	2-1/2"	S2S to 2-1/4"
3/4"	S2S to 9/16"	3"	S2S to 2-3/4"
1"	S2S to 13/16"	3-1/2"	S2S to 3-1/4"
1-1/4"	S2S to 1-1/16"	4"	S2S to 3-3/4"
1-1/2"	S2S to 1-5/16"		

¹ From: NHLA Rule Book page 9 for commercial sales of hardwood lumber.

Kiln-Dried Hardwood Lumber-Measurement

Measurement After Kiln Drying

Sales of hardwood lumber measured after kiln drying or surfacing shall be quoted, invoiced, and delivered on the basis of net board footage, with no addition of footage for kiln drying shrinkage or surfacing.

Measurement Before Kiln Drying

Sales of hardwood lumber measured prior to kiln drying or surfacing shall be quoted, invoiced, and delivered by the basis of net board footage before kiln drying or surfacing. If the lumber is to be kiln dried or surfaced at the request of the purchaser, the kiln drying or surfacing charge shall be clearly shown and identified on the quotation and invoice.

Retail Sales of Stock Width Surfaced Lumber

Sizes for Surfaced (S4S) Hardwood Lumber Manufactured to Stock Widths

Hardwood lumber is normally manufactured in random widths. Stock width boards are a special item manufactured to pre-determined widths, normally for retail sales. The following table shows minimum sizes for the stock widths listed:

Table 2 Minimum Sizes for Surfaced (S4S) Hardwood Lumber²

Normal Stock Widths	Inches	SII Units (mm)	Normal Size Stock Widths	Inches	SII Units (mm)
2 x 4	1-1/2 x 3 1/2	38 x 89	1 x 1	3/4 x 3/4	19 x 19
2 x 6	1-1/2 x 5-1/2	38 x 140	1 x 2	3/4 x 1-1/2	19 x 38
2 x 8	1-1/2 x 7-1/4	38 x 184	1 x 3	3/4 x 2-1/2	19 x 63
2 x 10	1-1/2 x 9-1/4	38 x 235	1 x 4	3/4 x 3-1/2	19 x 89
2 x 12	1-1/2 x 11-1/4	38 x 286	1 x 6	3/4 x 5-1/2	19 x 140
			1 x 8	3/4 x 7-1/4	19 x 184
			1 x 10	3/4 x 9-1/4	19 x 235
			1 x 12	3/4 x 11-1/4	19 x 286

Note: The dry thicknesses of nominal 1-1/4" and 1-1/2" hardwood lumber are 1" and 1-3/16" respectively. Widths for these thicknesses are the same as the stock widths shown above.

Estimating Board Feet in a Package of Lumber

To determine the board feet of one board, the procedure is to multiply the surface measure by the thickness. A package of lumber can be estimated in much the same manner. First, figure the "surface measure" of one layer of lumber. Do this by multiplying the width of the package by the length of the package, less gaps (if mixed lengths, use an average of lengths present) and divide by 12. Then, multiply this figure by the thickness of boards in the package. This total will be board feet for one layer, so multiply this by the number of layers to get the total feet in the package.



Diagram 8. Estimating package measurement

Average width of unit 40" (lumber only, after allowing for gaps)

Length of unit 10'

$$40'' \times 10' = 400 + 12 = 33.33$$

$$\begin{array}{r} \text{Thickness of lumber } 8/4 \\ \times \quad 2 \\ \hline 66.66 \end{array}$$

$$\begin{array}{r} \text{Number of layers} \\ \times \quad 10 \\ \hline 666.67 \end{array}$$

-667 BF

²From: Uniform Laws and Standards, National Institute of Standards, U. S. Department of Commerce, 1994.