



NHLA

RULES

FOR THE MEASUREMENT
& INSPECTION OF
HARDWOOD & CYPRESS

Plus NHLA Sales Code &
Inspection Regulations

Effective January 1, 2023

STRONG ROOTS. GLOBAL REACH.

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FOREWORD

Hardwood lumber comes from sustainable harvested, self regenerating non-coniferous trees. Most are broad leaf and deciduous though there are a few exceptions. Softwood lumber is produced from coniferous trees which are predominantly needle bearing and non-deciduous or evergreen. Because of the differing inherent qualities, growth characteristics and end uses of hardwoods compared to softwoods, their grading methods are substantially different. In general, a softwood board is graded as a whole piece, whereas a hardwood board is graded on its usable content aside from any parts which may be considered undesirable for its use such as knots, wane, splits, etc.

The hardwood grades have been adopted to establish the comparable value of the board and to provide the user with a standard on which he may base his purchase for a particular end use. A chair manufacturer can utilize a board which contains shorter and narrower clear or sound pieces (cuttings), whereas a manufacturer of case goods or tables may require longer or wider cuttings or both. The grading rules are of further advantage in that they apply generally to all species with certain exceptions. Other rules have been established for particular end uses such as piano actions, key stock, paneling, and for particular types of construction where strength and size may be a factor.

The rules are the result of long and careful study by practical lumbermen in cooperation with the user, with the aim of providing the best available products, conservation of the timber from which it is cut and in maintaining a lumber language of terms and specifications which permit a ready and understandable meeting of the minds among buyers and sellers wherever and for whatever use hardwoods are required. As a consequence, the rules are used universally with well-founded confidence.

The underlying codification of the rules was made with the formation of the National Hardwood Lumber Association in 1897 and since that time has been revised or enlarged to reflect the industry's needs with the advice of a standing committee representing the various species and producing areas.

The Association provides short term instructional courses and a full-time training school available to members and non-members alike so that a full and uniform understanding and application of the rules may be achieved.

To further the interests and provide for the protection of the buyer and seller of hardwoods, the Association maintains a staff of highly qualified inspectors whose services are available on request to both members and non-members.

Their duties are to grade the lumber as specified in the written order given to them based on National rules and to provide where applicable a certificate covering their work. Such certificates are financially guaranteed by the Association as covered by the regulations governing their issuance.

From the adoption of the earliest hardwood rules, no major alteration of standards has occurred that was not prompted by a noticeable change in the character of the hardwood timber supply. Practical hardwood operators have an awareness of the obligation to strive to make the rules bear a reasonable and practical relationship to the general quality of the available timber supply. Conservation is promoted by the maintenance of this type of sensible relationship between the lumber rules and the raw material from which the lumber is produced.

Before a rule is amended or a new rule adopted, the proposal is carefully considered by the Rules Committee composed of knowledgeable, experienced lumbermen. If the proposal passes the scrutiny of this Committee, it is then debated and voted upon by the Active membership of the Association. If the proposal is passed by a two-thirds majority vote, it then becomes official and is included in the Rules.

A study of the Sales Code is recommended. It was written by practical lumbermen of wide experience and high moral values. As will be seen in the preamble, its use is designed to create a basis for a meeting of the minds and to provide a ready means for the settlement of disputes without recourse to litigation. Its provisions are stipulated in an ever-increasing number of sale and purchase contracts.

The grading and measurement of hardwood lumber is not a simple matter and should not be undertaken lightly. A constant review and study of the individual rules is advisable even by those who are constantly using them. No rules or regulations can be truly effective unless they are understood and correctly applied. Those presented in the following pages have stood the test of time and of an exacting market. They have served as a pattern for others and are an outstanding example of the determined efforts of a great and basic industry to conduct its affairs on the most profound edict of all time: The Golden Rule.

GENERAL INSTRUCTIONS

1. Inspectors are instructed to study these rules carefully and use their best judgment in applying them, but shall not allow their judgment to supersede anything specifically stated in the rules themselves.
2. All lumber shall be inspected according to these rules as defined under General Instructions and Standard Inspection unless otherwise specified. The rules defined under Special Combined & Face Grades shall be applied only when specified in the contract between buyer and seller. The rules under Standard Inspection and Special Inspection shall not be applied under any contract which specifies grade names different from those listed herein except by special agreement between buyer and seller.
3. Exceptions to the General Instructions and Standard Grades are stated under the caption of the respective species and grades.
4. Lumber shall be inspected and measured as the inspector finds it, of full length, width and thickness. No allowance shall be made for the purpose of raising the grade, except that in rough stock, wane, and other defects which can be removed by surfacing to standard rough thickness shall not be considered. Nothing herein shall be construed as prohibiting the shipper from improving the grade or appearance of the lumber at time of or prior to shipment.

The surface grade as determined by the cutting yield shall first be established by the inspector, after which the thickness shall be determined. Thickness does not determine grade.

After grade and thickness have been determined, special features, such as the amount of forty-five degree radial grain for classification as quarter sawn lumber and the amount of figure as specified for figured woods and some quartered woods, shall be considered.

5. The grade shall be determined from the poor side of the piece, except when otherwise specified. In the cutting grades the poor side of the board is determined by the side with the lower grade, or if both sides have the same grade, it is the side with the least number of cutting units.

When determining the poor side of a board, grade each face independently without regard to the reverse side of the cuttings. After the poor side has been determined, then look to the reverse side for soundness.

6. These rules define the poorest piece in any given Standard or Special grade, but the respective grades shall contain all pieces up to the next higher Standard or Special grade as defined in these rules.
7. All widths, lengths and thicknesses mentioned in these rules shall be inclusive. These rules do not define standard average widths or lengths and in all cases which a specific average width or length or a specific percentage of any width or length or groups of widths or lengths is required, it is incumbent upon the buyer to specify same in the contract.

Manufacture

8. Lumber should be properly manufactured of good, average width and lengths. It should be edged and trimmed carefully to produce the best possible appearance while conserving the usable product of the log. Shipments of rough lumber will admit 25% of surfaced lumber when it is of the specified rough thickness. Contracts for green lumber should specify dimensions required to provide for shrinkage in drying.

Miscut Lumber

9. Rough lumber shall be categorized for Standard Thickness by the measurement taken at the thinnest cutting used in establishing the grade. If there is a greater variation in thickness over the entire length of the piece than shown in the following table, the board shall be classed miscut.
 - 3/8", 1/2", 5/8", and 3/4" minus 0" / plus 3/16"
 - 4/4 and 5/4 minus 0" / plus 1/4"
 - 6/4 and 7/4 minus 0" / plus 3/8"
 - 8/4, 10/4 and 12/4 minus 0" / plus 1/2"
 - 14/4 to 24/4 minus 0" / plus 5/8"

In determining the variation in thickness of Quartered lumber, the scant thickness of 1/16" and 1/8" admitted in those species under Paragraph 36, shall not be included.

Minimum Widths

10. Ninety percent of the minimum widths mentioned in all grades of lumber shall be full width; the remaining ten percent may be up to 1/4" scant in width. This rule also applies to each stock width and to any specified width. Width of the piece is determined at the narrowest point in the standard length with a sawn edge.

Specified Widths S1E or S2E

11. Lumber of specified width, rough or dressed one or two sides, when dressed one or two edges shall be 3/8" scant of the nominal width in lumber less than 8" wide and 1/2" scant of the nominal width in lumber 8" and wider.

Standard Lengths

12. Standard lengths are: 4', 5', 6', 7', 8', 9', 10', 11', 12', 13', 14', 15' and 16'.

Standard Thicknesses

13. Standard thicknesses for rough lumber are: 3/8", 1/2", 5/8", 3/4", 1", 1-1/4", 1-1/2", 1-3/4", 2", 2-1/2", 3", 3-1/2", 4", 4-1/2", 5", 5-1/2", and 6". One inch and thicker may also be expressed in quarter inches as follows: 4/4, 5/4, 6/4, 7/4, 8/4, 10/4, 12/4, 14/4, 16/4, 18/4, 20/4, 22/4 and 24/4.

Standard Thickness for Surfaced Lumber

14. Standard thicknesses for surfaced lumber is calculated by subtracting 3/16" from standard rough thickness for lumber 1-1/2" thick or less and by subtracting 1/4" for lumber between 1-3/4" and 4" thick as follows:

Rough	Surfaced	Rough	Surfaced
3/8"	S2S to 3/16"	7/4"	S2S to 1-1/2"
1/2"	S2S to 5/16"	8/4"	S2S to 1-3/4"
5/8"	S2S to 7/16"	10/4"	S2S to 2-1/4"
3/4"	S2S to 9/16"	12/4"	S2S to 2-3/4"
4/4"	S2S to 13/16"	14/4"	S2S to 3-1/4"
5/4"	S2S to 1-1/16"	16/4"	S2S to 3-3/4"
6/4"	S2S to 1-5/16"		

15. Thickness of lumber surfaced on one side only, shall be subject to special contract.

Measurement & Tally

16. Board feet is the unit of measure of lumber. One board foot is 12" wide by 12" long and 1" thick (144 cubic inches) or the equivalent. Surface Measure is the unit of measure to express the number of square feet on the surface of a board without regard to thickness. Surface measure is expressed in whole feet and rounded up or down to the nearest whole number when being calculated. Board feet is calculated by multiplying the surface measure by the standard thickness, except that standard thicknesses less than 1" are measured as 1". In random width lumber measured with a board rule, fractions of a foot below the half are dropped and fractions of a foot higher than the half are counted to the next higher whole foot. Widths measuring to the even half foot are counted alternately to the next higher or lower foot. In standard length lumber any fractions of feet longer than the standard lengths are dropped to the next lower standard length. In surfaced lumber, board footage is measured before surfacing.

Unless otherwise specified, reference to percentages applies to board feet and not to the number of pieces. See page 56 for measurement regulations concerning kiln dried lumber.

Formula to calculate Surface Measure

$(\text{Actual } W \times \text{Std. } L) / 12 = \text{SM Rnd.}$

Actual W = Full width including fractions.

Note: End Tally refers to the method of board footage measurement where lumber is tallied on a 12 Ft. basis as described in paragraph 21 except all width measurements are taken from the ends of boards after the lumber has been stacked in bundles.

It is recognized that there will be some minor differences in end tally measurement from "board measure" method. In cases of footage dispute caused by the use of both measurement methods, the footage as determined by "board measure" will supersede.

17. Tapering lumber in standard lengths shall be measured one-third the length of the piece from the narrow end for surface measure and to record footage on length and width tallies.
18. Random width lumber of standard grades and thicknesses shall be tallied surface measure and this tally shall be the number of feet, board measure, of 1" lumber. In lumber thicker than 1" the tally so obtained is multiplied by the standard thickness as expressed in inches and fractions of an inch.

Except squares, lumber less than 1" thick shall be counted surface measure.

19. Strips and stock-widths shall be tallied and counted as of their nominal specified widths and lengths.
20. Rough dimension stock shall be counted as of the nominal specified size. When surfaced it shall be counted as of the nominal rough size required in its manufacture.

Tallying on 12 Ft. Basis

21. The terms "export tally," "width and length tally" and "tally on 12 ft. basis" are synonymous. The term "tally on 12 ft. basis" is more definite because the width of 12' lumber is the same as the surface measure on the board rule. On this basis, the lengths are tallied separately. In tallying the widths, pieces measuring to the even half inch are alternately counted as of the next higher or lower width. Fractions below the half inch are dropped and fractions above the half inch are counted as of the next higher width. After the tally is figured, the proper fraction is added or subtracted in order to obtain the correct measure, thus: for 4' lengths, divide the total by 3; 6' divide by 2; 8' subtract 1/3; 9' subtract 1/4; 10' subtract 1/6; 11' subtract 1/12; 13' add 1/12; 14' add 1/6; 15' add 1/4; 16' add 1/3; 5' and 7' multiply by the length and divide by 12. A short method to figure width and length tallies is to multiply the width by number of pieces for each width. Multiply this total by length of pieces and divide by 12. If lumber is thicker than one inch, multiply by thickness. This method of tallying should not be confused with tallying stock widths such as 1 x 6", 1 x 8", etc.

Formula to calculate Surface Measure (Length & Width Tally)

((Nominal W x # pcs.) x Std. L)/12 = SM Rnd.

Nominal W = Width rounded to nearest inch

Season Checks

22. Season checks are considered ordinary and are admitted in clear face cuttings if they will dress out at standard surfaced thickness. Season checks that do not impair the strength are admitted in Sound Cuttings and Construction grades.

Sapwood – Heartwood

23. Unlimited sapwood or heartwood is admitted unless otherwise specified. Contracts for special grades under a heartwood or sapwood

specification shall state the maximum or minimum percentage of heartwood or sapwood desired and how it shall be calculated, whether in width, length, girth, facial or surface area.

Stain

24. Stain shall not be admitted in clear-face cuttings unless it will dress out in surfacing to standard thickness for surfaced lumber, except in species where rules specifically state stain is admitted.
25. When an order or contract specifies "free from stain," stain shall not be admitted unless it will dress out in the required cutting area in surfacing to standard thickness for surfaced lumber.
26. Stain, including spots in which the disintegration has not proceeded far enough to soften or otherwise change the hardness of the wood perceptibly, will be admitted in grades of species where the rules specifically state stain is admitted or in grades of species specifying Sound Cuttings.

Streaks & Spots

27. Mineral streaks and spots, and streaks and spots of similar nature, will be admitted in the cuttings unless otherwise specified in the grading rules for the respective species.

Piling sticker marks showing a variation in color but not containing stain shall be admitted.

Burls

28. A burl is a swirl or twist in the grain of the wood which usually occurs near a knot but does not contain a knot. Those containing sound centers are admitted in the cuttings except when otherwise specified.

Cutting

29. A portion of a board or plank obtained by crosscutting or ripping, or by both. In the Common grades, a cutting shall be flat enough to surface two sides to standard surfaced thickness after it has been removed from the board. In the grades of Selects and Better the entire board must be flat enough to surface two sides to standard surfaced thickness (for skip limitations, see page 58 under the rule "Clear-Face" Cutting Grade). Diagonal cuttings are not permitted.

Clear-Face Cutting

30. A cutting having one clear face (ordinary season checks are admitted) and the reverse side sound as defined in Sound Cutting. The clear face of the cutting shall be on the poor side of the board except when otherwise specified.

Sound Cutting

31. A cutting free from rot, pith, shake and wane. Texture is not considered. It will admit sound knots, bird pecks, stain, streaks or their equivalent, season checks not materially impairing the strength of a cutting, pin, shot and spot worm holes. Other holes 1/4" or larger are admitted but shall be limited as follows: one 1/4" in average diameter in each cutting of less than 12 units; two 1/4" or one 1/2" to each 12 units and on one side only of a cutting.

Check

32. A length-wise separation of the wood that usually extends across the rings of annual growth and commonly results from stresses set up in wood during seasoning.

Mineral Streak

33. An olive to greenish-black or brown discoloration of undetermined cause in hardwoods.

Sound Knot

34. A knot that is solid across its face, hard as the surrounding wood and shows no indication of decay.

Quartered Lumber

35. In species where figure is not required, pieces shall be considered quartered when 80% of the surface of the required cuttings in the aggregate shows the radial grain at an angle of 45° or less with one face.
36. In ten percent of a shipment of quartered lumber when shipping dry, the required cuttings may be 1/16" scant in thickness on one edge provided the other edge of the cuttings is full standard thickness in thicknesses up to and including 7/4"; in 8/4" and thicker they may be 1/8" scant on one edge, provided the other edge is full standard thickness.

METHODS USED IN APPLYING INSPECTION RULES

37. **CUTTING UNIT METHOD:** the method used to measure the amount of useable wood in boards. A cutting unit is 1" wide and 1 foot long or the equivalent. There are 12 cutting units in 1 square foot or 1 foot of surface measure. Cutting units are calculated by multiplying the width of a cutting measured in inches and fractions of an inch by the length measured in feet and fractions of a foot. The number of units obtained in the cuttings of a board are totaled and used as one requirement in the individual grades. To determine the number of cutting units required by each grade, the surface measure is multiplied as follows:

Yield requirement

- | | | |
|------------|----------|------------------------------------|
| • 11.64/12 | 97% | multiply surface measure by 11.64. |
| • 11/12 | (91.67%) | multiply surface measure by 11. |
| • 10/12 | (83.33%) | multiply surface measure by 10. |
| • 9/12 | 75% | multiply surface measure by 9. |
| • 8/12 | 66.67% | multiply surface measure by 8. |
| • 6/12 | 50% | multiply surface measure by 6. |
| • 4/12 | 33.33% | multiply surface measure by 4. |
| • 3/12 | 25% | multiply surface measure by 3. |

Example: A board 9-3/8" wide by 16' long contains the following Clear-Face Cuttings:

8-1/2" x 6	=	51 cutting units
3" x 9-1/2	=	28-1/2 cutting units
4" x 2-3/4	=	11 cutting units
3" x 3-1/3'	=	10 cutting units
Total	=	100-1/2 cutting units

The surface feet of the board is counted 12, and the number of cutting units required for 66-2/3% cutting is $8 \times 12 = 96$ cutting units.

This board contains more than 66-2/3% cutting, therefore it grades Standard No. 1 Common provided it does not contain pith in excess of one-half its length in the aggregate.

38. **TO DETERMINE** one-sixth the surface of the piece multiply the width by the length by two.

Example: A Poplar board 6" wide and 8' long could not exceed 96 square inches of blue mineral to qualify for FAS.

- 39 TO DETERMINE one-sixth the length of a board, multiply the length in feet by 2. The result will be the required number of inches in length; thus, one-sixth the length of a 6' board is 12".
One-sixth the length of a 7' board is 14".
- 40 TO DETERMINE one-third the length of a board, multiply the length by 4. The result will be the required number of inches in length.
42. TO DETERMINE $1/12$ of the required cutting area, the amount of square inches permitted is equivalent to the number of cutting units required for the grade. Example: A 6' SM needs 60 cutting units for FAS and would be permitted 60 square inches of mineral in FAS Red Oak.
43. TO DETERMINE one-twenty-fourth of the cutting area, divide the number of required cutting units by two.
- Example:** 6' SM needs 60 cutting units for FAS and would be permitted 30 square inches of mineral streak for FAS White Maple.
44. TO DETERMINE the average width of lumber tallied on the 12' basis: Divide the total width in inches by the total number of pieces. The result is the average width in inches.
45. TO DETERMINE the average width of lumber when not tallying on 12' basis: Tally the surface feet of each piece in separate columns under each length. After totaling surface feet, the proper fraction is applied to change surface feet to width in inches; thus, for 4' length, multiply the surface feet by 3; for 5' multiply by $2\frac{2}{5}$; for 6' multiply by 2; for 7', multiply by $1\frac{5}{7}$; for 8' multiply by $1\frac{1}{2}$; for 9' multiply by $1\frac{1}{3}$; for 10' multiply by $1\frac{1}{5}$; for 11' multiply by $1\frac{1}{11}$; for 12' the surface feet is the same as the surface width; for 13' subtract $1/13$; for 14' subtract $1/7$; for 15' subtract $1/5$; for 16' subtract $1/4$. When the surface feet has been translated to width in inches the method of determining the average width of the lumber tallied on the above basis is the same as for lumber tallied on the 12' basis.

46. TO DETERMINE the average length of lumber, multiply the number of pieces by their length, which will give the total lineal footage, and divide the result by the total number of pieces.

Example:

10 pieces 10' = 100 lineal feet

8 pieces 12' = 96 lineal feet

6 pieces 14' = 84 lineal feet

12 pieces 16' = 192 lineal feet

Total 36 pieces = 472 lineal feet

Dividing 472 by 36 equals 13.1' average length.

47. TO DETERMINE the average diameter of a knot or hole, add the maximum length and maximum width and divide by two.
48. TO DETERMINE the amount of thin lumber obtained by resawing a given amount of various thicknesses:
- For 5/4 resawn once, multiply the original surface measure by 2;
 - For 6/4 resawn once, multiply the original surface measure by 2; resawn twice multiply by 3; resawn three times, multiply by 4;
 - For 8/4 resawn twice, multiply the original surface measure by 3.

Note: *When lumber has been resawn and sold as such, the pieces obtained from the original board should be kept together, inspected on the outer surfaces and tallied as one piece. When the pieces are not kept together and it is not possible to inspect them as one piece, then each piece must be inspected and tallied individually. Before applying such inspection at destination the buyer should inform the seller of the condition of the lumber and they should agree on the basis of the inspection.*

**STANDARD GRADES
(SUBJECT TO GENERAL INSTRUCTIONS)**

49. The standard grades of hardwood lumber are:
- | Clear Face Cuttings Grades | Sound Cuttings Grades |
|-----------------------------------|------------------------------|
| FAS | No. 2B Common |
| FAS One Face (F1F) | No. 3B Common |
| Selects | Sound Wormy |
| No. 1 Common | |
| No. 2A Common | |
| No. 3A Common | |
50. Selects and No. 1 Common may be combined as one grade.
51. No. 2A Common and No. 2B Common may be combined as one grade, No. 2 Common, and when so combined and specified should be understood to include all the No. 2A Common that the logs produce.
52. No. 3A Common and No. 3B Common may be combined as one grade, No. 3 Common, and when so combined and specified should be understood to include all the No. 3A Common that the logs produce.

FAS

53. Widths: 6" and wider.
54. Lengths: 8' to 16'.
55. Minimum cutting: 4" wide by 5' long, or 3" wide by 7' long.
56. No piece shall be admitted which contains pith, boxed or showing, exceeding in the aggregate in inches in length the surface measure in feet.
57. Wane shall not exceed on either edge of the piece over one-half the length in the aggregate.
58. Splits shall not exceed in the aggregate in inches in length twice the surface measure of the piece, except when one foot or shorter and covered by Paragraph 59.

Splits may diverge up to one inch to the lineal foot, except when one foot or shorter and covered by Paragraph 59.

In special widths 10 in. or wider, splits shall not exceed in the aggregate in inches in length the surface measure of the piece, except when one foot or shorter and covered by Paragraph 59.

59. Within one lineal foot from the ends of the boards of standard lengths there must be 50% clear wood, and not less than 25% of sound wood in the aggregate.
60. The average diameter of any knot, or hole, shall not exceed in inches one-third the surface measure of the piece in feet, except when it lies entirely within the first lineal foot of a board and is covered by Paragraph 59.
61. Warp and Cup shall be admitted if the entire board will surface two sides to standard surfaced thickness in accordance with the rules for lumber surfaced two sides, except that cupped or warped pieces 12" and wider are admitted if they can be ripped to produce two pieces each of which would grade FAS and meet this warp and cup requirement. The exception as to pieces 12" and wider shall not apply to contracts for lumber in special widths 10" and wider.
62. FAS admits pieces that will yield 10/12 (83-1/3%) or 11/12 (91-2/3%) clear-face cuttings as follows: 4' to 7' surface measure, 10/12 (83-1/3%) in one cutting; 8' to 11' in two cuttings; 12' to 15' in three cuttings; 16' and over in four cuttings, except that pieces 6' to 15' surface measure will admit one additional cutting to yield 11/12 (91-2/3%).

Note: *A short method of determining the maximum number of cuttings permissible in pieces of 4' and over is to divide the surface measure by four, dropping fractions, except not more than 4 cuttings are admitted. 6' to 15' SM, inclusive, will admit one additional cutting if yielding 11/12 (91-2/3%) clear face.*

63. Admits also pieces 6" and wider of 6' to 12' surface measure that will yield 11.64/12 (97%) in two clear-face cuttings of any length full width of the board.

FAS One Face (F1F)

64. Shall grade not below FAS on the better face for the particular species, and not below No. 1 Common on the reverse side. The reverse side of the cuttings in both FAS and No. 1 Common are not required to be sound.

Wane on the No. 1 Common side is limited to the following: the width of wane from both edges, when added together, cannot exceed $\frac{1}{3}$ the total width of the piece. The total length of wane on either edge cannot exceed $\frac{1}{2}$ the length.

Selects

65. Widths: 4" and wider.
66. Lengths: 6' to 16'.
67. The grading requirements for FAS in Paragraphs 55 to 63 inclusive shall apply to the better face of the piece.
68. SELECTS admits: Pieces of 2' and 3' surface measure that will yield 100% or $\frac{11}{12}$ (91- $\frac{2}{3}$ %) clear in one cutting on the better face with the reverse side of the board grading not below No. 1 Common. Will also admit pieces of 4' and over surface measure that will grade FAS on the better face with the reverse side of the board grading not below No. 1 Common. The reverse side of the cuttings in both FAS and No. 1 Common are not required to be sound.

In pieces 6" and wider, wane on the No. 1 Common side is limited to the following: the width of wane from both edges, when added together, cannot exceed $\frac{1}{3}$ the total width of the piece. The total length of wane on either edge cannot exceed $\frac{1}{2}$ the length.

69. In pieces 4" and 5" wide, wane on either face is limited to the following: the width of wane from both edges when added together, cannot exceed $\frac{1}{3}$ the total width of the piece. The total length of wane on both edges, when added together, cannot exceed $\frac{1}{2}$ the length.

No. 1 Common

70. Widths: 3" and wider, admitting 5% of 3" widths.
71. Lengths: 4' to 16'.

72. No piece shall be admitted which contains pith, boxed or showing, exceeding in the aggregate one-half its length.
73. Minimum cutting: 4" wide by 2' long or 3" wide by 3' long, except that in pieces less than 3" wide, under the minimum width rule, Paragraph 10, cuttings the full width of the piece are admitted.
74. No. 1 Common admits pieces that will yield clear-face cuttings as follows:

Surface measure of piece	Required yield	Number of cuttings
1'	12/12 (sm x 12 or 100 %)*	1
2'	9/12 (75%)	1
3' and 4'	8/12 (66-2/3%)	1
	9/12 (75%)	2
5' to 7'	8/12 (66-2/3%)	2
	9/12 (75%)	3
8' to 10'	8/12 (66-2/3%)	3
	9/12 (75%)	4
11' to 13'	8/12 (66-2/3%)	4
14' and over	8/12 (66-2/3%)	5

*Clear both faces.

Note: A short method of determining the maximum number of cuttings permissible in pieces of 3' and over is to add one to the surface measure of the pieces in feet and divide by three, dropping fractions; except not more than five cuttings are allowed and pieces of 3' to 10' surface measure inclusive will admit one additional cutting if yielding 75% clear face.

No. 2A Common & No. 2B Common

Note: The grade of No. 2 Common is divided into two categories: No. 2A Common (clear cuttings) and No. 2B Common (Sound Cuttings).

75. Widths: 3" and wider.
76. Lengths: 4' to 16'.
77. There is no restriction as to pith when outside of the required cutting area.
78. Minimum cutting: 3" wide by 2' long, except that in pieces less than 3" wide under the minimum width rule, Paragraph 10, cuttings the full width of the piece are admitted.

79. No. 2A Common admits pieces that will yield clear-face cuttings as follows:

Surface measure of piece	Required yield	Number of cuttings
1'	8/12 (66-2/3%)	1
2' and 3'	6/12 (50%)	1
	8/12 (66-2/3%)	2
4' and 5'	6/12 (50%)	2
	8/12 (66-2/3%)	3
6' and 7'	6/12 (50%)	3
	8/12 (66-2/3%)	4
8' and 9'	6/12 (50%)	4
10' and 11	6/12 (50%)	5
12' and 13'	6/12 (50%)	6
14' and over	6/12 (50%)	7

Note: A short method of determining the maximum number of cuttings permissible in pieces of 2' and over is to divide the surface measure by two, dropping fractions; except that not more than seven cuttings shall be allowed. Pieces 2' to 7' surface measure, inclusive, will admit one additional cutting if yielding 66-2/3% clear face.

Note: No. 2B Common – All the requirements of the grade No. 2A Common apply except that cuttings will be sound as defined in Sound Cuttings.

No. 3A Common

80. Widths: 3" and wider.
81. Lengths: 4' to 16'.
82. No. 3A Common admits pieces that will yield 4/12 (33-1/3%) clear-face cuttings not less than 3" wide by 2' long, except that in pieces less than 3" wide under the minimum width rule Paragraph 10, cuttings the full width of the piece are admitted, also pieces which grade not below No. 2A Common on the better face, the reverse side of the cuttings sound. There is no limit to the number of cuttings.

No. 3B Common

83. Widths: 3" and wider.
84. Lengths: 4' to 16'.
85. No. 3B Common admits pieces that will yield 3/12 (25%) sound cuttings not less than 1-1/2" wide and containing not less than 36 square inches. There is no limit to the number of cuttings.

Below Grade

86. Lumber poorer in quality than the lowest grade described in these rules shall be tallied and reported as "Below Grade."

Sound Wormy

87. Sound Wormy shall grade not below No. 1 Common except that the natural characteristics of worm holes, bird pecks, stain, sound knots not exceeding 3/4" in diameter are admitted. Other sound defects which do not exceed in extent or damage the defects described are admitted in the cuttings. Unless otherwise specified, Sound Wormy shall include the full product of the log in No. 1 Common and Better Sound Wormy.

Note: *When lumber is purchased under specifications combining the term "Sound Wormy" with the names of Standard Grades, such as "FAS Sound Wormy," "No. 1 Common and Better Sound Wormy," the required cutting yield shall be the same as specified in the Standard Grades, except that the quality of the cuttings shall be as defined in the Standard Grade of "Sound Wormy."*

WHND

When lumber is purchased under specifications combining the term "worm holes no defect" with the names of standard grades such as "FAS, worm holes no defect," "No. 1 Common & Better, worm holes no defect," the required yield shall be the same as specified under Standard Grades, except that worm holes, bird pecks and streaks are admitted without limit.

	FAS	F1F	SELECT	#1 COM	#2A & 2B
Minimum Size Board	6" x 8'	Same as FAS for species being graded	4" x 6'	3" x 4'	3" x 4'
Minimum Size Cutting	4" x 5' 3" x 7'	Better Face to Grade FAS Poor Face to Grade #1 Common		4" x 2' 3" x 3'	3" x 2'
Basic Yield	SM x 10 83-1/3%			SM x 8 66-2/3%	SM x 6 50%
Formula to Determine Number of Cuts	$\frac{SM}{4}$ (4 max)			$\frac{SM + 1}{3}$ (5 max)	$\frac{SM}{2}$ (7 max)
SM Needed to Take Extra Cutting	6-15' SM			3-10' SM	2-7' SM
Extra Yield Needed for Extra Cutting	SM x 11 91-2/3%			SM x 9 75%	SM x 8 66-2/3%
Special Yields	97% Rule - 2 cuts full widths any length; Pcs. 6" & wider with 6-12' SM SM x 11.64 for Yield			97% Rule - On Better Face	97% Rule - On Better Face; 2' & 3' SM to be 100% clear or SM x 11 in one cutting

#3A COM	#3B COM	FAS Limits	
3" x 4'	3" x 4'	Pith = SM in inches	Wane in FAS 1 FACE FAS limitation applies to Better Face #1 Common side: 1/3 W or 1/2 L Widest wane added together; Length can be on both edges
3" x 2'	Not less than 1-1/2" wide containing 36 sq. inches	Wane = 1/2 Length Knot = 1/3 SM	Wane in Selects <u>Pcs. 6" & Wider</u> FAS limitation applies to Better Face. #1 Common side: 1/3 W or 1/2 L Widest wane added together. Length can be on both edges.
SM x 4 33-1/3%	SM x 3 25%	Warp = Entire board must be flat enough to S2S to S.S.T.	<u>Pcs. 4" & 5" Wide</u> 1/3 W or 1/2 L applies to both faces. Add widest wane together. Add total length of wane from both edges.
Unlimited	Unlimited Sound Cuttings	Splits: Not to exceed 2 x SM or 12" whichever is greater Splits shall not diverge 1" in 12"	
		First Lineal Rule: Applies to both ends of Board to contain not less than 50% clear wood, 25% sound wood.	
#2A Com on Better Face and reverse side of cuttings sound; will also qualify for 3A Com		1 Common Limit Pith cannot exceed 1/2 the length in the aggregate.	NOTE: This chart summarizes the main requirements for the standard grades. For complete information, consult the appropriate section of the NHLA Rule Book.

SPECIAL COMBINED & FACE GRADES

No. 1 Common & Better

The full run of the logs with all grades below No. 1 Common excluded.

No. 2A Common & Better (Log Run)

The full run of the logs, excluding all grades below No. 2A Common as defined for the various species under "Standard Inspection."

No. 3B Common & Better (Mill Run)

The full run of the logs, No. 3B Common and Better.

No. 1 Common Face

The same as the Standard grade of No. 1 Common, except that the grade shall be determined from the better face. The reverse side of the cuttings shall be sound.

No. 2A Common Face

The same as the Standard grade of No. 2A Common, except that the grade shall be determined from the better face. The reverse side of the cuttings shall be sound.

All Species – Lengths 17 Feet & Over (When Specified)

In grades FAS, F1F, Selects and No. 1 Common, pieces over 17' in length containing more than 16' surface measure are allowed one additional cutting for each additional 4' surface measure, except that not more than 7 cuttings will be admitted in any one piece.

STANDARD INSPECTION BY SPECIES

Any species of Hardwood not specifically listed in the following pages shall be graded using the Standard Grades

**Ash, Beech, Birch, Sassafras, Hackberry, Buckeye, Box Elder,
Sycamore, Tanoak, Madrone & Golden Chinkapin**

**FAS, F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON, NO. 3A
COMMON, NO. 2B COMMON, NO. 3B COMMON: Standard**

LONG ASH: Specified lengths of 18' and over in Ash will admit 5" pieces in FAS.

Red Birch (When Specified)

Each required cutting shall have one clear heartwood face.

FAS: Standard, except: Widths 5" and wider; pieces 5" wide containing 3' and 4' surface measure shall be clear, pieces 5" wide containing 5' to 7' surface measure shall yield 11/12 (91-2/3%) clear face in one cutting.

F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON: Standard

Sap Birch (When Specified)

Same as Red Birch with the following exception: That each required cutting shall have one clear sapwood face.

Hard Maple

FAS, F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON, NO. 3A COMMON, NO. 2B COMMON, NO. 3B COMMON: Standard

Note: *Unless otherwise specified, Hard Maple will be unselected for color.*

Sap Hard Maple (When Specified)

Each required cutting shall have one clear sapwood face.

FAS: Standard except: Widths 5" and wider; pieces 5" wide containing 3' and 4' surface measure shall be clear, pieces 5" wide containing 5' to 7' surface measure shall yield 11/12 (91-2/3%) clear face in one cutting.

F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON: Standard

White Maple

Note: *Orders should specify Hard Maple or Soft Maple.*

"White" as used in these rules means sapwood. The terms "No. 1 White Maple" and "No. 2 White Maple" designate the sapwood requirements of the cuttings in all grades.

White Maple is divided into No. 1 White Maple and No. 2 White Maple. In No. 1 White Maple both faces and both edges of the required cuttings shall be sapwood. In No. 2 White Maple one face and both edges of the required cuttings shall be sapwood and the reverse side of the cuttings not less than 50% sapwood.

FAS: Standard, except: Widths: 4" and wider. Pieces 4" and 5" wide shall be clear.

F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON: Standard

Note: *In No. 2A Common and Better, mineral streaks and spots, and streaks and spots of similar nature, exceeding in aggregate area one twenty-fourth of either face of the required cuttings shall not be admitted. (See Page 12, Par. 43)*

Piano Action Hard Maple

GRADES – FAS, F1F, SELECTS & NO. 1 COMMON:

Cuttings in these grades to be straight grained sapwood, clear both faces. The board will be considered straight grained when the grain does not diverge more than 1 in. in twelve inches of length in relation to the edge of the board in the required cutting area. Swirly grain, cross grain, curly grain, birds-eye, mineral streaks and spots and season checks shall not be admitted on either face of the required cuttings.

FAS: Standard, except: Widths: 4" and over. Pieces 4" and 5" wide shall be clear.

F1F, SELECTS, NO. 1 COMMON: Standard

Note: *A National Hardwood Lumber Association inspector will use his best judgment in considering straight grain, swirly grain, cross grain, curly grain, birds-eye, mineral streaks and spots and season checks, but the Association will not assume liability for these features.*

Basswood

FAS, F1F, SELECTS, NO. 1 COMMON: Standard

NO. 2A COMMON: Standard except stain is admitted.

NO. 2B COMMON: Standard

NO. 3A COMMON: Standard, except: Cuttings to be sound as defined in "Sound Cutting."

NO. 3B COMMON: Standard.

Note: *In Basswood, black or brown spots or streaks are admitted in the cuttings in No. 2A Common and Better but when exceeding in aggregate area 1/12 the total area of the required cuttings, will reduce a piece one grade only. (See Page 12, Par. 42) In F1F and Selects, limitation applies to better face only. In FAS, limitation exceeding on both faces will reduce the grade to 1 Common.*

Note: *Dormant twig buds to be considered as burls.*

Basswood Key Stock

GRADES – FAS, F1F, SELECTS & NO. 1 COMMON:

Same as Basswood grades except:

- The face side of each required cutting shall be all sapwood with the reverse side not less than 90% sapwood.
- Each required cutting shall be free of spots, streaks and curly or cross grain.

Note: *A National Hardwood Lumber Association inspector will use his best judgment in considering birdseye, streaks and spots, excessive curly and cross grain, but the Association will not assume liability for these features.*

Soft Elm

**FAS, F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON,
NO. 2B COMMON:** Standard

NO. 3A COMMON: Standard, except: Cuttings to be sound as defined in "Sound Cutting."

NO. 3B COMMON: Standard.

Note: *In Soft Elm, bird pecks not over 3/8" average diameter are admitted in the cuttings in No. 2A Common and Better, but when exceeding in aggregate area 1/12 the total area of the required cuttings, will reduce a piece one grade only. (See Page 12, Par. 42)*

Soft Maple

**FAS, F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON,
NO. 2B COMMON:** Standard

NO. 3A COMMON: Standard, except: Cuttings to be sound as defined in "Sound Cutting."

NO. 3B COMMON: Standard.

Note: *When Soft Maple is sold WHND (worm holes no defect) knots or their equivalent, not exceeding 1/4" in their greatest dimension, sound or containing unsound centers not over 1/8" in diameter, shall be admitted in the cuttings.*

Cherry

FAS, F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON, NO. 2B COMMON, NO. 3A COMMON, NO. 3B COMMON:
Standard

Note: *Pin Knots shall be admitted in the cuttings. Gum streaks and spots are admitted without limit. (Par. 27)*

Hickory, Pecan & Rock Elm

FAS: Standard, except: Widths: 4" and wider, pieces 4" and 5" wide shall cut 11/12 (91-2/3%) clear face in one cutting.

F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON, NO. 2B COMMON: Standard

NO. 3A COMMON: Standard, except: Cuttings to be sound as defined in "Sound Cutting"

NO. 3B COMMON: Standard.

Note: *Bird pecks not over 3/8" average diameter are admitted in the cuttings in No. 2A Common and Better, but when exceeding in aggregate area 1/12 the total area of the required cuttings, will reduce a piece one grade only. (See Page 12, Par. 42)*

Note: *A National Hardwood Lumber Association Inspector will not make any distinction in species between Hickory and Pecan.*

Cabinet Rock Elm, Cabinet Hickory & Cabinet Pecan (When Specified)

Standard grades apply in all respects

Red Oak, White Oak, & Locust (Plain Sawn)

FAS, F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON, NO. 3A COMMON, SOUND WORMY, NO. 2B COMMON, NO. 3B COMMON: Standard

Note: *In Plain Sawn Red Oak, White Oak, and Locust, mineral streaks and spots, and streaks and spots of similar nature, exceeding in aggregate area 1/12 the total area of the required cuttings, will reduce a piece one grade only. (See Page 12, Par. 42) In F1F and Selects, limitation applies to better face only. In FAS, limitation exceeding on both faces will reduce the grade to 1 Common.*

Quarter Sawn Red Oak, White Oak, and Locust

90% of one face of the required cutting area in the aggregate shall show figure.

FAS: Standard, except: Widths 5" and wider; pieces 5" wide containing 3' and 4' surface measure shall be clear, pieces 5" wide containing 5' to 7' surface measure shall yield 11/12 (91-2/3%) clear face in one cutting.

FAS, F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON, NO. 3A COMMON, SOUND WORMY, NO. 2B COMMON, NO. 3B COMMON: Standard

Note: *In Quarter Sawn Red Oak, White Oak, and Locust, mineral streaks and spots, and streaks and spots of similar nature, exceeding in aggregate area 1/12 the total area of the required cuttings, will reduce a piece one grade only. (See Page 12, Paragraph 42) In F1F and Selects, limitation applies to better face only. In FAS, limitation exceeding on both faces will reduce the grade to 1 Common.*

Quartered Sycamore

Quarter Sawn Sycamore shall be graded according to the rules for Quarter Sawn Oak except that mineral streaks and spots and streaks and spots of similar nature are admitted without limit.

Poplar (American Tulipwood)

Note: *Mineral not exceeding in the aggregate one-sixth of the surface of the piece is admitted in FAS and on the FAS side of F1F and Selects. It is not limited in the Common grades. (See Page 11, Par. 38)*

FAS, F1F, SELECTS: Standard

NO. 1 COMMON: Standard, except slight stain is admitted.

Note: *Stain will be light gray when the piece is surfaced two sides to standard surfaced thickness.*

NO. 2A COMMON: Standard, except stain is admitted.

NO. 2B COMMON: Standard.

NO. 3A COMMON: Standard, except cuttings to be sound as defined in "Sound Cutting."

NO. 3B COMMON: Standard.

Walnut & Butternut

When Walnut has been steamed and is sold and specified as "Steamed Walnut," sapwood shall not be considered.

FAS: Standard, except:

- Minimum cutting 4" wide by 3' long, or 3" wide by 6' long.
- Widths: 5" and wider.
- Lengths: 6' and longer.
- Pieces 5", 6" and 7" wide admit sapwood on either or both faces which does not exceed in the aggregate one-sixth the width of the piece; 8" and wider admit sapwood on either or both faces which does not exceed in the aggregate one-fourth the width of the piece. Any part of the sapwood allowed may be included in the cuttings.
- Pieces 3' to 7' surface measure shall yield 10/12 (83-1/3%) clear face in two cuttings; 8' and over surface measure in three cuttings, except that pieces of 12' and over surface measure which will yield 11/12 (91-2/3%) clear face with one additional cutting, are admitted.

FAS (6' & 7' long only): Graded on Standard Defect basis listed on page 29.

- Widths: 5" and wider.
- Admits sapwood to the same extent as admitted in the standard grade of FAS walnut.
- Admits wane along the edges not exceeding in the aggregate one-sixth the length of the piece, or its equivalent at one end or both ends, not exceeding one-half the thickness of the piece, and not exceeding 1/2" in width in 1/2" to 3/4" lumber; 3/4" in width in 1" to 2" lumber and 1" in width in 2-1/2" and thicker lumber.
- Admits 6" of split in one end or its equivalent in both ends.
- Pieces 5", 6" and 7" wide admit one standard defect; 8" and wider admit two standard defects. See Standard Defects on page 29.

F1F: Pieces 6' and 7' long shall grade FAS on the better face. The reverse side of the board shall be sound as defined in Sound Cutting or the reverse side of the board grading not below No. 1 Common. Pieces 8' and longer shall grade FAS on the better face. The reverse side of the cuttings shall be sound as defined in Sound Cutting or the reverse side of the board grading not below No. 1 Common.

SELECTS: Standard, except:

- Pieces of 2' surface measure shall be clear; 3' and over surface measure shall yield cuttings as defined in FAS Walnut.
- Minimum cutting: 4" wide by 3' long, or 3" wide by 6' long.

- Lengths: 6' and longer.
- Pieces 4" wide admit sapwood on the better face which does not exceed in the aggregate one-sixth the width of the piece. 5" and wider admit sapwood on the better face as in FAS. Sapwood is admitted without limit on the reverse side.

NO. 1 COMMON: Standard, except:

- The restrictions as to percentage of widths and lengths do not apply. All widths and lengths shall yield 66-2/3% clear-face cuttings except 1' sm must yield 12 cutting units.
- There is no limit to the number of cuttings.
- Each cutting shall be clear and black on the heartwood side of the board, and may be one-half sapwood in the aggregate on the sapwood side of the board. The grade shall be determined from the black (heartwood) side of the board with the reverse side of the cuttings sound as defined in Sound Cutting; the sapwood side of the board otherwise shall yield 66-2/3% clear-face cuttings.

NO. 2A COMMON: Standard, except:

- There is no limit to the number of cuttings.
- Minimum size of cutting: 2" or wider containing 72 square inches.
- Each cutting shall be clear and black on the heartwood side of the board and may be all sapwood on the sapwood side of the board.
- The grade shall be determined from the black (heartwood) side of the board with the reverse side of the cuttings sound; the sapwood side of the board otherwise shall yield 50% clear-face cuttings.

NO. 2B COMMON: All the requirements for No. 2A Common Walnut shall apply except cuttings to be sound as defined in Sound Cutting.

NO. 3 COMMON: Standard to include No. 3A Common and 3B Common as one grade

Standard Defects (Applies to 6' & 7' FAS Walnut)

The average of the maximum length and maximum width shall be used in measuring the size of knots or holes.

One knot or hole 1-1/4" in diameter is a standard defect.

When located away from the edges and ends where they cannot be admitted as the equivalent to wane defects, the following shall be considered as standard defects:

Four pin worm holes or their equivalent equals one defect.

Three spot worm holes or their equivalent equals one defect.

Two knots or other defects, the diameter of which when added together do not exceed 1-1/4" equals one defect.

Not more than two standard defects of the above types can be admitted to the piece, each additional pin worm hole, spot worm hole, knot or hole 5/8" or less shall be considered as one additional standard defect.

Pith not exceeding 2-1/2" in length in the aggregate shall be considered one standard defect.

Defects larger than one standard defect, excepting wane and split, shall be considered on the following average diameter measurement:

- 2-1/2" knots or their equivalent shall be two standard defects.
- 3-3/4" knots or their equivalent shall be three standard defects.
- 5" knots or their equivalent shall be four standard defects.

One split equal in length in inches to the surface measure of the piece in feet and diverging not more than 1" to the foot in length.

Wane or its equivalent in other defects, 1" wide, one-sixth the length of the piece along the edges, or its equivalent at one or both ends. In the wane defect, wane may extend through the full thickness of the piece showing on both faces.

Worm, grub, knot and rafting pin holes, not exceeding in extent one standard knot defect described above.

EQUIVALENT DEFECTS: Other defects not defined as standard defects, that do not damage the piece more than the standard defects allowed, are equivalent defects and must be so considered by the inspector.

Sap Gum, Cottonwood, Black Gum, Tupelo, Magnolia, Willow

Note: *A National Hardwood Lumber Association Inspector will not make any distinction in species between Black Gum and Tupelo.*

FAS, F1E, SELECTS, NO. 1 COMMON, NO. 2A COMMON, NO. 2B

COMMON: Standard except, unless otherwise specified, stain is admitted in all grades

NO. 3A COMMON: Standard, except: Cuttings to be sound as defined in "Sound Cutting."

NO. 3B COMMON: Standard.

Note: *Sap Gum is lumber produced from the Sweet Gum tree containing sapwood in excess of the quantity admitted in the grades of Red Gum lumber. For the grading rules regarding the various Gum separations, see below.*

Quartered Sap Gum, Quartered Black Gum & Quartered Tupelo

FAS: Standard. Except: Widths 5" and wider; pieces 5" wide containing 3' and 4' surface measure shall be clear, pieces 5" wide containing 5' to 7' surface measure shall yield 11/12 (91-2/3%) clear-face in one cutting.

F1F, SELECTS, NO. 1 COMMON, NO. 2A COMMON:

- No figure is required.
- Stain is admitted in all grades.
- Pieces below the grade of No. 2A Common shall be graded as Sap Gum or Black Gum.

Ribbon Stripe: When ribbon stripe figure is specified each piece shall be selected for the stripe effect caused by the wavy grain brought out in quarter sawing. One face of each required cutting shall show 90% in the aggregate of such ribbon stripe figure.

Plain Red Gum

Red Gum is lumber produced from the Sweet Gum tree, containing sufficient heartwood to be admitted into the grades defined under the caption of Red Gum.

Stain is admitted in the sapwood in all grades. Any part of the sapwood allowed may be included in the cuttings.

FAS: Standard, except: FAS will admit 1" of sapwood in the aggregate on one face and one-Fifth of the surface in the aggregate on the reverse side.

F1F: Standard.

SELECTS: Standard, except: Pieces 4" and 5" wide and pieces 6' and 7' long shall be free of sapwood on one face; pieces 6" and wider 8' and longer will admit 1" of sapwood in the aggregate on one face, such faces shall meet the

grading requirements of Standard Selects. Unlimited sapwood is admitted on the reverse side.

NO. 1 COMMON: Standard, except: Each cutting shall have one clear heartwood face.

NO. 2A COMMON: Standard, except: Each cutting shall have one clear heartwood face. Pieces below the grade of No. 2A Common shall be graded as Sap Gum.

Plain Sawn Red Gum, Figured Wood

Each piece shall be especially selected for markings and color tones of spots and streaks producing a variegated effect on the surface. One face of each required cutting shall show 90% in the aggregate of such markings and color tones, with the exception that unfigured spaces not exceeding 1" by 24" or its equivalent in area between spots and streaks, shall be disregarded.

Otherwise the rules for Plain Red Gum shall apply.

Quartered Red Gum

(No figure is required. Stain is admitted in the sapwood in all grades.)

FAS: Standard, except: Widths 5" and wider; pieces 5" wide containing 3' and 4' surface measure shall be clear, pieces 5" wide containing 5' to 7' surface measure shall yield 11/12 (91-2/3%) clear-face in one cutting.

In FAS, pieces 5" wide shall be free of sapwood on one face; pieces 6" and 7" wide may have 3/4" of sapwood in the aggregate on one face; pieces 8" and wider may have 1" of sapwood in the aggregate on one face. The reverse side of any piece will admit sapwood aggregating one-fifth of its surface. Any part of the sapwood allowed may be included in the cuttings.

SELECTS: Standard, except: Pieces 4" and 5" wide shall be free of sapwood on one face; pieces 6" and 7" wide will admit 3/4" of sapwood and pieces 8" and wider 1" of sapwood in the aggregate on one face, which faces shall meet the grading requirements of Standard Selects. Unlimited sapwood is admitted on the reverse side.

NO. 1 COMMON: Standard, except: Each cutting shall have one clear heartwood face.

NO. 2A COMMON: Standard, except: Each cutting shall have one clear

heartwood face. Pieces below the grade of No. 2A Common shall be graded as Sap Gum.

Ribbon Stripe: When ribbon stripe figure is specified each piece should be selected for the stripe effect caused by the wavy grain brought out in quarter sawing. One face of each required cutting shall show 90% in the aggregate of such ribbon stripe figure.

Quartered Red Gum, Figured Wood

Each piece shall be especially selected for markings and color tones of spots and streaks producing a variegated effect on the surface.

One face of each required cutting shall show 90% in the aggregate of such markings and color tones, except that unfigured spaces not exceeding 1" by 24" or its equivalent in area between spots and streaks, shall be disregarded.

Otherwise the rules for Quartered Red Gum shall apply.

Aspen

FAS, F1E, SELECTS & NO. 1 COMMON: Standard.

NO. 2A COMMON: Standard except stain is admitted.

NO. 2B COMMON: Standard.

NO. 3A COMMON: Standard except: Cuttings to be sound as defined in "Sound Cutting."

NO. 3B COMMON: Standard.

American Chestnut

FAS, F1E, SELECTS & NO. 1 COMMON: Standard, except that worm holes and stain shall be admitted without limit.

SOUND WORMY: Standard, except:

- The size of sound knots admitted is not limited.
- Cuttings to be sound as defined in "Sound Cutting."
- Pith extending three-fourths the length of the piece in the aggregate is admitted.

NO. 2A & No. 2B COMMON: Standard, except: Cuttings to be sound as defined in "Sound Cutting."

NO. 3A COMMON: Standard, except: Cuttings to be sound as defined in "Sound Cutting."

NO. 3B COMMON: Standard.

Aromatic Red Cedar

GRADES – NO. 1 COMMON & BETTER, NO. 2A COMMON:

- Will admit sound knots, white streaks and firm, tight pith in the cuttings, which otherwise shall be sound.
- No cutting may contain sapwood in the aggregate exceeding one-sixth the heartwood side. Unlimited sapwood is admitted on the reverse side.
- Standard Miscut Rule.
- Thicknesses: Standard.

NO. 1 COMMON & BETTER:

- Widths: 3" and wider, admitting 25% of 3" width.
- Lengths: 3' and longer.
- Minimum cutting: 3" wide by 2' long or 2" wide by 3' long.
- Each piece shall yield not less than 66-2/3% of cuttings.
- There is no limit to the number of cuttings.

NO. 2A COMMON:

- Widths: 2" and wider, admitting 35% of 2" width.
- Lengths: 2' and longer.
- Minimum Cutting: 2" or wider containing not less than 48 square inches.
- Each piece shall yield not less than 50% of cuttings.
- There is no limit to the number of cuttings.

Colonial Poplar

Widths: 4" and wider.

Lengths: 6' to 16'.

Minimum cuttings: 4" wide by 2' long, or 3" wide by 3' long. Each required cutting will admit without limits sound knots, spot worm holes, pin worm holes, bird peck, streaks, stain, and burls.

The reverse side of each cutting shall be sound as defined in "Sound Cutting," except that holes larger than 1/8" in diameter are not admitted.

Knots admitted may contain checks or splits not exceeding in depth one-half the thickness of the piece.

Colonial Poplar admits pieces that will yield 66-2/3% in cuttings as follows:

- Pieces 2' to 4' surface measure in 1 cutting
- Pieces 5' to 7' surface measure in 2 cuttings
- Pieces 8' to 10' surface measure in 3 cuttings
- Pieces 11' to 13' surface measure in 4 cuttings
- Pieces 14' & over surface measure in 5 cuttings

By agreement between buyer and seller, defects on the edges and/or ends may be marked off. When this method is agreed upon, the surface measure and grade shall be determined inside the markings on the piece.

Rustic Oak

The grading rules for Colonial Poplar shall apply in all respects, except that one additional cutting is allowed.

Pacific Coast Red Alder

All Pacific Coast Red Alder lumber is sold and specified "Pin knots no defect", knots or their equivalent, not exceeding 1/4" in their greatest dimension, sound or containing unsound centers not over

1/8" in diameter, shall be admitted in the cuttings. General Instructions and Standard Grades (Pages 6-19) shall govern the measurement and inspection of all commercial hardwoods indigenous to the Northwest hardwood belt, with the exceptions as set forth under the respective species. These rules shall apply to green, dry, rough or surfaced lumber. The better face of boards in all thicknesses shall yield not less than the minimum percentage of cuttings required for the grade, unless otherwise specified; the reverse side of the cuttings in all thicknesses shall be sound as defined in "SOUND CUTTING," or better, unless otherwise specified. No exception shall be made to these rules unless agreed to by the seller and the buyer and specifically stated in the purchase order.

SUPERIORS:

- Widths: 4" & Wider.
- Lengths: 6' & longer.
- Minimum Size Cuttings (face): 4" wide by 3' long, or 3" wide by 6' long.
- Minimum Size Cuttings (reverse): 4" wide by 2' long or 3" wide by 3' long.
- There is no limit to the number of cuttings.
- Admits pieces of 2' and over surface measure that will not yield less than

83 1/3% (10/12) on the better face with the reverse side grading not below Cabinet grade (66 2/3% or 8/12). The reverse side of the cuttings in both the Superiors and Cabinet grade face is not required to be sound.

- Pith: No piece shall be admitted which contains pith, boxed or showing, exceeding in the aggregate in inches in length twice the surface measure in feet.
- Splits: No piece shall be admitted which contains splits exceeding in the aggregate in inches in length twice the surface measure of the piece in feet.
- Wane: On the face side of Superiors, wane or its equivalent shall be limited to 1/2 the length in the aggregate on either edge or 1/12 the surface measure of the piece. On the reverse or Cabinet side, wane or its equivalent shall not exceed one fourth the width by three-fourths the length in the aggregate, or pieces may alternately have wane one-third the width by one-half the length in the aggregate. Width of the wane may be divided and show on both edges.
- Side bend: No piece shall be admitted which contains side bend exceeding 5/8".
- There is no 1st Lineal Foot Rule or restriction to knot size outside the cutting area.

CABINET GRADE:

- Widths: 4" and wider, of which 5% of 3" width is admitted. Lengths: 6' and longer
- There is no limit to the number of cuttings.
- Minimum Size Cuttings: 4" wide by 2' long or 3" wide by 3' long. The grade shall be determined from the worst face of the board. Admits pieces of 1' and over surface measure that will not yield less than 66 2/3% (8/12) clear-2 face cuttings.

CUSTOM SHOP GRADE:

- Widths: 4" and wider, of which 5% of 3" width is admitted. Lengths: 6' and longer.
- There is no limit to the number of cuttings.
- Minimum Size Cuttings: 4" wide by 2' long or 3" wide by 3' long.
- The grade shall be determined from the better face of the board. Admits pieces of 1' and over surface measure that will not yield less than 66 2/3% (8/12) clear-face cuttings with the reverse side of the cuttings sound as defined in "Sound Cutting".

COM-SHOP:

- Widths: 4" and wider, of which 5% of 3" width is admitted. Lengths: 5' and longer.
- There is no limit to the number of cuttings. Minimum Size Cuttings: 3" wide by 2' long.
- The grade shall be determined from the better face of the board. Admits pieces of 1' and over surface measure that will not yield less than 50% (6/12) clear-face cuttings with the reverse side of the cuttings sound as defined in "Sound Cutting".

KNOTTY ALDER:**PREMIUM/RUSTIC/CHARACTER (GRADE):**

- Widths: 4" and wider
- Lengths: 7' and longer
- There is no limit to the number of cuttings.
- Min. Size Cuttings (face): 4" wide by 2' long with a minimum of one 4" wide by 7' long cutting in each piece.
- Min. Size Cuttings (reverse): 4" wide by 2' long. Best Face Yield: 83 1/3% structurally sound yield.
- Worst Face Yield: 66 2/3% structurally sound yield to grade not below Frame Grade.
- The cuttings will admit slight season checks, bark pockets, firm tight pith, worm holes, sound knots, star checked knots and unsound knots. Wane shall not exceed one-fourth the width or one half the length of the piece. Width of wane may be divided and shown on both edges. Grades may be selected and packaged individually or combined together as to the manufacturer's specifications.
- Pith: Admitted without limitation.
- Splits: No piece shall be admitted which contains splits exceeding in the aggregate in inches in length twice the surface measure of the piece in feet.
- Side bend: No piece shall be admitted which contains side bend exceeding 5/8" in 3/8 to 5/4 or 1" in 6/4 to 24/4.
- Knots: Unsound knots that go through the piece are not admitted. Maximum Premium Knot Size (face): 1" unsound & 1 1/2" sound. Maximum Rustic/Character Knot Size (face): 1 1/2" unsound & 3" sound.
- Each required cutting must contain a minimum of one character for each 8 units.

FRAME GRADE:

- Widths: 4" and wider
- Lengths: 6' and longer
- There is no limit to the number of cuttings.

- Yield: 66 2/3% structurally sound yield from worst face of the board with the reverse side sound.
- Minimum Size Cutting: 4" wide by 2' long except that each piece must contain at least one cutting 4" wide by 6' long.
- The cuttings will admit stain, season checks, slight surface shake, bark pockets, firm tight pith, worm holes, and sound knots that do not exceed in their greatest dimension one-half the width of the cutting. Other holes and unsound knots that do not exceed in their greatest dimension 1 1/2" in 4" to 5" wide cuttings and 2" in 6" and wider cuttings are admitted.
- Wane shall not exceed one-fourth the width or one-half the length of the piece. Width of wane may be divided and shown on both edges. Length of wane allowed both edges. Other defects are admitted if they do not impair the strength of the cuttings.

No.3 / ECONO FRAME GRADE:

- Widths: 4" and wider
- Lengths: 5' and longer
- Minimum Size Cutting: 3" wide by 2' long There is no limit to the number of cuttings. Yield: 33 1/3% structurally sound cuttings.
- Cuttings will admit stain, season checks, slight surface shake, bark pockets, firm tight pith, worm holes, and sound knots that do not exceed in their greatest dimension one-half the width of the cutting. Other holes and unsound knots that do not exceed in their greatest dimension 1 1/2" in 4" to 5" wide cuttings and 2" in 6" and wider cuttings are admitted. Other defects are admitted if they do not impair the strength of the cuttings.

Pacific Coast Maple

When Pacific Coast Maple is sold and specified "Pin knots no defect," knots or their equivalent, not exceeding 1/4" in their greatest dimension, sound or containing unsound centers not over 1/8" in diameter, shall be admitted in the cuttings. General Instructions and Standard Grades (pages 4–19) shall govern the measurement and inspection of all commercial hardwoods indigenous to the Northwest hardwood belt, with the exceptions as set forth under the respective species.

These rules shall apply to green, dry, rough or surfaced lumber. The better face of boards in all thicknesses shall yield not less than the minimum percentage of cuttings required for the grade, the reverse side of the cuttings in all thicknesses shall be sound as defined in "Sound Cutting," or better, unless otherwise specified.

No exception shall be made to these rules unless agreed to by the seller and the buyer and specifically stated in the purchase order.

GRADING RULES –SELECTS & BETTER:

- Widths: 4" and wider, of which 5% of 3" width is admitted.
- Lengths: Random 4' and longer.
- Minimum cuttings: 4" wide by 3' long, or 3" wide by 6' long. There is no limit to the number of cuttings. This grade admits all boards of 1' and over, surface measure, that will yield not less than 83-1/3% of clear-face cuttings, the reverse side of the cuttings sound as defined in "Sound Cutting," except that boards of 1' and over surface measure yielding not less than 83-1/3% clear-face cuttings on one face, the reverse side of the board grading not below No. 1 Shop.

Pith: No piece shall be admitted which contains pith exceeding in the aggregate in inches in length twice the surface measure in feet.

Splits: No piece shall be admitted which contains splits exceeding in the aggregate in inches in length twice the surface measure of the piece in feet, nor when diverging more than one inch to the foot in length, except when one foot or shorter and covered by Paragraph 59 of Standard Grades.

Wane: On the face side of Selects and Better, wane or its equivalent shall be limited to 1/12 the surface measure of the piece.

On the No. 1 Shop side of Selects and Better, wane or its equivalent shall not exceed one-fourth the width by three-fourths the length in the aggregate, or pieces may alternately have wane one-third the width by one-half the length in the aggregate. Width of the wane may be divided and show on both edges. The reverse side of the cuttings in Selects and Better and No. 1 Shop are not required to be sound.

NO. 1 SHOP:

- Widths: 4" and wider, admitting 5% of 3" width.
- Lengths: Random 4' and longer.
- Minimum cuttings: 3" wide by 3' long, or 4" wide by 2' 1' and over surface measure shall yield not less than 66-2/3% clear-face cuttings, the reverse side of the cuttings sound as defined in "Sound Cutting."

NO. 2 SHOP:

- Widths: 4" and wider, admitting 5% of 3" width.
- Lengths: Random 4' and longer.
- Minimum cuttings: 3" wide by 2' long. There is no limit to the number of cuttings. Admits boards of 1' and over surface measure that will yield not less than 50% clear-face cuttings, the reverse side of the cuttings sound as defined in "Sound Cutting."

NO. 3 SHOP: Widths 3" and wider.

LENGTHS – RANDOM 4' & LONGER: Minimum cuttings: 3" wide by 2' long. There is no limit to the number of cuttings. Admits boards of 1' and over surface measure that will yield not less than 33-1/3% of sound cuttings or better.

Note: *Lumber poorer in cutting percentage, or less in width or length than admitted in No. 3 Shop described above, shall be tallied and reported below grade.*

FRAME GRADE:

- Widths: 4" and wider.
- Lengths: 7' and longer.
- Minimum cuttings: Each piece must contain at least one cutting 4" x 7'; other cuttings, minimum size 4" x 2'. Each piece shall yield not less than 83-1/3%.
- There is no limit to the number of cuttings.

Wane: Wane shall not exceed one-fourth the width and one-half the length of the piece. Width of the wane may be divided and show on both edges. Each cutting shall be reasonably flat and straight; will admit bark pockets, season checks, slight surface shake that does not impair the strength of the cutting, firm tight pith, stain, worm holes and other holes or unsound knots that do not exceed in their greatest dimension 1-1/2" in 4" to 5" wide cuttings and 2" in 6" and wider cuttings. Sound knots that do not exceed in their greatest dimension one-half the width of the cutting and other defects that do not impair the strength of the cutting more than the above mentioned defects are admitted.

Rules apply to both faces of the piece.

INSPECTION OF CYPRESS LUMBER

General Instruction

Note: *National Hardwood Lumber Association Inspectors will apply these rules when called upon to inspect cypress lumber unless otherwise specified.*

1. These rules for Cypress are complete under this caption and are not to be confused with any standard grades or other species shown elsewhere in this book.
2. Requests to Association inspectors for inspection of Cypress at loading point should be accompanied by a copy of the order on which shipment is to be made. Requests for inspection at destination should also be accompanied by copy of order, but in the absence of such information the inspector will grade the lumber according to the following standard Cypress grades giving preference to grades in the order named: Selects & Better, No. 1 Common, No. 2 Common, and Peck.
3. Lumber shall be inspected and measured as the inspector finds it, of full length and width. He shall make no allowance for the purpose of raising the grade, except that imperfections in rough stock which can be removed in dressing to standard surfaced thickness shall not be considered in determining the grade; otherwise the defects admissible in rough and dressed stock shall be the same for like kinds and grades.
4. These rules define the poorest piece in any given grade, but the respective grades shall contain all pieces up to the next higher grade.
5. The grade shall be determined from the better face of the board. In Selects & Better the reverse side shall grade not below No. 1 Common. In No. 2 Common, the reverse side shall not prevent the serviceability of this utility grade.

Measurement & Tally

6. Lumber of standard size shall be tallied board measure. In lumber of standard thickness less than 1 inch, the board-foot measurement shall be based on the surface dimensions. In lumber measured with a board rule a piece tally in feet shall be made and this tally shall be the number of feet board measure of 1-inch lumber. The tally of lumber thicker

than 1 inch shall be multiplied by the thickness as expressed in inches and fractions of an inch.

7. In material measured with a board rule, random width pieces measuring to the even half foot shall be alternately counted as of the next higher and lower foot count; fractions below the half foot shall be dropped and fractions above the half foot shall be counted as of the next higher foot.
8. Lumber shipped on stock or specified widths shall be tallied by the number of pieces of each size and length.
9. Recommended Sawing Sizes: When fresh sawn, stock widths should be $1/4$ " to $1/2$ " over nominal width. When dry, stock widths must be full width allowing 10% $1/8$ " scant in width. When dressed two edges, pieces less than 8" wide can be $1/2$ " scant of the nominal width. Pieces 8" and wider can be $3/4$ " scant of the nominal width. All grades shall be stock widths, unless otherwise specified.
10. Lumber having greater variation in thickness, except as to wane, between the thinnest and thickest points, than shown in the following table shall be measured for thickness at the thinnest point and classed as miscut, and shall be graded and reported as such.
 - $1/16$ " in thicknesses of $3/8$ " and $1/2$ "
 - $1/8$ " in thicknesses of $5/8$ " and $3/4$ "
 - $1/4$ " in thicknesses of 1" to 2"
 - $3/8$ " in thicknesses of $2-1/2$ " and 3"
 - $1/2$ " in thicknesses of 4".

Moisture Contents

12. Kiln dried moisture contents by weight
 - $5/4$ and under 11% to 15%
 - $6/4$ and over 13% to 18%
 - Air dried moisture content not to exceed 18%

Standard Thicknesses

13. Standard thicknesses for rough lumber are: 1", $1-1/4$ ", $1-1/2$ ", $1-3/4$ ", 2", $2-1/2$ ", 3", $3-1/2$ ", 4", $4-1/2$ ", 5", $5-1/2$ ", and 6". Thicknesses may also be expressed in quarter inches as follows: $4/4$, $5/4$, $6/4$, $7/4$, $8/4$, $10/4$, $12/4$, $14/4$, $16/4$, $18/4$, $20/4$, $22/4$ and $24/4$.
14. Thickness in rough sawn lumber must be $1/16$ " to $1/8$ " over nominal

thickness. When dry, lumber must be full thickness allowing 10% 1/16" scant.

Warp and Cup

15. Entire board must be flat enough to surface both sides at 1/4" less than nominal thickness, no skip allowed.

Definition of Defects & Blemishes

16. When defects or blemishes, or combinations thereof, not described in these grading rules are encountered, they will be considered as equivalent to known defects according to their damaging effect upon the piece in the grade under consideration.
17. Standard definitions of the defects and blemishes usual in Cypress are as follows:
18. A defect is defined as any irregularity occurring in or on wood that may lower some of its strength, durability, or utility values.
19. A blemish is defined as anything not classified as a defect, marring the appearance of the wood.

Checks

20. A check is a lengthwise separation of the wood, which occurs usually across the rings of annual growth.
21. A surface check is a check occurring on the surface of the piece.
22. A small surface check is a perceptible opening, not over 4" long.
23. A medium surface check is one not over 1/32" wide and over 4" but not more than 10" long.
24. A large surface check is one over 1/32" wide and over 10" long.
25. An end check is one occurring on an end of a piece.
26. A through check is one extending from one surface through the piece to the opposite surface or to an adjoining surface.
27. A heart check is one starting at the pith and extending toward but not to the surface of the piece.

Decay & Peck

28. Decay is a disintegration of the wood substance due to the action of the wood-destroying fungi. The words "dote" and "rot" mean the same as decay.
29. Incipient decay is the early stage of decay in which the disintegration has not proceeded far enough to soften or otherwise change the hardness of the wood perceptibly. It is usually accompanied by a slight discoloration or bleaching of the wood.
30. Advanced (or typical) decay is the older stage of decay in which the disintegration is readily recognized because the wood has become punky, soft and spongy, stringy, ring shaked, pitted, or crumbly. Decided discoloration or bleaching of the rotted wood is often apparent.
31. A peck is typical decay which appears in the form of a hole, pocket, or area of soft rot usually surrounded by sound wood. Slight peck is not through the piece occupying less than 10% of the surface area.

Holes

32. Holes in wood may extend partially or entirely through the piece and be from any cause. When holes are permitted the average of the maximum length and maximum width shall be used in measuring the size, unless otherwise stated.
33. A pin worm hole is one not over 1/16" in diameter.
34. A medium worm hole is one over 1/16" but not more than 1/4" in diameter.
35. A large worm hole is one over 1/4" in diameter.

Knots

36. Knots are classified according to size, form, quality, and occurrence. The average of the maximum length and maximum width shall be used in measuring the size of knots, unless otherwise stated.
37. A pin knot is one not over 1/2" in diameter.
38. A small knot is one over 1/2", but not more than 3/4" in diameter.

39. A medium knot is one over $3/4$ ", but not more than $1-1/2$ " in diameter.
40. A large knot is one over $1-1/2$ " in diameter.
41. A round knot is one oval or circular in form.
42. A spike knot is a branch or limb sawed in a lengthwise direction.
43. A sound knot is solid across its face, as hard as the surrounding wood, and shows no indications of decay. It may vary in color from red to black.
44. An unsound knot will not impair the strength of the board.
45. A decayed knot is softer than the surrounding wood and contains advanced decay.
46. A tight knot is one so fixed by growth or position that it will firmly retain its place in the piece.
47. An intergrown knot is one whose rings of annual growth are completely intergrown with those of the surrounding wood.
48. A water-tight knot is one whose rings of annual growth are completely intergrown with those of the surrounding wood on one surface of the piece, and which is sound on that surface.
49. An encased knot is one whose rings of annual growth are not intergrown and homogenous with those of the surrounding wood. The encasement may be partial or complete.
50. A loose knot is one not held firmly in place by growth or position and cannot be relied upon to remain in place in the board.
51. A pith knot is a sound knot with a pith hole not more than $1/4$ " in diameter.
52. A hollow knot is an apparently sound knot with a relatively large hole in it.

Manufacturing Defects

53. Manufacturing defects include all defects or blemishes which are produced in manufacturing, such as chipped grain, loosened grain, raised grain, torn grain, machine burn, and machine gouge.

54. Chipped grain means that a part of the surface is chipped or broken out in very short particles below the line of cut. It should not be classed as torn grain and, as usually found, shall not be considered a defect unless it is present in excess of 25% of the area.
55. Loosened grain means that a small portion of the wood has become loosened but not displaced.
56. Raised grain is a roughened condition of the surface of dressed lumber in which the hard summer wood is raised above the softer spring wood, but not torn loose from it.
57. Torn grain means that a part of the wood is torn out in dressing, and in depth is four distinct characters; slight, medium, heavy and deep.
58. Slight torn grain is not over $1/32$ " in depth.
59. Medium torn grain is over $1/32$ ", but not more than $1/16$ " in depth.
60. Heavy torn grain is over $1/16$ ", but not more than $1/8$ " in depth.
61. Deep torn grain is over $1/8$ " in depth.
62. A skip is an area on a piece that failed to surface.
63. A slight skip is one that failed to surface smoothly, whose area does not exceed the product of the width of the piece in inches multiplied by 6.
64. A heavy skip is one that the planer knife did not touch.
65. A machine burn is a darkening or charring of the wood due to overheating by the machine knives.
66. A machine gouge is a groove across a piece due to the machine cutting below the desired line of cut.

Shake

67. A shake is a lengthwise separation of the wood, which occurs usually between and parallel to the rings of annual growth.
68. A fine shake is one with a barely perceptible opening.

69. A slight shake is one with more than a perceptible opening but not over $1/32$ " in width.
70. A medium shake is one with an opening over $1/32$ " but not more than $1/8$ " wide.
71. An open shake is one with an opening over $1/8$ " wide.
72. A through shake is one extending from one surface through the piece to the opposite surface or to an adjoining surface.
73. A round shake is one completely encircling the pith.
74. A cup shake is one that does not completely encircle the pith.

Splits

75. A split is a lengthwise separation of the wood due to the tearing apart of the wood cells.
76. A short split is one not exceeding in length either the width of a piece or one-sixth its length.
77. A medium split is one exceeding in length the width of a piece but does not exceed one-sixth its length.
78. A long split is one exceeding in length one-sixth of the length of the piece.

Stain (or Discoloration)

79. Stain is a discoloration, occurring on or in lumber, of any color other than the natural color of the piece, on which it appears. It is classified as light medium and heavy.
80. Light stain is a slight difference in color which will not materially impair the appearance of the piece if given a natural finish.
81. Medium stain is a pronounced difference in color which, although it does not obscure the grain of the wood, would customarily be objectionable in a natural but not in a painted finish.
82. Heavy stain is a difference in color so pronounced as practically to obscure the grain of the wood.

Wane

83. Wane is bark, or the lack of wood or bark, from any cause on the edge or corner of a piece.
84. Slight wane is not over 1/4" wide on the surface on which it appears, for one-sixth of the length and one-fourth the thickness of the piece.
85. Medium wane is over 1/4" but not more than 1/2" wide on the surface on which it appears, for one-sixth the length and one-fourth the thickness of the piece.
86. Large wane is over 1/2" wide on the surface on which it appears, and/or over one-sixth the length and one-fourth the thickness of the piece.

Standard Grades

87. STANDARD GRADES: Selects & Better, No. 1 Common, No. 2 Common, and Peck. For most commercial sales, Selects & Better, then No.2 Common are shipped.

Selects & Better

88. The Selects & Better grade is of the highest quality and should be specified for any use where appearance is of the utmost importance, such as paneling, flooring, partition, etc.
89. Minimum size board 4" x 8' admitting 25% odd lengths.
90. Graded from better face with reverse side not below No. 1 Common.

Sapwood no defect.

Wane on No. 1 Common side shall not exceed 1/2 thickness or 1/3 length or 1/6 width in the aggregate.

A. Pieces 4" and 5" wide must be clear allowing slight wane on one edge. (Par. 84)

B. Pieces 6" and wider admit:

- Split equal to the width of board in the aggregate.
- Wane equal to 1/2 the thickness and twice the length in inches and 3/4" wide.
- Light stain – paragraph 80.

Defects Allowed: Pieces

- 6" wide – 1 medium knot
- 7" – 9" wide - 2 medium knots
- 10" and wider – 3 medium knots allowing one additional knot for every 3" in width.
- Season checks that can be removed by surfacing to 1/4" under standard thickness shall be admitted. .

Note: *Medium knot is from 3/4" – 1 1/2" average diameter and No. 2 Common must be sound except in 10" and wider lumber, one inch unsound medium knot permitted.*

Defects which can be substituted for 1 medium knot:

- 3 Pin Knots – pin knot is 1/2" average diameter or less.
- 2 Small Knots – small knot is 1/2" - 3/4" A.D.
- 1 Slight Manufacturing Defect as defined in Par. 53, 54, 57, 58, 62, 63, 65.
- 10" and wider pieces allow 2 pin worm holes for each lineal foot.

No. 1 Common & No. 2 Common

91. The commons are a staple grade useful for all types of general construction, finish, trim, pattern stock, and other uses where ordinary tree characteristics either enhance the appearance of the piece or do not restrict the appropriate application of the piece.

No. 1 Common

92. Graded from standpoint of strength primarily used as poor face of a Select and Better board.
93. Minimum size board – 4" x 8' admitting 25% odd length.
94. Admits any number of the following or equivalent:

Medium manufacturing defects as defined in paragraphs 53, 54, 57, 59, 62, 63, 65.

Sound Knots: Occasional unsound knots on one face only – 10% of the pieces.

Average diameter of any knot to be less than:

- 1-1/2" in 4" - 6" widths
- 2" in 7" - 11" widths
- 2 1/2" in 12" widths
- 3" in 13" and wider pieces

Will admit split equal to the width of board in the aggregate. Wane on one or both edges 1/2 thickness and 1/3 length and 1/6 width in the aggregate.

Admits any number of the following or equivalent: Checks not extending through the piece and not impairing the strength of the piece, stain, slight peck, and pin worm holes.

No. 2 Common

Grade same as No. 1 Common except admits: unlimited diameter, sound or (unsound knots), pith knots and slight peck.

95. Defect graded from standpoint of strength.
96. Minimum size board 4" x 6' on even 2' increments. No odd lengths admitted unless otherwise specified.
97. Must be suitable for ordinary fencing or dimension purposes in its full width and length.

Checks not extending through the piece shall be admitted without limit providing they do not impair the strength of the piece.

Shake is limited to one face only and no more than 10% of the length of the piece in the aggregate.

Wane on better face not to exceed 1/2 the thickness or 1/3 the length and 1/6 the width of the piece. Wane on the poor face must not extend through the full thickness of the piece, leaving an 1/8" nailing edge on the good face.

Split equal to the length of piece in inches.

Pith is admitted.

No open holes are permitted. Any unsound knot must not impair the strength of the piece.

Peck

98. Each piece must contain peck, with a minimum area of 10% of the Surface Measure, well distributed on one side. Each piece must be suitable for ordinary handling and construction without breakage.

Cypress Timbers

Sizes and lengths as specified.

Square Edge & Sound

Shall be free from through shake, unsound knots or a combination of admissible defects that seriously impair the strength of the piece.

Will admit firm pith (heart center) well boxed; season checks; stain; pin worm holes; sound knots; slight peck in ends; slight shake in ends not extending to the surface; slight shake and slight peck on the surface, the aggregate of each not exceeding one-fourth the length of the piece; wane not exceeding one-eighth the width of a face on one corner or its aggregate equivalent on two or more corners.

No. 1 Common Timbers

Will admit firm pith (heart center) well boxed; season checks; stain; pin worm holes; sound, encased and pith knots; an occasional unsound knot not to exceed in diameter 1/2" in 3" to 6" faces, 2" in 7" to 11" faces, 2-1/2" in 12" faces and 3" in wider faces; slight shake; medium shake not extending through the piece and not exceeding one-sixth its length; slight peck; split in each end not exceeding in length the width of the piece; wane not exceeding one-fourth the width of a face on one corner or its aggregate equivalent on two or more corners.

No. 2 Common Timbers

Grade same as No. 1 common except admits: unlimited diameter sound or (unsound knots), pith knots and slight peck.

Checks not extending through the piece shall be admitted without limit providing they do not impair the strength of the piece.

Will admit pith (heart center) boxed or showing on the surface; season checks; stain; pin worm holes; medium holes; sound, encased and pith knots; unsound knots not to exceed in diameter one-third the width of the face on which they appear; split not exceeding one-sixth the length of the piece; wane not exceeding one-half the width of the face on which it appears; peck and through shake that do not seriously impair the strength of the piece.

No. 3 Common Timbers

Will admit coarser defects than No. 2 Common, such as coarse peck; unsound knots and an occasional knot hole, but each piece shall be of sufficient soundness and strength for use as ground sills and low cost building material.

Mesquite

FAS: Widths: 6" and greater. Lengths: 4' and greater.

Minimum size of cuttings: 4" wide by 24" long. The number of allowed cuttings is the surface measure divided by 4. Grading is made on the poorest face of the board. At least 83% of surface measure will be present as clear-face cuttings.

SELECTS: Widths: 4" and greater. Lengths: 3' and greater.

Minimum size of cuttings: 2.5" wide by 18" long. The number of allowed cuttings is the surface measure divided by 4. For this grade, grading is made on the clearest face. At least 83% of surface measure will be present as clear-face cuttings.

NO. 1 COMMON: Widths: 2" and greater. Lengths: 2' and greater.

Minimum size of cuttings: 2" wide by 12" long. The number of allowed cuttings is 1 plus the surface measure, divided by 3. Grading is made on the poorest face. At least 67% of surface measure will be present as clear-face cuttings.

NO. 2 COMMON: Widths: 2" and greater. Lengths: 2' and greater.

Minimum size of cuttings: 1.5" wide by 6" long. The number of allowed cuttings is the surface measure divided by 2. Grading is made on the poorest face. At least 50% of surface measure will be present as clear-face cuttings.

DECORATIVE: Widths: 2" and greater. Lengths: 1' and greater.

Minimum size of cuttings: 1.5" wide by 6" long. There is no limit as to the number of allowed cuttings, however, at least 25% of surface measure will be present as cuttings on the worst side of the board.

- For all grades, a modifier exists to deal with sapwood. No sapwood will be allowed in any clear cutting, but, if present, shall be designated as "WS" (with sap).

- Allowable defects could be a small (1/2") sound knot in the center, a crack less than 1/32" wide and 3" long, or an unusual knot or crack in the very end of the board that does not extend more than 2" into the length of the board.

Grades for Small, Clear Mesquite Pieces

Although small, clear mesquite lumber pieces are eminently useful for a variety of purposes, if their widths or lengths are too small, they cannot be classified according to rough lumber grades. Accordingly, the following grades were adopted from the National Dimension Manufacturers Association for small furniture pieces:

C1F (CLEAR ONE FACE): This material shall be clear on one side or face, both edges and both ends, and shall otherwise comply with the clear two face quality, except that the reverse face may contain defects of sound quality.

C2F (CLEAR TWO FACE): This material shall be clear on both faces, the edges, and the ends, except that sapwood, slight streaks, small burls or swirls and light stain shall be permitted.

CORE: This material shall be sound on both faces admitting tight sound knots, small worm holes, slight surface checks or their equivalent.

SOUND INTERIOR: This material may contain any defects that will not materially impair the strength of the individual piece for the use intended.

SOUND FRAME: Same as for sound interior.

TROPICAL HARDWOODS

Odd lengths are admitted without limit.

Fractions of over one-half foot in length shall be counted up, and fractions of one-half foot or less in length shall be dropped, except in the grades of Shorts. This does not change the minimum length requirements of the respective grades.

Sapwood is not allowed in the cuttings on both faces in all grades.

FAS: Standard, except: Pieces of 4' and 5' surface measure shall yield 11/12 (91-2/3%) clear face in one cutting.

F1F: Standard.

SELECTS: Standard, except: Widths: 4" and wider allowing 10% 4" and 5" of which a minimum of one-half must be 5".

NO. 1 COMMON: Standard, except:

- Widths: 4" and wider.
- Lengths: 6' and longer.
- No. 1 Common admits pieces that will yield clear-face cuttings as follows:

Surface measure of piece	Required yield	Number of cuttings
2'	75%	1
3' and 4'	66-2/3%	1
	75%	2
5' to 7'	66-2/3%	2
	75%	3
8' to 11'	66-2/3%	3
12' and over	66-2/3%	4

NO. 2A COMMON: Standard, except: Lengths: 6 ft. and longer. There is no limit to the number of cuttings.

NO. 2B COMMON: All the requirements for No. 2A Common shall apply except cuttings to be sound as defined in Sound Cutting.

NO. 3 COMMON: Standard, to include No. 3A Common and No. 3B Common as one grade, except lengths are 6 ft. and longer.

Shorts

GRADES – FAS SHORTS, COMMON SHORTS: Standard Lengths: 2', 2-1/4', 2-1/2', 2-3/4', 3', 3-1/4', 3-1/2', 3-3/4', 4', 4-1/4', 4-1/2', 4-3/4', 5', 5-1/4', 5-1/2'.

- Lengths other than standard shall be measured as of the next lower standard length.
- Shorts shall be measured and tallied as if four times the actual standard length and the resulting total divided by four.

FAS: Widths: 4" and wider.

- Pieces 4" and 5" wide shall be clear.
- Pieces 6" and wider will admit standard defects or their equivalent

according to the above basis of surface measure (four times the actual surface measure) as follows: 8', 1; 16', 2; 22', 3; 26', 4.

COMMON SHORTS: Widths: 3" and wider.

- Shall yield 50% clear face in not over two cuttings.
- No cutting containing less than 36 square inches shall be considered.
- Shall grade First and Seconds Shorts except as to minimum width, and pin worm holes or grooves, burls and stain are admitted.

Strips

Inspection shall be made from the better face of the piece.

Odd lengths are admitted without limit. Fractions over one-half foot in length shall be counted up, and fractions of one-half foot or less in length shall be dropped. This does not change the minimum length requirement of Strips.

The widths in Clear and No. 1 Common Strips are 2", 2-1/2", 3", 3-1/2", 4", 4-1/2", 5" and 5-1/2".

Strips may be 1/8" scant in width when shipping dry. In Clear Strips, tapering pieces shall be measured at the narrow end. In the grade of No. 1 Common, tapering pieces shall be measured one-third the length of the piece from the narrow end.

Sapwood is admitted without limit in all grades.

CLEAR: Lengths: 6' and longer. Shall have one clear face, the reverse side will admit wane or its equivalent in other defects, not exceeding one-third the length, one-third the width and one-third the thickness of the piece and shall otherwise be sound as defined in "Sound Cutting."

NO. 1 COMMON: Lengths: 6' and longer. Both edges of pieces 6' and 7' long and both edges of each cutting in 8' and longer shall be clear. In addition to the above requirements, pieces 6' and 7' long will admit one standard defect; 8' and longer shall yield 66-2/3% clear face in not over two cuttings in 8' to 11' and not over three cuttings in 12' and longer. No cutting shall be less than 2' long nor less than 2" wide in pieces 2" and 2-1/2" wide, nor less than 3" wide in pieces 3" and wider.

The reverse side of the cuttings to be sound as defined in "Sound Cutting."

INSPECTION OF KILN DRIED LUMBER

Measurement After Kiln Drying

The Model State Regulation adopted by the National Conference on Weights and Measures on July 21, 1977 specifies that: "Sales of hardwood lumber measured after kiln drying shall be quoted, invoiced, and delivered on the basis of net board footage, with no addition of footage for kiln drying shrinkage."

Measurement Before Kiln Drying

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

This regulation is recognized as law in many states and NHLA members are cautioned to consult regulations of the states in which they do business.

When inspecting kiln dried lumber National Inspectors will make no addition for estimated kiln shrinkage.

In contracts for kiln dried lumber, the Standard Kiln Dried Rule shall apply unless otherwise specified in the sales contract.

Standard Kiln Dried Rule

Kiln dried lumber will be graded and measured as such, the grading rules for air dried lumber to be applied in all respects, unless otherwise specified. Rough kiln dried lumber specified 3/8" to 1-3/4" thick may be 1/16" scant of the nominal thickness; 2" and thicker may be 1/8" scant and the 10% of scant quartered lumber admitted by Paragraph 36, may be 3/32" scant on one edge in 1" to 1-1/2" lumber and 3/16" on one edge in 2" and thicker. The minimum widths mentioned in all grades may be 1/4" scant in width and the 10% admitted by Paragraph 10 may be 1/2" scant in width. In other respects the rules for grading air dried lumber shall apply.

National Inspectors will mark certificates under these specifications "Standard Kiln Dried Rule Applied."

Kiln Drying of Hardwood Lumber

Note: *In order to minimize dimensional changes in service, hardwood lumber used for most products must have moisture removed by placing it in a dry kiln with controlled humidity and heat for a period of time determined by the starting and the desired moisture content, the species, and the thickness. Other advantages of kiln drying are the relieving of stresses and the killing of insects and organisms causing stain and decay.*

Moisture content of wood is ordinarily expressed as the percentage of the weight of water in the wood to the oven dry weight of the wood. Lumber with a moisture content above 30% is considered as green or partly air dried lumber. The moisture content of air dried lumber is generally from 15% to 30%. Dry kilns usually dry hardwood lumber to a moisture content of from 6% to 10%, and kiln dried lumber will gradually adjust to the humidity of its final location.

Kiln drying is a specialized technical process. Custom kiln drying is a contractual agreement between the kiln operator and the owner of the lumber. Shrinkage of hardwood lumber in kiln drying varies from about 5% to 9%, depending on species and initial dryness (shrinkage values of individual species can be found in technical references below). Some degrade also occurs in kiln drying.

Technical References

If you would like more information, we recommend:

Dry Kiln Operators Manual, GPO Stock No. 001-000-04576-8, for sale by the Superintendent of Documents, U.S. Government Printing Office, 710 N. Capitol Street, Washington, D.C. 20402, Tel: 202-783-3238, www.fpl.fs.fed.us

Forest Products Laboratory, One Gifford Pinot Drive, Madison, Wisconsin 53726, Tel: 608-231-9200, "Wood Handbook: Wood as an Engineering Material" – limited copies available, www.fpl.fs.fed.us

Forintek Canada Corp., 319 rue Franquet, Ste-Foy Quebec, G1P 4R4, Canada, Tel: 418-659-2647, Fax: 418-659-2922, www.forintek.ca

INSPECTION OF SURFACED LUMBER

Surfaced lumber S2S shall be inspected according to the established grades under the caption of the respective woods, with the following exceptions:

The "Clear-Face" Cutting Grade

The grade shall be determined from the better face of the piece. Paragraphs 56, 57, 58, 60 on pages 14–15 apply to both faces in FAS and to the better face in F1F and Selects. The reverse side of the cuttings in both FAS and No. 1 Common are not required to be sound for the standard grades of F1F and Selects.

Slight skips, chipped or torn grain will be admitted on the better face of the required cuttings, the aggregate area not exceeding 6" long by the width of the piece in FAS; 12" long by the width of the piece in F1F and Selects; 18" long by the width of the piece in No. 1 Common, No. 2A and No. 2B Common and No. 3A Common and on the reverse side in aggregate area not exceeding one-third of the surface of the required cuttings.

Surfaced Lumber "Hit or Miss"

Lumber surfaced two sides to a thickness greater than standard surfaced thickness and specified "hit or miss", shall allow skip, chips, or torn grain without limit provided that the cutting area is sufficiently thick to permit surfacing to standard surfaced thickness and conform to the rules for lumber surfaced to standard surfaced thickness.

Surfaced Lumber D1S

Shall be inspected according to the rules governing lumber dressed two sides, except that inspection shall be made from the dressed face.

Shall be inspected according to the rules for rough lumber. Slight skips, chipped or torn grain, the aggregate area not exceeding 6" long by the width of piece, will be admitted on one or both faces of the required cuttings.

FURNITURE DIMENSION STOCK

(For furniture dimension stock, partially or fully machined, solid or glued see the rules of Wood Components Manufacturer's Association; www.woodcomponents.org)

Squares & Flat Stock Rough Green, A.D. or K.D.

Stock shall be straight, flat and square edged. Sapwood is not admitted in Red Gum, Cherry, Mahogany and unsteamed Walnut unless otherwise specified. Stain is admitted in all grades in woods in which it is admitted in the Standard grade of FAS.

When kiln dried, the additional tolerances in size allowed for kiln dried lumber apply. See page 56, Inspection Kiln Dried Lumber.

LENGTHS: Shall be full and should be 1/2" to 2" longer than specified. All pieces shall be free of end checks in the full length specified. Pieces may be in multiple lengths.

THICKNESS: Flat stock will admit 10% not more than 1/16" scant in thickness in 1-1/4" and thinner, and not more than 1/8" scant in 1-1/2" and thicker. Squares will admit 10% not more than 1/16" scant in one or both dimensions in sizes 1-1/4" or smaller, and not more than 1/8" scant in one or both dimensions in sizes 1-1/2" or larger. General instructions as to miscut lumber shall apply.

WIDTHS: Flat stock will admit 10% not more than 1/16" scant in widths 3" and narrower and 1/8" scant in widths over 3".

Note: *Six percent of the shipment may consist of pieces having defects on the edge or end, or both, which shall be measured off to make the grade or a smaller size ordered.*

Furniture Squares

CLEAR: Clear four sides and two ends.

SELECTS: Clear three corners and two adjacent faces, the remaining corner and two faces to be clear one-half length; the other half will admit sound defects and wane not exceeding one-fourth the thickness of the piece.

COMMON: Admits pin and spot worm holes, sound bird pecks, sound knots not exceeding 1/2" in diameter and other sound defects which do not exceed in extent or damage the defects described except that knots will not be admitted on three corners.

Furniture Flat Stock

CLEAR: Clear four sides and two ends.

SELECTS: Clear two edges and two ends and to have one clear face, the reverse side to be sound except that wane or its equivalent in other defects not exceeding one-fourth the thickness and one-third the width of the piece on 25% of the pieces will be admitted.

COMMON: The face side will admit pin and spot worm holes, sound bird pecks, small sound knots not exceeding 1/2" in diameter and other sound defects which do not exceed in extent or damage the defects described, except that knots shall not be admitted on the corners of the face side. The reverse side to be sound except that wane or its equivalent in other defects not exceeding one-fourth the thickness and one-half the width of the piece on 25% of the pieces will be admitted.

Plain Sawn Flitch

Shall be graded according to the general rules applying to lumber of the same species except that the grade requirements shall be based on the surface measure of the narrow face. Measurement, however, is made inside the bark at the middle of the piece on the narrow or sapwood side of stock up to 2" thick; on both sides of stock 2-1/2" and thicker, taking the average of the two measurements, dropping fractions. There is no restriction as to pith in the cutting grades, when outside of the required cutting area.

STRIPS

STANDARD STRIP GRADES: Clear, No. 1 Common and No. 2A Common. Exceptions to these standard grades are stated under the captions of the respective species.

Inspection shall be made from the better face.

Sapwood is admitted. Any limitation of streaks and spots under Standard Inspection of the same species of lumber apply also to Strips.

Standard widths: 2", 2-1/2", 3", 3-1/2", 4", 4-1/2", 5" and 5-1/2".

Strips may be 1/8" scant of standard widths when shipping dry. In the grade of Clear Strips, tapering pieces shall be measured at the narrow end. In the grade of Common Strips, tapering pieces shall be measured one-third the length of the piece from the narrow end.

CLEAR: Lengths: 8' to 16'.

Shall have one clear face, the reverse side will admit wane or its equivalent in other defects, not exceeding one-third the length, one-third the width and one-third the thickness of the piece and shall otherwise be sound.

NO. 1 COMMON: Lengths: 6' to 16'.

Shall yield 66-2/3% clear face in not over two cuttings in 6' to 11' and not over three cuttings in 12' and longer.

No cutting shall be less than 2' long nor less than 2" wide in pieces 2" and 2-1/2" wide, nor less than 3" wide in pieces 3" and wider.

The reverse side of the cuttings will admit wane or its equivalent in other defects, not exceeding one-third the length, one-third the width and one-third the thickness of the piece and shall otherwise be sound.

NO. 2 COMMON: Lengths: 6' to 16'.

Shall yield 50% clear face in cuttings 2" or wider by 2' or longer. The reverse side of the cuttings will admit wane or its equivalent in other defects, not exceeding one-third the length, one-third the width and one-third the thickness of the piece and shall otherwise be sound.

Cherry Strips

CLEAR: Shall be free from sapwood on the better face.

NO. 1 COMMON: Cuttings shall be free of sapwood on the clear face.

Plain and Quartered Oak Strips

GRADES: Clear, Clear Sap, No. 1 Common and No. 2 Common, which are standard strip grades with the following exceptions: Quartered Oak Strips shall have the radial grain running 45-1/4 or less with one face of the piece.

Bevel on the clear face side of the piece in grades of Clear and Clear Sap shall be measured off. The reverse side will admit bevel or wane or their equivalent in other defects, not exceeding one-third the length, one-third the width and one-third the thickness of the piece and shall otherwise be sound.

Bevel on the face side of the piece in grades of No. 1 Common and No.

2A Common which does not exceed one-half the thickness of the piece where the surface measure is made will be admitted in the waste portion of the piece. The reverse side of the cuttings will admit bevel or wane or their equivalent in other defects, not exceeding one-third the length, one-third the width and one-third the thickness of the piece and shall otherwise be sound.

CLEAR: Will admit sapwood on the face side as follows: 2" to 3" widths, 1/2"; 3-1/2" to 4-1/2" widths, 3/4"; 5" to 5-1/2" widths, 1", in the aggregate.

CLEAR SAP: Same as the standard grade of Clear, with sapwood admitted.

Poplar Strips

GRADES: Clear, Sap, No. 1 Common and No. 2 Common. Widths: 2-1/2", 3", 3-1/2", 4", 4-1/2", 5", 5-1/2" and 6".

CLEAR: Shall be clear on both faces and free of sapwood except 1" in the aggregate on one face.

SAP: The same as Clear Poplar Strips except that sapwood is admitted without limit. Pieces free of sapwood will admit one sound standard defect or its equivalent.

NO. 1 COMMON: Standard, except pieces 6' and 7' long shall be clear on both faces. All cuttings shall be the full width of the piece and clear both faces. Stain is admitted.

NO. 2A COMMON: Standard, except stain is admitted.

Quartered Poplar

No figure required.

Sapwood is admitted without limit in all grades. In FAS, mineral not exceeding one-sixth the surface of the piece in the aggregate will be admitted. In No. 1 Common mineral stain will be admitted without limit.

FAS: Standard, except: Widths: 5" and over; pieces 5" wide containing 3' and 4' surface measure shall be clear, pieces 5" wide containing 5' to 7' surface measure shall cut 11/12 (91-2/3%) clear face in one cutting.

NO. 1 COMMON: Standard, except: Lengths: 6' to 16'. Slight stain will be admitted.

Note: *Pieces below the grade of No. 1 Common shall be graded according to the rules for Poplar and specified as No. 2A Common, No. 2B Common and No. 3 Common Quartered Poplar.*

Plain Sawn Bending Oak

Bending Oak, unless otherwise specified, will include both Red and White Oak and shall be cut from live timber. The grain shall not diverge more than 1" in 15", except for short deviations occasioned by admissible defects. There shall be not more than fifteen annual rings per inch.

Green lumber 1-1/4" and thicker shall be sawn 1/8" thicker than specified thickness except that 10% 1/16" thicker will be admitted.

Stain, bird pecks, spot and pin worm holes scattered or in clusters not less than 6" apart with not more than three worm holes to the cluster are not considered defects.

Widths: 5" and wider. Lengths: 6' to 16'.

Pieces 5" wide and pieces 6' and 7' long shall be clear except as stated above.

In pieces 6" and wider, 8' and longer the following in addition to those mentioned above shall not be considered defects: Six inches of split in one end, or its aggregate equivalent in both ends.

Wane along the edges not exceeding in the aggregate one-sixth the length and not over one-half the thickness of the piece and not exceeding 1/2" in width in 1/2" to 3/4" lumber; 3/4" in width in 1" to 2" lumber and 1" in 2-1/2" and thicker lumber, or its equivalent in area at one or both ends.

Standard defects or their equivalent will be admitted according to surface measure of the piece as follows:

- 5' to 7', one; 8' to 11', two; 12' to 15', three; 16' to 19', four; 20' and over, five. Splits in excess of the equivalent of two standard defects shall not be admitted.
- In any series of special widths sold 10" on or wider, splits in excess of the equivalent of one standard defect shall not be admitted.
- Unless otherwise specified, 1/2" side bend in pieces 8' and 9' long, 3/4" in pieces 10' to 12' long and 1-1/4" in pieces 13' to 16' long, shall not be considered a defect. Each additional 1/2" of side bend in all lengths shall be considered one standard defect, except that not more than two such defects shall be allowed in any piece.

- Slightly cupped pieces 12" and wider which may be ripped so as to produce two pieces each of which would grade Bending Oak and each be sufficiently flat to dress uniformly to standard thickness for surfaced lumber, shall be admitted in this grade. This rule does not apply to specified widths.

HARDWOODS FOR CONSTRUCTION

Note: *The American Lumber Standards Committee has developed voluntary product standards for softwood lumber used primarily for construction, under procedures established by the U.S. Department of Commerce. The latest such standard, PS 20, serves as the basis for grade rules published by various regional associations covering species in different regions, ex. southern yellowpine, western softwoods, eastern white pine and spruce, etc. PS 20 also applies to structural lumber manufactured from hardwood species when the species is included in rules certified by the American Lumber Standard Committee's Board of Review. The Northeastern Lumber Manufacturers Association (www.nelma.org) is the home for several hardwood species including Aspen, Red Maple, Mixed Maple, Beech, Mixed Oak, Red Oak, Northern Red Oak, White Oak, Poplar, and Eastern Cottonwood. The Southern Pine Inspection Bureau (www.spib.org) is the home for Bald Cypress. Design values for these species and species groups can be found in the agency grading rules as well as the National Design Specification Supplement, published by the American Wood Council (www.awc.org)*

The Alternatively, the following rules have been included for the convenience of users of the specifications that preceded the National Grading Rule, PS 20, first published in 1970.

These rules for hardwoods for construction may be used by mutual agreement between Buyer and Seller. The National Hardwood Lumber Association makes no warranty of representation that lumber graded under any of these specifications has any particular strength values or is suitable for a particular purpose.

Specifying Species

White Oak comprises the species of the trees in the white oak group, commercially known as bur oak, chestnut oak, chinquapin oak, cow oak, live oak, overcup oak, post oak, rock oak, swamp white oak, and white oak, and includes also the other species of oak whose leaves have rounded lobes.

Red Oak comprises species of trees in the red oak group commercially known as black oak, pin oak, red oak, scarlet oak, spanish oak, turkey oak, water oak, willow oak, and yellow oak, and includes other species of oak whose leaves have bristle-tipped lobes.

Mixed Oak comprises the species of the trees in the red oak and white oak groups, regardless of the proportion of either group or any species.

Mixed Hardwoods comprise the species of the oaks and the other broad-leaved trees.

The kind of hardwood desired in the following grades shall be specified in contracts.

Select Dimension – Select Car Stock (Boxed Hearts & Planking)

Shall be sawn full to specified sizes and lengths, with square edges except as to wane mentioned herein. Ten percent of the pieces may be 1/4" scant in thickness and/or width. Each piece in the entire shipment may be up to 1" over in thickness and/or width and up to 3" over in length. Will admit stain, ordinary season checks, bird pecks, pin worm holes, spot and shot worm holes.

Sound knots which do not exceed in average diameter one-half the width of the surface on which they appear are admitted, provided they are not less than 6' apart; sound knots from one-sixth up to but not including one-half the width of the surface are admitted, provided they are not less than 12" apart; sound knots smaller than one-sixth of the width of the surface on which they appear, may be admitted without restriction. Loose knots, unsound knots or holes, may be admitted provided they are not less than 6' apart and provided, they do not exceed 1/2" in pieces less than 6" thick; 3/4" in pieces 6" to 10" thick; and 1-1/4" in pieces 11" and thicker.

WANE: In boxed hearts wane not exceeding one-fourth of the width of the surface on which it appears will be admitted on one corner or this amount may be divided and show on two or more corners.

In pieces 5" and less in thickness (planking) wane may be admitted up to one-third of the width, one-third the thickness, and one-third the length of the piece, in the aggregate. (Pieces containing the maximum wane allowance shall not exceed 20% of the quantity of any one shipment.)

PITH: In boxed hearts pith is admitted if completely boxed. Exposed firm pith may be admitted on one face if it does not exceed one-third of the length of the piece in the aggregate. In pieces 5" and less in thickness (planking) firm surface pith may be admitted on one face only, up to one-third of the length of the piece, in the aggregate.

END SHAKE: In boxed hearts end shake may be permitted in two annular

ring growths for the entire circumference of the rings in which they appear, if confined to the center area of the timber. If end shake occurs between the center area, and the faces of the timber, it may be admitted in not over two annular ring growths, and the length of the shake must not exceed one-fourth of the circumference of the ring in which it appears. End shake shall not extend from one face to another.

In pieces 5" and less in thickness (planking) end shake may be admitted in two annular ring growths not to exceed one-fourth of the length of the ring growth segment in which it appears.

SURFACE SHAKE: In boxed hearts surface shake may be admitted up to 1/12 of the length of the piece in the aggregate.

The same restriction shall apply to pieces 5" and less in thickness.

SPLITS: Shall not exceed 12" in length in either end of the piece of Standard or specified length.

Note: *For the purpose of applying these rules, the center area of a square or rectangular timber is that area within one-half of the distance from the center point of the timber to the four surfaces.*

Common Dimension – Freight Car Stock & Mine Car Lumber (Boxed Hearts & Planking)

Shall be sawn full to specified sizes and lengths, with square edges except as to wane mentioned herein. Ten percent of the pieces may be 1/4" scant in thickness and/or width. The entire shipment may be up to 1" over in thickness and/or width and up to 3" over in length.

Will admit stain, ordinary season checks, bird pecks, pin, spot and shot worm holes and an occasional grub worm hole; one sound knot up to one-half the width of the surface on which it appears may be admitted in each 6 lineal feet; sound knots not exceeding in average diameter one-third the width of the surface on which they appear will be admitted without limit.

One loose knot, unsound knot or hole may be admitted in each 4 lineal feet, provided it does not exceed 3/4" in pieces less than 5" thick, 1" in pieces 5" to 10" thick and 1-1/2" in pieces 11" and thicker.

WANE: In boxed hearts wane not exceeding one-fourth of the width of the surface on which it appears will be admitted on one corner or this amount may be divided and show on two or more corners.

In pieces 5" and less in thickness (planking) wane may be admitted up to one-third of the width, one-third of the thickness, and one-third the length of the piece in the aggregate. (Pieces containing maximum wane allowance shall not exceed 30% of the quantity of any one shipment.)

PITH: In pieces 5" and thicker, pith may be admitted when it is either boxed (boxed heart) or when exposed, or both, provided that the exposed portion of pith is firm and is on one face only and does not exceed one-third the length of the piece in aggregate. In pieces less than 5" in thickness (planking) firm surface pith may be admitted on one face only; may be boxed, or partially boxed.

END SHAKE: In boxed hearts end shake may be permitted in four annular ring growths for the entire circumference of the rings in which they appear, if confined to the center area of the timber. If end shake occurs between the center area and the faces of the timber, it may be admitted in not over four annular ring growths. The length of the shake must not exceed one-half of the circumference of the ring in which it appears. End shake shall not extend from one face to another.

In pieces 5" and less in thickness (planking) end shake may be admitted in four annular ring growths, not to exceed one-half the length of the ring growth segment in which it appears.

SURFACE SHAKE: In boxed hearts surface shake may be admitted up to one-sixth of the length of the piece in the aggregate. The same restriction shall apply to pieces 5" and less in thickness.

SPLITS: Splits shall not exceed in the aggregate in inches in length twice the surface measure of the piece of Standard or specified length, except when one foot or shorter.

Note: *For the purpose of applying these rules, the center area of a square or rectangular timber is that area within one-half of the distance from the center point of the timber to the four surfaces.*

Sound Square Edge (Boxed Hearts & Planking)

Will admit unsound defects that do not seriously impair the strength, or prevent the use of the piece for purposes of strength, in its full size. The pieces shall be sawn full to specified sizes except that 10% of the pieces may be 1/4" scant in thickness and/or width. The entire shipment may be up to 1" over in thickness and/or width and up to 3" over in length.

Will admit pith, boxed or showing on the surface; worm holes; an occasional

grub hole; and an occasional unsound knot or hole, not extending through the piece; season checks; sound knots; splits in each end not exceeding in length, the width of the piece.

WANE: Will be admitted on one or more corners, not exceeding in the aggregate one-third of the width or thickness or it may extend across only one face for one-third of the length to a depth not exceeding 1/12 of the distance to the opposite face.

END SHAKE: In boxed hearts end shake may be admitted in six annular ring growths for the entire circumference of the rings in which the shake appears, if confined to the center area of the timber. If end shake appears between the center area and the faces of the timber, it may be admitted in not over six ring growths. The length of the shake must not exceed 3/4 of the circumference of the rings in which they appear.

End shake may extend from one face to another.

In pieces 5" and less in thickness (planking) end shake may be admitted in six annular ring growths and the shake shall not exceed three-quarters of the length of the ring growth segments in which they appear.

Hollow or unsound heart center may be admitted not to exceed in diameter one-sixth of the smallest dimension of the timber. This unsound heart center shall not be permitted in over one end of the piece.

SURFACE SHAKE: In boxed hearts, surface shake may be admitted up to one-third of the length of the piece in the aggregate. Surface shake may appear on two faces.

In pieces 5" and less in thickness surface shake may appear on one face only, and may be admitted up to one-third of the length of the piece in the aggregate.

Note: *To determine center area of timber see Note under "Select Car Stock."*

Common Timbers & Industrial Blocking

Will admit unsound defects that do not seriously impair the strength or prevent the use of the piece for purposes of strength in its full size. The pieces shall be sawn full to specified sizes except that 10% of the pieces may be 1/4" scant in thickness and/or width. The entire shipment may be up to 1" over in thickness and/or width and up to 3" over in length.

Will admit pith, boxed, or showing on the surface; worm holes, sound knots; an occasional grub hole; an occasional knot hole; split in each end, not exceeding one-sixth of the length; shake on the surface not exceeding one-half the length of the piece; and season checks. End shake shall be admitted to the extent defined in the grade of "Sound Square Edge."

WANE: Not exceeding one-third the width or thickness is admitted on one corner or its aggregate equivalent on two or more corners or it may extend across only one face for one-third of the length to a depth not exceeding 1/12 of the distance to the opposite face.

Military or Commercial Timbers and Planking

This designation of quality shall consist of the grades of "Select Car Stock"; "Common Dimension"; and "Sound Square Edge." Timbers or planking sold in accordance with this designation must contain not less than 50% of the quality of Common Dimension and Better, of which 50%, one-half, must be of the grade of Select Car Stock. No material lower in quality than that defined under the caption of "Sound Square Edge" shall be admitted.

Ties

The inspection of Ties shall be made according to the AREA specifications in effect at the time the inspection is made.

NATIONAL INSPECTION SERVICE

The National Hardwood Lumber Association employs inspectors in many of the principal hardwood markets and producing centers of the United States and Canada. A list of Association inspectors, with their street addresses, can be obtained from the Executive office. The services of these inspectors are available subject to the Inspection Regulations and official instructions.

National Inspectors are available for inspection, as well as conducting quality control checks for inspection through the NHLA Certification Program. In addition, inspectors can conduct in-house training programs for members of the Association.

Fees Charged to Members

The charge to members for service of inspectors is on a straight per diem basis regardless of species and type of inspection. One quarter or one half of the per diem rate may be charged for a partial day when the inspector is able to complete the days work at a nearby location.

Expenses for transportation, room and meals will be charged to the member. For time lost after the inspector has reported for service due to lack of proper facilities for handling the lumber, lack of suitable stock, or for other delays beyond the control of the inspector, except weather conditions, the regular per diem charge will be made.

Charges for instruction by members of the inspection staff are at the same per diem rate as other services plus expenses for transportation, room and meals. Charges for special or unusual services may be obtained by calling the Executive Office.

The per diem inspection rate and mileage charges are adjusted from time to time by the Board of Managers. Current rates may be obtained by calling the Executive Office.

Inspection Services to Non-Members

Non-members may obtain official inspection services at per diem charges 50% higher than those listed in the schedule in lieu of membership dues. Actual traveling and hotel expenses will be charged. An advance deposit to cover the costs will be requested. Application for these services is to be made to the Executive Office to avoid delay.

ORIGINAL NATIONAL INSPECTION REGULATIONS

- I. All applications for an Original Inspection on grades in this book shall be made in writing to the Chief Inspector or to an authorized National Inspector of the Association. Applicants will avoid delay by calling ahead and then mailing or faxing the application for an Original Inspection direct to the National Inspector nearest the point where the inspection is to be made, and sending a copy of the application to the Chief Inspector at:

P.O. Box 34518 | Memphis, TN 38184-0518,
USA | (901) 382-6419 Fax

Note: *The word "lumber" includes timbers and planking as defined in this book.*

- II. An application for an Original Inspection may request that the inspection be made at the point of origin or at the destination when authorized in the purchase contract or by special agreement. It should be thoroughly understood that no member or officer of the Association possesses the authority to impose an Original Inspection upon any seller

or buyer. When an Original Inspection has been made, it is binding only upon those parties who agreed beforehand to recognize it in the individual transaction in which it is involved. A buyer or seller may desire that the National Rules for grading and measurement apply to a contract and thus specify "National Rules to Govern," without necessarily obligating either party to be bound by the results of an Original Inspection performed by a National Inspector. It is therefore, absolutely necessary in any transaction involving the sale or purchase of lumber in which a buyer or seller relies upon the results of an Original Inspection by a National Inspector for the protection of his interests, that it be clearly stated in the contract of sale or purchase that an Original Inspection is to be binding on the parties. The following provision is recommended to be included in contracts where the Original Inspection is intended to be binding on the parties:

The lumber described in this contract is subject to and the parties are bound by an Original Inspection by a National Inspector according to the rules and regulations of the National Hardwood Lumber Association.

- III. The contract of sale should also state whether the seller or the buyer is to apply for the Original Inspection, whether the inspection is to be made at point of origin or at destination and the time limit within which the application is to be made to the Association for the Original Inspection. The point of Original Inspection may be governed by the convenience in securing the services of a National Inspector.
- IV. When an Original Inspection is agreed to in a sales contract, the contract should provide for the allocation of the expense of the inspection between the buyer and seller. The inspection expense may be divided between the buyer and seller or may be borne entirely by either party, but a bill for the expense as established by the Association from time to time will be tendered by the Association to the party calling for the inspection, which bill is immediately due and payable.
- V. In an Original Inspection, a National Inspector is required to inspect the full amount of lumber contained in a shipment and he is expressly forbidden from making an Original Inspection of a portion of a shipment after selections have been made therefrom, unless both seller and buyer agree thereto.
- VI. In the absence of signed instructions to the contrary, a National Inspector will inspect and measure lumber according to "Standard

Inspection" and "General Instructions," as provided by the rules in this book.

- VII. Upon completion of an Original Inspection, the National Inspector will cause the lumber that has been inspected to be piled down, securely bundled with steel straps and sealed with an official NHLA seal. The National Inspector shall complete and sign a Certificate of Original Inspection certifying to the amount and grade of lumber so inspected and shall note on the Certificate whether or not the Original Inspection is subject to the "Financial Guarantee" of the Association. The National Inspector shall deliver a copy of the Certificate to the party requesting the inspection and to the office of the Chief Inspector.
- VIII. The Financial Guarantee of the Association does not apply to lumber that has been inspected in an Original Inspection unless (1) the inspected lumber has been strapped and sealed, (2) the Certificate of Original Inspection has been completed and signed by the National Inspector with the notation "Subject to Association Financial Guarantee" duly noted thereon, (3) the party requesting the inspection forwards one copy of the Certificate of Original Inspection to the other party within three (3) days after receipt of the Certificate from the inspector and (4) if the lumber was inspected at the point of origin, the lumber was forwarded to its destination within seven days after completion of the Original Inspection.
- IX. (a) The Association's Financial Guarantee does not apply to an inspection where:
- (i) The application contains a request for special grades requiring a higher, more rigid, more technical or more difficult grade than is published in this book;
 - (ii) The specifications are subject to buyer's or seller's interpretation;
 - (iii) The specifications require that the lumber be entirely free of worm holes, worm or insect infestation, ingrown bark, dote, stain or that the lumber be straight and flat; or
 - (iv) The specifications which require that the lumber, or the cutting, be entirely free of checks, burls, mineral streaks, splits, bird's eye, cross grain, curly or twisted grain or that the lumber be straight grained.

- (b) An application for an inspection of the types described in subsection (a) shall be made in writing to the Chief Inspector and shall be interpreted by the Chief Inspector as a request for a Special Inspection and assigned to an appropriate National Inspector with proper instructions. The Financial Guarantee of the Association will not apply to this type of Special Inspection and the National Inspector conducting this type of inspection shall note on the Certificate, "Special Inspection Not Subject to Association Financial Guarantee." Failure of a National Inspector to insert this notation on the Certificate will not alter the limitation of the Financial Guarantee.
- X. National Inspectors will not certify to texture, moisture content, degree of dryness or weight. If the lumber being inspected is green lumber, the Certificate will be marked accordingly.
- XI. When the Financial Guarantee is desired on lumber to be kiln dried in transit after the Original Inspection, it is necessary that the National Inspector be instructed by the party ordering the inspection to place an identification mark for grade and surface measure on each piece. The mark of identification will be noted on the Certificate and the Certificate marked "For Kiln Drying". The surface measurement marked on each board shall be used in tallying and grading if reinspected after kiln drying, in accordance with Section XI of Re-inspection Regulations. If the lumber is not placed in the kiln within twenty days after the Original Inspection the Financial Guarantee is terminated.
- XII. Upon Completion of an Original Inspection in accordance with Section VII (on page 73), the Certificate shall be binding on the parties unless an Official Re-inspection is requested. If the Original Inspection was made at the point of origin, all applications for re-inspection shall be made within fourteen days from receipt of the lumber at destination. If the Original Inspection was made at the destination, the application for re-inspection shall be made within fourteen days from date of Original Inspection. If a re-inspection is requested, the party requesting the re-inspection is responsible for preserving the official NHLA seal from each bundle of lumber involved in the Original Inspection.
- XIII. Clerical errors are subject to correction at the source of the inspection without liability on the Association; in such instances right is reserved to issue a corrected Certificate.

- XIV. Any member who applies for an Original Inspection on lumber which he has neither bought nor sold is subject to suspension or expulsion from the Association.
- XV. If any member of the Association fails to apply for a re-inspection and refuses to recognize the Original Inspection after agreeing to be governed by it, the Association is required, on receipt of sufficient evidence of the repudiation, to suspend service to such member in accordance with the By Laws.
- XVI. When an Original Inspection is made at point of origin according to the contract and the buyer fails to apply for a re-inspection, it shall be considered a repudiation of the inspection if the buyer fails to settle in full for the shipment as shown by the Certificate of Original Inspection.
- XVII. When an Original Inspection is made at destination according to the contract and the buyer fails to apply for a re-inspection, it shall be considered a repudiation of the inspection if the buyer fails to settle in full for that portion of the shipment which the Certificate shows to be in accordance with the specifications of the order, provided that the portion of the shipment which is according to the specifications of the order amounts to at least 80% of the total footage of the shipment. Lumber not up to the specifications may be held for the disposition of the seller or accepted in accordance with any adjustment upon which buyer and seller may be able to agree.
- XVIII. When an Original Inspection is conducted at destination by agreement between buyer and seller, the buyer shall protect the seller's right to re-inspection by preserving the official NHLA seal from each bundle of lumber involved and by giving the seller an opportunity to order re-inspection before using any part of the shipment.
- XIX. At the discretion of the National Inspector, lumber 5/4" thick or thicker will be graded and measured by a National Inspector only at destination. This regulation applies especially but not solely to lumber bulk piled at shipping point.

NATIONAL RE-INSPECTION REGULATIONS & GUARANTEE

- I. No complaints or claims will be considered unless the lumber is officially re-inspected under these Re-inspection Regulations.
- II. Should either party agree to a transaction involving an Original Inspection, that qualifies for a re-inspection under the Re-inspection Regulations be dissatisfied with the results of the Original Inspection, such party, whether a member of the Association or not, may call for re-inspection, provided the lumber is intact, the official NHLA seal is available and the lumber is located within the continental limits of the United States or Canada. This class of Official Re-inspection can only be obtained by applying to the Chief Inspector of the Association.
- III. If the Original Inspection was made at the point of origin, all applications for and Official Re-inspection shall be made within fourteen days from receipt of the lumber at destination. If the Original Inspection was made at the destination, the application for an Official Re-inspection should be made within fourteen days from date of the Original Inspection.
- IV. Upon approval of application for the official Re-inspection of lumber by the Chief Inspector, the Chief Inspector or an authorized National Inspector, other than the Inspector making the Original Inspection, shall proceed as promptly as possible to conduct the Official Re-inspection of the lumber.
- V. If the Official Re-inspection of the lumber that was subject to an Original Inspection and the Financial Guarantee of the Association results in a difference in favor of the party complaining of more than four percent in money value based on the total gross value of all lumber included in the Original Inspection, the Association shall apply and the party complaining may receive the amount of such difference directly from the Association by sending to the Chief Inspector an itemized statement showing in detail the items and amounts as shown on the Certificate of Original Inspection and the Official Re-inspection Certificate. Items in the original Certificate are to be figured at the sales contract or invoice prices and all other items of the same species are to be included at recognized price differentials, subject to the approval of the Executive Committee. In the adjustment of the claim, there shall be no credit taken for any thickness greater than the

thickness or thicknesses reported in the original Certificate nor credit taken for species of a value higher than that reported on the original Certificate. A species of a lesser value than that reported on the original Certificate is to be credited at its respective lesser value. Species found in the Official Re-inspection which are not shown on the original Certificate are to be accepted at the prices determined according to the above evaluation but they are not to be considered in determining the Association's liability for the payment of a claim.

- VI. All claims for payment under the Financial Guarantee shall be presented within 90 days after the date of Official Re-inspection, otherwise the Association's Financial Guarantee does not apply. The Association does not under any circumstances take possession of lumber or dispose of it.
- VII. In all cases where claims are approved on the four percent money value clause, the Association will assume a labor cost for handling the amount of lumber re-inspected at actual cost or at the rate of \$15.00 per M feet, whichever is less. No claim will be approved and passed for payment where handling charges are in excess of these rates. In cases which claims are approved, the Association charges for the Official Re-inspection will be canceled. The Association assumes no liability on account of demurrage or for any other expense than as herein provided.
- VIII. If the difference in favor of the party complaining does not exceed four percent in money value, the party demanding the Official Re-inspection shall pay all expenses connected therewith.
- IX. All limitations upon the applicability of the Financial Guarantee of the Association contained in the Original Inspection Regulations are incorporated herein by reference and made a part hereof as if set forth in verbatim.
- X. In addition to the foregoing, in making and Official Re-inspection of a steel strapped and sealed shipment, warp, stain and checks shall be considered defects. The Financial Guarantee will apply in Certificates denoting green lumber and on all lumber loaded on open rail cars and open trucks, except that stain, season checks, splits, warp and twist shall be disregarded in conducting the Official Re-inspection when ordered on the complaint of the buyer. The Association reserves the right to decline to make an Official Re-inspection and the Financial

Guarantee will not apply to lumber shipped in leaky cars or delayed beyond a reasonable period in transit, or which does not arrive at destination in its original container.

- XI. The Financial Guarantee does not apply on lumber that has been dressed or worked after completion of the Original Inspection; provided, however, that the Financial Guarantee applies on lumber kiln dried in transit after the Original Inspection has been completed, only when all of the conditions of Section 11 of Original Inspection Regulations have been complied with. Official Re-inspection will then be granted on complaint of the buyer when requested in accordance with the same regulations governing re-inspection of air dried lumber except that it should be understood that the Association assumes no liability for any shortage in measurement, scant thickness, or proper kiln drying and that in conducting the Official Re-inspection the inspector will tally and grade on the measurement marked on the boards before kiln drying, will consider only the nominal thickness and will disregard checks, honeycomb, splits and warp in grading.

NATIONAL HARDWOOD LUMBER ASSOCIATION SALES CODE – Revised August 2007

Note: *This Code is binding between buyer and seller only when it is specifically stated in the contract that it shall govern.*

PREAMBLE

The purposes of this Hardwood Sales Code are as follows:

1. To establish uniform practices in the conduct of transactions, involving the sale and purchase of hardwood lumber, by defining in plain unequivocal terms, the approved customs and usages of the trade under which such transactions are conducted.
2. To supply reasonable regulations governing elements of transactions that are not already covered by established customs.
3. To provide practical and responsive means for the settlement of disputes arising between sellers and buyers of hardwood lumber, without recourse to litigation.

ARTICLE I – Name

The following statement of principles applying to transactions involving the sale and purchase of hardwood lumber expresses customs and usages common to the hardwood lumber trade, and as arranged, shall be known as the National Hardwood Lumber Association Sales Code.

ARTICLE II – Parties

- Section 1. Parties subscribing to this code shall consist of corporations, firms and individuals engaged in the production, distribution or consumption of hardwood lumber.
- Section 2. The terms of this code can be rendered binding as between buyers and sellers of lumber only by contractual agreement of the parties at interest that they shall apply to specific transactions.

ARTICLE III – Quotations

- Section 1. Quotations are of two classes, general and special.
- Section 2. General quotations in the form of stock lists or circular letters are made subject to prior sale and immediate acceptance.
- Section 3. Special quotations made at request of the buyer shall be protected for a specific period by mutual agreement.

ARTICLE IV – Orders

- Section 1. The term "order" refers to a contract of sale and purchase existing between seller and buyer.
- Section 2. All orders should be in writing and should specifically embody all provisions of the agreement of sale and purchase, to-wit: Kind, variety, quantity, dimensions, grade, manufacture, age, inspection, point of delivery, time of shipment, price, terms of payment, etc.
- Section 3. An order taken by a salesman is not binding upon the seller until it has been accepted in writing by competent authority or until delivery under the order has begun, and in the absence of either of these forms of acceptance, it is subject to cancellation by the buyer.

Section 4. Any provision or provisions omitted by the buyer from his formal order may be supplied by the seller, or any provision or provisions contained in the formal order may be amended by the seller in his acceptance of the order, but such additions or amendments do not become a part of the contract sale and purchase until they are specifically accepted by the buyer.

ARTICLE V – Quantity & Loading

Section 1. Where a specific quantity of lumber is required, the quantity should be stated in feet in the order, and the seller should adjust the contents of shipments going forward under the order in a manner to enable him to make substantial delivery of the specified total.

Section 2. When an order specifies a carload or a given number of carloads, the seller should load and the buyer should receive cars loaded substantially to the capacity of weight or contents.

Note: *Shippers shall make every attempt to ship full, accurate tallies for both grade and measurement on all shipments under the sales code as defined by the order. Attempts to intentionally under ship footage and/or ship a percentage of off-grade material in order to fall within Article X (Inspection) regulations, or to vary tallies and grade by the trend in market conditions are discouraged as they do not accurately portray the intended purpose of Article X and therefore, represent a breach of good faith under the sales code.*

ARTICLE VI – Delivery

Section 1. A bill of lading showing buyer as consignee, or if to the order of shipper, properly endorsed by him, shall constitute evidence as to the fact and time of delivery at shipping point.

ARTICLE VII – Time of Shipment

Section 1. Where time of shipment is not an essential element of the contract, and is not so stated in the order, shipment may be made at once or within a reasonable time.

Section 2. Where time of shipment is an essential element of a contract, the specific date or dates of shipment should be stated in the order, thus making the time of shipment a material stipulation of the contract.

ARTICLE VIII – Contingencies

- Section 1. Deliveries of shipments under this code are subject to the following contingencies: Fires, floods, strikes, delays of carriers, or acts of God, or other conditions beyond the control of the contracting parties.
- Section 2. A claim for relief arising from the operation of the foregoing clause, by either party, must be made in good faith, and must be supported by satisfactory evidence that the failure to discharge contractual obligations is due, and only due, to the operation of the contingency upon which the claim is based or other conditions beyond the control of the contracting parties

ARTICLE IX – Freight Charges

- Section 1. The term "F.O.B. destination" or "Freight allowed to destination," includes only the lawful line haul charge in effect on date of quotation.
- Section 2. Unless otherwise stipulated, all switching charges, demurrage and other terminal charges, and all tax on freight and duty assessed on goods shall be paid by buyer unless any of these charges result from negligence on the part of the seller in not conforming to the shipping instructions contained in order, in which event the seller shall assume payment of charges that have accrued by reason of his neglect.
- Section 3. When price delivered at destination is agreed upon, the seller assumes all liability for any increase in freight rates, and receives the benefit arising from any reduction in freight rate. When price at shipping point is agreed upon, the buyer assumes all liability for any increase in freight rate and receives the benefit arising from any reduction in freight rate.

ARTICLE X – Inspection

- Section 1. Lumber sold under this code is subject to the current rules for grading and measurement of the National Hardwood Lumber Association.
- Section 2. When the order provides for an Original Inspection, the lumber is subject to inspection under the Original Inspection Regulations and the Re-inspection Regulations which govern

the Inspection Department of the National Hardwood Lumber Association and the Financial Guarantee of the Association shall apply as therein provided.

- Section 3. When a shipment of lumber is received under an order which did not require an Original Inspection, the buyer shall cause the shipment to be inspected and measured. If an unsatisfactory difference exists between the amount of seller's invoice covering the shipment and the value of the shipment computed from the buyer's measurement and inspection, the buyer shall hold the entire shipment intact and report this difference to seller within fourteen days after unloading the shipment and furnish seller with piece tally, unless buyer and seller agree otherwise. If it be impossible to adjust such difference by compromise, an authorized National Inspector of the National Hardwood Lumber Association shall be called to inspect the lumber under dispute.
- Section 4. If the buyer and the seller agree in writing, the application to the Chief Inspector or to an authorized National Inspector may request that the lumber be inspected as an "Original Inspection" under the Original Inspection Regulations and the Re-inspection Regulations and the Financial Guarantee of the Association shall apply on the terms and conditions therein provided. The buyer and seller must agree in writing that the Original Inspection is to be binding on the parties.
- Section 5. Alternatively, the application may request that the National Inspector perform a "dispute inspection" pursuant to this Section 5 and Sections 6, 7 and 8 hereof. The inspector shall inspect and measure the lumber according to the "Standard Inspection" and "General Instructions" as provided in the rules of this book and no Financial Guarantee of the Association shall apply to the dispute inspection.
- Section 6. If the result of the dispute inspection reveals that less than 80% of the total footage in the shipment is in accordance with the specifications of the order, the seller shall reimburse the buyer for any freight paid by the buyer on the shipment, and the shipment shall be held for the disposition of the shipper, who is to pay all expenses of the inspection and labor charges at actual cost or at the rate of \$15.00 per M feet, whichever is less.

- Section 7. If the result of the dispute inspection reveals that at least 80% of the total footage in the shipment is in accordance with the specifications of the order, then the total value of all lumber of the species ordered, as revealed by this dispute inspection, is to be calculated, using prices shown on the order and recognized price differentials for other items of the species ordered.
- Section 8. Should this dispute inspection result in not more than 4% deductible difference in money value from the gross amount of the invoice, the buyer is to pay all expenses of the inspection, accept all lumber and honor the seller's invoice in full. If the deductible difference be more than 4% money value the seller is to pay all expenses of the NHLA inspection and labor charges at actual cost or at the rate of \$15.00 per M feet, whichever is less. The seller shall invoice for and the buyer shall retain and pay for all items reported on the dispute inspection certificate of the species and thickness ordered. All other items shall be held for the disposition of the shipper.
- Section 9. If either the buyer or seller is dissatisfied with the results of the dispute inspection, it is within such party's right to call for re-inspection under the same terms and conditions set forth in the Re-inspection Regulations of the Association. The results of the re-inspection shall be binding on both parties. No Financial Guarantee by the Association is applicable to a re-inspection provided for under this Section 9.

ARTICLE XI – Enforcement

- Section 1. Any person who believes a Sales Code violation has occurred shall have the right to file a complaint with NHLA. Such person shall complete, sign and deliver a standardized NHLA complaint form to NHLA headquarters. The NHLA Chief Inspector shall investigate the complaint and submit a report to a committee comprised of the following individuals: (1) First Vice President of the NHLA
(2) Chairman of the Inspection Services Committee of the NHLA
(3) NHLA Mission Leader regarding the Rules. This committee shall determine if a violation of the Sales Code has occurred.
- Section 2. If no violation is found, the complaint will remain confidential. No person shall be entitled to obtain any information regarding the complaint except that the complaining party will be notified that its complaint was dismissed. If a violation is found, the Inspection Services Committee Chairman shall send a letter of warning

to the NHLA against whom the complaint was made. Such member shall be notified of its right to appeal, and any appeal shall be decided by the Inspection Services Committee. Pending disposition of the appeal, the complaint and the warning letter shall remain confidential. If no appeal is made or if the appeal is dismissed, then the NHLA may disclose to any NHLA member making inquiry that a warning was sent, the date on which the warning was sent, and whether any other warnings had been sent.

Section 3. After three (3) warnings in a twelve (12) month period, or five (5) warnings in a twenty-four (24) month period, a letter will be sent to an association member censuring them. A censured company will be identified to the NHLA membership.

ARTICLE XII – Cancellations

Section 1. If the credit of a buyer is found to be impaired and the buyer upon request of the seller, fails to give satisfactory security for payment, the seller may cancel the order or any unfilled portion thereof.

Section 2. If it becomes apparent that the seller cannot make delivery of stock covered by an order, or if delivery of the stock on the order, or any portion thereof, is unreasonably delayed, the buyer may cancel the order or any unfilled portion thereof.

Note: *The fact that the seller has oversold his stock, or the fact that the buyer has over-purchased his requirements, is in neither case a justifiable reason for arbitrary cancellation. Neither does the condition of the market bear any relation to the inviolability of a contract of sale and purchase. If the market goes down, the buyer is obliged to receive the stock purchased by him. If the market goes up, the seller is obliged to deliver and receive payment for the stock sold by him. Cancellation of an order by either party for any of these reasons is wholly without warrant, and is in absolute opposition to the letter and spirit of this code, which is based upon the principles of good faith and square dealing.*

ARTICLE XIII – Arbitration

Section 1. In order to adjust disputes arising between seller and buyer in the application of the principles of this code arbitration is recommended.

Section 2. The customary procedure in arbitration cases is to select an arbitrator and in the event the buyer and seller cannot agree

upon a sole arbitrator, each party should select one. If these two arbitrators shall disagree, they shall elect a third arbitrator and a majority decision of these arbitrators shall be binding upon the parties to the dispute.

Note: *This Code is binding between buyer and seller only when it is specifically stated in the contract that it shall govern.*

DEFINITIONS

Bark Pocket: A bark-filled blemish in the board.

Bird Peck: A patch of distorted grain resulting from birds pecking through the growing cells in the tree and sometimes containing a hole and/or ingrown bark.

Boxed Heart: The term used when the pith falls entirely within the four faces of a piece of wood anywhere in its length.

Burl: A burl is a swirl or twist in the grain of the wood which usually occurs near a knot but does not contain a knot. Those containing sound centers are admitted in the cuttings except when otherwise specified.

Check: A lengthwise separation of the wood that usually extends across the rings of annual growth and commonly results from stresses set up in wood during seasoning.

Cup: A distortion of a board in which there is a deviation flatwise from a straight line across the width of the board.

Cutting: A portion of a board or plank obtained by cross-cutting or ripping, or by both. In the Common grades, a cutting shall be flat enough to surface two sides to standard surfaced thickness after it has been removed from the board. In the grades of Selects and Better, the entire board must be flat enough to surface two sides to standard surfaced thickness (for skip limitations, see page 58 under the rule "Clear-Face" Cutting Grade). Diagonal cuttings are not permitted.

Clear-Face Cutting: A cutting having one clear face (ordinary season checks are admitted) and the reverse side sound as defined in Sound Cutting. The clear face of the cutting shall be on the poor side of the board except when otherwise specified.

Sound Cutting A cutting free from rot, pith, shake and wane. Texture is not considered. It will admit sound knots, bird pecks, stain, streaks or their

equivalent, season checks not materially impairing the strength of a cutting, pin, shot and spot worm holes. Other holes 1/4" or larger are admitted but shall be limited as follows: One 1/4" in average diameter in each cutting of less than 12 units; two 1/4" or one 1/2" to each 12 units and on one side only of a cutting.

Decay: The decomposition of wood substance by fungi.

Incipient Decay: The early stage of decay that has not proceeded far enough to soften or otherwise perceptibly impair the hardness of the wood. It is usually accompanied by a slight discoloration or bleaching of the wood.

Green: Freshly sawn lumber, or lumber that has received no intentional drying; unseasoned.

Heartwood: The wood extending from the pith to the sapwood, the cells of which no longer participate in the life processes of the tree.

Honeycomb: A cellular separation that occurs in the interior of a piece of wood, usually along the wood rays.

Lumber (Shipping-Dry): Lumber that is partially dried to prevent stain and mold in transit.

Lumber (Stump-Shot): That having jagged or irregular ends, sawn from a butt log.

Mineral Streak: An olive to greenish-black or brown discoloration of undetermined cause in hardwoods.

Pin Knot: A knot which does not exceed 1/8" in average diameter.

Pith: The small soft core occurring in the structural center of the log.

Sapwood: The living wood of pale color near the outside of the log.

Seasoning (Air-Dried): Dried by exposure to air, usually in a yard, without artificial heat.

Seasoning (Kiln-Dried): Dried in a kiln with the use of artificial heat.

Shake: A separation along the grain, the greater part of which occurs between the rings of annual growth.

Sidebend: A distortion of a board in which there is a deviation edgewise from a straight line from end to end of the board.

Sound Knot: A knot that is solid across its face, as hard as the surrounding wood, and shows no indication of decay.

Split: A lengthwise separation of the wood, due to the tearing apart of wood cells.

Stain: In hardwoods the word "stain" is used to describe the initial evidences of decay.

Unselected: The full product of the log from which no separation for heartwood or sapwood has been made.

Wane: Bark or lack of wood.

Warp: Warp is any variation from a true or plane surface. Warp includes bow, crook, cup and twist, or any combination thereof.

Worm Holes –

- **Pin Worm Hole:** One not over 1/16" in diameter.
- **Spot Worm Hole:** One over 1/16" but not more than 1/8" in diameter.
- **Shot Worm Hole:** One over 1/8" but less than 1/4" in diameter.
- **Grub Hole:** One 1/4" in diameter or larger.

METRIC CONVERSION TABLE

Linear Measure

1 millimeter (mm)	0.0394 inches
1 inch	25.4 millimeters
1 centimeter (cm)	0.3937 inches
1 inch	2.54 centimeters
1 decimeter (dm) – 3.937 inches0328 feet
1 foot	3.048 decimeters
1 meter (m) – 39.37 inches	1.0936 yards
1 yard	0.9144 meters

Weights

1 kilogram (kg)	2.2046 pounds
1 pound	0.4536 kilograms
1 metric ton (M.T.) – 1.102 short tons	2,200 pounds
1 short ton – 2,000 pounds	0.9072 metric tons

Volume

1 cubic centimeter (cm ³)061 cubic inches
1 cubic inch	16.39 cubic centimeters
1 cubic decimeter (dm ³)	0.0353 cubic feet
1 cubic foot	28.317 cubic decimeters
1 cubic meter (m ³) – 35.34 cubic feet	1.308 cubic yards
1 cubic yard	0.7646 cubic meters

Lumber

1 cubic meter lumber	424 board feet
1 board foot lumber	2,359 cubic centimeters
1 board foot lumber	0.0024 cubic meters

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Tips and Short Cuts

1. To determine $\frac{2}{3}$ the width of the board, use the 16' scale on the lumber rule and divide by 2.

2. To determine value for upgrading, obtain the percentage difference between lumber prices, then divide 100 by the surface measure. When reducing the surface measure percentage, do not exceed the percentage difference of the prices.

EXAMPLE: FAS \$1200 – 1 Common \$850 divided by FAS \$1200 = 29%. The board: 100 divided by 6' SM = 16.66%, removing 1 foot SM will be profitable.

3. To determine the amount of side bend in a board, stand the board on its edge and measure the bend at its greatest distance from a straight line. When taking full length cuttings, this amount must be deducted from the total width of the cutting.

EXAMPLE: A board 6" wide and 10' long with a 1" bend would allow a maximum 5" wide, full length cutting.

Weights of Green and Kiln-Dried Lumber^a

Common Name	Latin Name	Green				Kiln-Dried ^b			
		lb/ft3	kg/m3	lb/MBF	kg/MBF	lb/ft3	kg/m3	lb/MBF	kg/MBF
Alder, Red	<i>Alnus rubra</i>	46	737	3833	1739	27.5	440	2288	1038
Ash									
Black	<i>Fraxinus nigra</i>	52	833	4333	1966	34.1	546	2843	1290
Green	<i>Fraxinus pennsylvanica</i>	49	785	4083	1852	39.3	629	3274	1485
White	<i>Fraxinus americana</i>	48	769	4000	1814	41.0	657	3420	1551
Aspen	<i>Populus tremuloides</i>	43	689	3583	1625	26.5	425	2211	1003
Basswood, Amer.	<i>Tilia americana</i>	42	673	3500	1588	24.4	390	2031	921
Beech, Amer.	<i>Fagus grandifolia</i>	54	865	4500	2041	43.2	691	3597	1632
Birch									
Sweet	<i>Betula lenta</i>	57	913	4750	2155	45.6	731	3803	1725
White	<i>Betula papyrifera</i>	50	801	4167	1890	36.8	590	3067	1391
Yellow	<i>Betula alleghaniensis</i>	57	913	4750	2155	42.2	677	3520	1597
Black Gum/Tupelo	<i>Nyssa spp.</i>	45	721	3750	1701	34.6	555	2887	1310
Black Locust	<i>Robinia pseudoacacia</i>	58	929	4833	2192	48.0	769	4003	1816
Black Walnut	<i>Juglans nigra</i>	58	929	4833	2192	37.9	607	3159	1433
Boxelder ^c	<i>Acer negundo</i>	32	513	2667	1210	27.5	508	2642	1198
Buckeye, Yellow	<i>Aesculus octandra</i>	49	785	4083	1852	24.5	392	2039	925

Common Name	Latin name	Green				Kiln-Dried ^b			
		lb/ft ³	kg/m ³	lb/MBF	kg/MBF	lb/ft ³	kg/m ³	lb/MBF	kg/MBF
Butternut	<i>Juglans cinerea</i>	46	737	3833	1739	26.3	421	2191	994
Cherry, Black	<i>Prunus serotina</i>	45	721	3750	1701	34.6	554	2881	1307
Chestnut, Amer.	<i>Castanea dentata</i>	55	881	4583	2079	29.4	472	2453	1113
Cottonwood ^c	<i>Populus deltoides</i>	49	785	4083	1852	27.5	444	2308	1047
Cypress	<i>Taxodium distichum</i>	60	961	5000	2268	30.6	491	2553	1158
Elm									
Hard	<i>Ulmus thomasii</i>	53	849	4417	2003	43.1	690	3591	1629
Soft	<i>Ulmus rubra</i>	56	897	4667	2117	36.0	576	2997	1359
Hackberry	<i>Celtis spp.</i>	50	801	4167	1890	36.7	588	3060	1388
Hickory									
True (average)	<i>Carya spp.</i>	64	1025	5333	2419	49.6	795	4135	1876
Pecan (bitternut)	<i>Carya spp.</i>	61	977	5083	2306	27.5	724	3767	1709
Honeylocust ^c	<i>Gleditsia triacanthos</i>	61	977	5083	2306	27.5	702	3650	1656
Madrone	<i>Arbutus spp.</i>	60	961	5000	2268	45.0	722	3754	1703
Magnolia, So. ^c	<i>Magnolia grandiflora</i>	59	945	4917	2230	27.5	485	2525	1145
Maple									
Hard (sugar)	<i>Acer spp.</i>	56	897	4667	2117	42.3	677	3523	1598
Soft (red)	<i>Acer spp.</i>	50	801	4167	1890	36.4	582	3030	1374

Weights of Green and Kiln-Dried Lumber^a (continued)

Common Name	Latin Name	Green				Kiln-Dried ^b			
		lb/ft ³	kg/m ³	lb/MBF	kg/MBF	lb/ft ³	kg/m ³	lb/MBF	kg/MBF
Red Oak Group									
Black	<i>Quercus velutina</i>	62	993	5167	2344	42.4	679	3534	1603
Cherrybark ^c	<i>Q. falcata</i> v. <i>pagodifolia</i>	68	1089	5667	2570	46.5	745	3875	1758
Laurel	<i>Q. laurifolia</i>	65	1041	5417	2457	43.8	702	3652	1657
Northern red	<i>Q. rubra</i>	63	1009	5250	2381	41.9	672	3494	1585
Pin	<i>Q. palustris</i>	63	1009	5250	2381	43.7	700	3642	1652
Scarlet	<i>Q. coccinea</i>	62	993	5167	2344	45.3	725	3774	1712
Southern red	<i>Q. falcata</i>	62	993	5167	2344	39.7	636	3309	1501
Water	<i>Q. nigra</i>	63	1009	5250	2381	42.8	685	3564	1617
Willow	<i>Q. phellos</i>	67	1073	5583	2533	43.8	701	3649	1655
White Oak Group									
Bur	<i>Quercus macrocarpa</i>	62	993	5167	2344	43.1	690	3589	1628
Chestnut	<i>Q. prinus</i>	61	977	5083	2306	43.6	699	3636	1649
Post	<i>Q. stellata</i>	63	1009	5250	2381	45.9	734	3821	1733
Swamp chestnut	<i>Q. michauxii</i>	65	1041	5417	2457	45.9	736	3828	1736
Swamp white ^c	<i>Q. bicolor</i>	69	1105	5750	2608	27.5	799	4158	1886
White	<i>Q. alba</i>	62	993	5167	2344	45.9	735	3825	1735
Live Oak	<i>Quercus virginiana</i>	76	1218	6333	2873	60.4	967	5032	2283
Redcedar, Eastern	<i>Juniperus virginia</i>	36	583	3033	1376	31.4	504	2620	1188

Common Name	Latin Name	Green				Kiln-Dried ^b			
		lb/ft ³	kg/m ³	lb/MBF	kg/MBF	lb/ft ³	kg/m ³	lb/MBF	kg/MBF
Sassafras	<i>Sassafras albidum</i>	44	705	3667	1663	27.5	497	2583	1172
Sweetgum	<i>Liquidambar styraciflua</i>	50	801	4167	1890	35.0	561	2920	1325
Sycamore	<i>Platanus occidentalis</i>	52	833	4333	1966	34.0	545	2836	1286
Tanoak	<i>Lithocarpus densiflorus</i>	65	1041	5417	2457	44.7	717	3728	1691
Yellow-poplar	<i>Liriodendron tulipifera</i>	38	609	3167	1436	29.7	476	2475	1123
Willow, Black	<i>Salix nigra</i>	50	801	4167	1890	27.0	432	2249	1020

^aGreen weights directly from Hardwoods of North America, USDA Forest Service, FPL-GTR-83; and Wood Handbook, USDA Forest Service, Ag Handbook 72. Kiln-dried weights from Dry Kiln Operator's Manual, USDA Forest Service, except where noted. Weights are calculated based on average densities for each species. Thus, the weights given here should always be considered approximations because of the natural variation in anatomy, moisture content and the ratio of heartwood to sapwood that occurs in a load. Board foot weights are based on exact board footage (1BF = 1' x 1' x 1"). No allowance is given for over thickness.

^bKiln-dried weights are calculated at 8% moisture content.

^cKiln-dried weights extrapolated from Hardwoods of North America, USDA Forest Service, FPL-GTR-83.

NOTES



Conversion of the Fractions Inch in Units

Fraction Inch	Decimal	Length									
		4'	5'	6'	7'	8'	9'	10'	11'	12'	
1/8"	0.125	0.50	0.625	0.75	0.875	1	1.125	1.125	1.375	1.50	
1/4"	0.25	1	1.125	1.50	1.75	2	2.25	2.50	2.75	3	
3/8"	0.375	1.50	1.875	2.25	2.625	3	3.375	3.75	4.125	4.50	
1/2"	0.50	2	2.50	3	3.50	4	4.50	5	5.50	6	
5/8"	0.625	2.5	3.125	3.75	4.375	5	5.625	6.25	6.875	7.50	
3/4"	0.75	3	3.75	4.50	5.25	6	6.75	7.50	8.25	9	
7/8"	0.875	3.50	4.375	5.25	6.125	7	7.875	8.75	9.625	10.50	
1"	1	4	5	6	7	8	9	10	11	12	

Reminder Select and Better

Rules wane, knot, hole

$$1/3 = .0333 \quad 2/3 = 0.666$$

$$3/8" = 0.375 \quad 5/8" = 0.625$$

Rule 97 % (SM x 11.64)							
PMS	6	7	8	9	10	11	12
Unit required	69.84	81.48	93.12	104.76	116.40	128.04	139.68

Reminder Calculation

1 unit = 1" wide and 1 foot long or the équivalent (12"²)

1 SM = 12 units or 144"²

	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
0	1/12	1/6	1/4	1/3	5/12	6/12	7/12	2/3	3/4	5/6	11/12	1
0	0.083	0.166	0.25	0.333	0.416	0.50	0.583	0.666	0.75	0.833	0.916	1

Diameter of a knot or hole in sound cutting
and Standard Defects Walnut (FAS 6'7')



1/8"



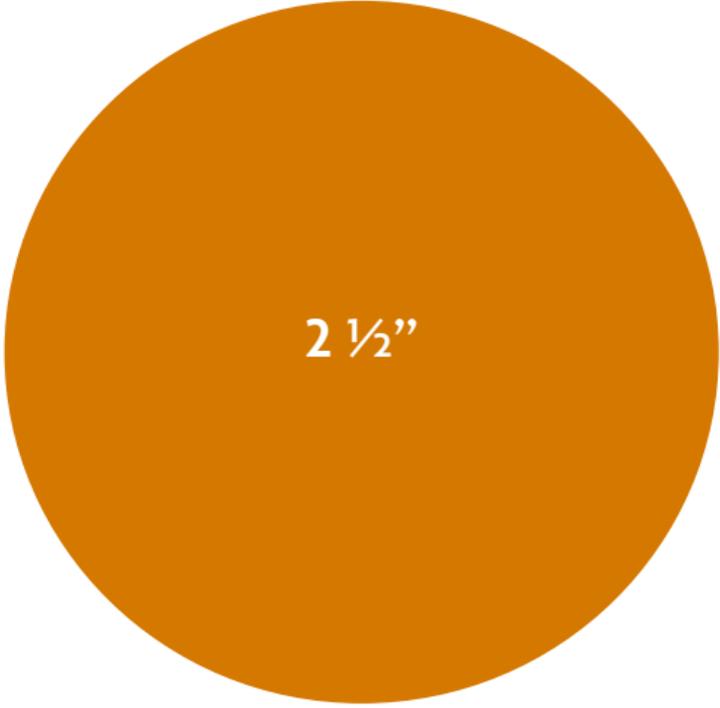
1/4"



1/2"



1 1/4"



2 1/2"



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