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HOW LUMBER IS GRADED

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FOREWORD

The purchase of lumber by the Government has been complicated by the number of species of wood involved, by the number of diversified uses of wood, and by the complexity and number of grading rules. It is not possible for all of those who act as purchasing agents to give detailed study to the manufacture and grading of each of the various articles they buy.

This circular, entitled "How Lumber is Graded", describes the grading of hardwood lumber and softwood lumber as practiced by the principal lumber associations and has a summary of American lumber standards for softwood lumber to which the associations rules conform in principle. The circular is supplemented by a separate set of grade-use tables which give the recommendations of each association as to the proper grades of their particular species to use in various types of construction. In making their grade-use recommendations the associations gave careful consideration to having their recommended grades neither too high nor too low. In one case the cost would be too great and other species would be employed, and in the other case the material would prove unsatisfactory and operate against further use of similar material.

The circular is a splendid example of cooperation between the Government and the lumber industry to the distinct benefit of both, and has the backing of both the Federal Government and the principal lumber associations. It should prove helpful in simplifying the preparation of lumber specifications and the purchase of lumber by Government officers under the provisions of the current Federal specifications for lumber, and also in the selling of lumber to the Government. It will also, I am sure, prove useful to a wide range of lumber consumers.

(Signed) T. T. CRAVEN,
Chief Coordinator,
Federal Coordinating Service.

AUGUST 16, 1932.

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INTRODUCTION

This report was prepared to meet the demand for information on the grading of lumber and to furnish to prospective purchasers of lumber information that will be helpful in selecting the proper grade of lumber for the use intended.

Lumber sawed from logs varies widely in quality. Some pieces are clear, others have a few knots, and still others are very knotty. Some contain checks or splits, and others have bark on the edges or are somewhat decayed in places. As the clear pieces are the most valuable, it becomes necessary to separate the lumber as it comes from the mill into classes or grades on a basis of the number, condition, and size of the visible defects. The lumber in these grades varies in quality from pieces that are practically clear in the highest grade to pieces that contain numerous defects in the lowest grade. The use to which lumber is to be put determines the number, size, condition, and position of the defects that it may contain and still be satisfactory. For some uses clear material is most satisfactory, but for many uses lumber may contain certain defects and still be entirely suitable. For example, even in the higher grades of siding, while some pieces will have one side clear, other pieces will have a

[1] The authors acknowledge the hearty cooperation of the following associations in reviewing the text and in furnishing the grade-use recommendations contained in the supplementary tables: California Redwood Association, Hardwood Dimension Manufacturers' Association, Hardwood Interior Trim Manufacturers' Association, Maple Flooring Manufacturers' Association, National Hardwood Lumber Association, National Lumber Manufacturers' Association, Northern Hemlock and Hardwood Manufacturers' Association, Oak Flooring Manufacturers' Association, Red Cedar Shingle Bureau, Southern Cypress Manufacturers' Association, Southern Pine Association, West Coast Lumbermen's Association, Western Pine Association. Acknowledgment is also made of the assistance received from members of the Forest Products Laboratory in the preparation of the text.

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few knots on the edge which is covered when the siding is in place and also a few sound tight knots that will not interfere with nailing and that will cover smoothly with paint. In high-grade flooring some defects on the underside are allowed, since they will not show when the flooring is laid and will not interfere with its wearing qualities. Sheathing and subflooring may have a considerable number of defects, since both kinds of lumber are entirely covered by finishing material. For interior paneling which is to be given a natural finish clear lumber is generally preferred, although lumber containing sound tight knots is not infrequently considered more pleasing in appearance. Patterns are an example of a product for which clear wood is generally used.

The grading rules in general use at present, with a few exceptions,[2] have to do only with defects and cutting requirements and do not take into account the weight or density of the wood itself. That is, if two boards of the same species are clear or if they have similar defects, both boards are placed in the same grade regardless of any difference in the weight of the wood itself. For some purposes, such as siding, ceiling, or finish, it may not matter whether dense or light wood is used; but for other purposes, such as vehicle parts, structural timber, or flooring, where strength or hardness is a prime requisite the denser wood gives the most satisfactory service. For still other purposes, such as certain kinds of boxes, lightweight wood is preferable.

The rules at present used for grading lumber were prepared largely by lumber associations. The members of most of these associations are made up of manufacturers who manufacture lumber of one species or of a number of species that grow in a certain region or are naturally grouped together. For example, the grading rules of the California Redwood Association cover one species only, while the rules of the National Hardwood Lumber Association, as the name implies, include practically all commercial hardwoods and cypress, and the association has a membership made up of manufacturers, wholesalers, and consumers located in all sections of the hardwood forest regions of the Eastern States. The following is a list of the names and addresses of the principal lumber manufacturers' associations and the woods graded under the rules of each association.

PRINCIPAL SOFTWOOD LUMBER MANUFACTURERS' ASSOCIATIONS AND WOODS GRADED UNDER THE RULES OF EACH ASSOCIATION

Name and address	Woods covered by grading rules[3]
California Redwood Association, 405 Montgomery Street, San Francisco, Calif.	Redwood.
Northern Hemlock & Hardwood Manufacturers Association, Oshkosh, Wis.	Eastern hemlock, tamarack, northern white cedar.
Southern Cypress Manufacturers Asso-	Red cypress (coast type)[4]

West Coast Lumbermen's Association, Stuart Building, Seattle, Wash.	Douglas fir (coast region), west coast hemlock,[5] Sitka spruce, western red cedar, Port Orford cedar.
Western Pine Association, Yeon Building, Portland, Oreg.	Ponderosa pine, Idaho white pine,[6] sugar pine, Western larch, Douglas fir ("Inland Empire" and California), white fir, Engelmann spruce, incense cedar, and western red cedar.
Red Cedar Shingle Bureau, Stuart Building, Seattle, Wash.	Western red cedar.

PRINCIPAL HARDWOOD LUMBER MANUFACTURERS ASSOCIATIONS AND WOODS GRADED UNDER THE RULES OF EACH ASSOCIATION

Name and address	Woods covered by grading rules
Hardwood Dimensions Manufacturers Association, Memphis, Tenn.	Hardwoods.
Hardwood Interior Trim Manufacturers Association, 63 South Third Street, Memphis, Tenn.	Do.
Hardwood Manufacturers Institute, Memphis, Tenn.	No grading rules.
Maple Flooring Manufacturers Association, 332 South Michigan Avenue, Chicago, Ill.	Maple (northern hard),[7] beech, birch.
National Hardwood Lumber Association, 2408 Buckingham Building, Chicago, Ill.	Hardwoods, cypress,[8] aromatic red cedar.[9]
Oak Flooring Manufacturers Association of the United States, 604 Dermon Building, Memphis, Tenn.	Oak (flooring).
Southern Oak Flooring Industries of the United States, Little Rock, Ark.	Do.

HARDWOOD-LUMBER GRADING

HARDWOOD LUMBER (ALL SPECIES)

The rules which are considered standard in grading hardwood lumber in the United States are those adopted by the National Hardwood Lumber Association.[10] In these rules the grade of a piece of hardwood lumber is determined by the proportion of the piece which can be cut into a certain number of smaller pieces of material clear on one side and not less than a certain size. In other words, the grade classification is based upon the amount of clear usable lumber in the piece rather than upon the number or size of the defects present. This clear material, commonly termed "clear face", must have one face clear and the reverse face sound, which means free from rot, heart-center, shake, and other defects which materially impair the strength of the cutting. Some grades only require that cuttings be sound.

The highest grade of hardwood lumber is termed "Firsts" and the next grade "Seconds." Firsts and Seconds, or, as they are generally written FAS, are practically always combined in one grade. The

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California Redwood Association, 405 Montgomery Street, San Francisco, Calif.	Redwood.
Northern Hemlock & Hardwood Manufacturers Association, Oshkosh, Wis.	Eastern hemlock, tamarack, northern white cedar.
Southern Cypress Manufacturers Association, Barnett National Bank Building, Jacksonville, Fla.	Red cypress (coast type).[4]
Southern Pine Association, New Orleans, La.	Longleaf and shortleaf southern yellow pine (including North Carolina pine).

[2] Structural material in the rules of the Southern Pine Association, West Coast Lumbermen's Association, and Western Pine Association. The rules of the California Redwood Association and the Southern Cypress Manufacturers' Association for structural material cover rate of growth but not density.

[3] See p. 12 for more complete information on names of woods.

[4] Forest Service name—southern cypress.

West Coast Lumbermen's Association, Stuart Building, Seattle, Wash.	Douglas fir (coast region), west coast hemlock,[5] Sitka spruce, western red cedar, Port Orford cedar.
Western Pine Association, Yeon Building, Portland, Oreg.	Ponderosa pine, Idaho white pine,[6] sugar pine, Western larch, Douglas fir ("Inland Empire" and California), white fir, Engelmann spruce, incense cedar, and western red cedar.
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Hardwood Interior Trim Manufacturers Association, 63 South Third Street, Memphis, Tenn.	Do.
Hardwood Manufacturers Institute, Memphis, Tenn.	No grading rules.
Maple Flooring Manufacturers Association, 332 South Michigan Avenue, Chicago, Ill.	Maple (northern hard),[7] beech, birch.
National Hardwood Lumber Association, 2408 Buckingham Building, Chicago, Ill.	Hardwoods, cypress,[8] aromatic red cedar.[9]
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The highest grade of hardwood lumber is termed "Firsts" and the next grade "Seconds." Firsts and Seconds, or, as they are generally written, FAS, are practically always combined in one grade. The third grade is termed "Selects", followed by No. 1 Common, No. 2

[5] Forest Service name—western hemlock.
[6] Forest Service name—western white pine.
[7] Forest Service name—sugar maple.
[8] Forest Service name—southern cypress.
[9] Forest Service name—eastern red cedar.
[10] This association publishes a booklet of over 100 pages which contains detailed grading rules for various hardwood products such as lumber, flooring, vehicle stock, etc. The association maintains bonded lumber inspectors in various hardwood producing and consuming centers who issue inspection certificates on shipments. The correctness of the grades as shown on these certificates is guaranteed by the association.

Common, Sound Wormy, No. 3A Common, and No. 3B Common. The grades adopted by the National Hardwood Lumber Association as standard for various hardwood lumber products and species are as follows:

GRADES ADOPTED FOR HARDWOOD LUMBER PRODUCTS BY THE NATIONAL HARDWOOD LUMBER ASSOCIATION

[Rules for the measurement and inspection of hardwood lumber, cypress, veneers, and thin lumber, issued January 1933]

Product	Species	Grade
Lumber	Ash, beech, birch, hard (sugar) maple, hackberry, red alder, sycamore.	Firsts and Seconds, Selects, No. 1 Common, No. 2 Common, Sound Wormy, No. 3A Common, No. 3B Common.
Do	Basswood, soft elm, boxelder, soft maple, buckeye.	Firsts and seconds, Selects, No. 1 Common, No. 2 Common, No. 3A Common, No. 3B Common.
Do	Chestnut	Firsts and seconds, Selects, No. 1 Common, Sound Wormy, No. 2 Common, No. 3A Common, No. 3B Common.
Do	Red and white oak (plain or quartered), locust, quartered sycamore.	Firsts and Seconds, Selects, No. 1 Common, No. 2 Common, Sound Wormy, No. 3A Common, No. 3B Common.
Do	Poplar	Firsts and Seconds, Saps, Selects, Stained Saps, No. 1 Common, No. 2A Common, No. 2B Common, No. 3A Common, No. 3B Common.
Do	Rock (cork) elm, hickory and pecan.	Firsts and Seconds, No. 1 Common, No. 2 Common, No. 3A Common, No. 3B Common.
Do	Sap gum, cottonwood, black gum, tupelo, magnolia, willow, aspen.	Firsts and Seconds, Selects, No. 1 Common, No. 2 Common, No. 3A Common, No. 3B Common.
Do	Quartered sap gum, quartered black gum, plain red gum, quartered red gum.	Firsts and Seconds, Selects, No. 1 Common No. 2 Common.
Do	Red birch	Firsts and Seconds, Selects, No. 1 Common.
Do	Cherry	Firsts and Seconds, Selects, No. 1 Common, No. 2 Common, No. 3A Common, No. 3B Common.
Do	Walnut, butternut	Firsts and Seconds, Selects, No. 1 Common, No. 2 Common, No. 3 Common.
Do	Mexican and African mahogany.	Counters, Firsts and Seconds, Selects, No. 1 Common, No. 2 Common, No. 3 Common, Selected Firsts and Seconds Pin Wormy, Firsts and Seconds Pin Wormy, No. 1 Common Pin Wormy, No. 2 Common Pin Wormy, Firsts and Seconds Shorts, Common Shorts, Pin Wormy Shorts.
Do	Cuban and San Domingo mahogany.	Firsts and Seconds, Selects, No. 1 Common, No. 2 Common, No. 3 Common, Log Run, First and Seconds Shorts, Wormy, Pin Wormy Shorts.
Do	Philippine mahogany [1]	Counters, Firsts and Seconds, Selects, No. 1 Common, No. 2 Common, No. 3 Common, Firsts and Seconds Fine Needle Wormy, Selects Fine Needle Wormy, No. 1 Common Fine Needle Wormy, No. 2 Common Fine Needle Wormy, No. 3 Common Fine Needle Wormy.
Do	Quartered popular	Firsts and Seconds, No. 1 Common, No. 2A Common, No. 2B Common, No. 3 Common.
Do	White maple	Firsts and Seconds, No. 1 Common.
Do	Bending oak	Do.
Do	Aromatic red cedar [2]	Firsts and Seconds, No. 1 Common, No. 1 Common and Better, No. 2 Common.
Factory lumber	Cypress [3]	Tank and Boat Stock, Firsts and Seconds, Selects, No. 1 Shop, No. 2 Shop, Box.
Yard lumber	Cypress [3]	Clear Heart, A, B, C, D, No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, Peck.

[1] The term "Philippine mahogany" is commonly applied to the Philippine hardwoods tanguile, almon, and red lauan. The use of the name "mahogany" for these woods without the word "Philippine" has been ruled against by the Federal Trade Commission.

[2] Aromatic red cedar, designated by the Forest Service as eastern red cedar, is not a hardwood but is included in the rules of the National Hardwood Lumber Association. It is not graded under any of the softwood association rules.

[3] Cypress, designated by the Forest Service as southern cypress, is not a hardwood. Cypress is graded under the rules of the National Hardwood Lumber Association. and the rules of the Southern Cypress Manufacturers' Association. The latter are used for red cypress (coastal type). The former apply to red cypress (coastal type) and also to yellow cypress and white cypress of the inland type.

GRADES ADOPTED FOR HARDWOOD LUMBER PRODUCTS BY THE NATIONAL HARDWOOD LUMBER ASSOCIATION—continued

Product	Species	Grade
Vehicle lumber	Any hardwood	Firsts and Seconds, No. 1 Common, No. 2 Common.
Step plank	do	Firsts and Seconds, Common.
Lath	do	No. 1, No. 2.
Wagon stock—box boards	Poplar, *cottonwood*, gum, tupelo, magnolia, basswood.	1 grade.
Wagon stock: Axles, bolsters, sand boards, poles, reaches, eveners, singletrees, brakebeams, neckyokes, sawn felloes.	Hickory, oak	No. 1 and No. 2.
Construction material:		
Select car stock	White oak	1 grade.
Select dimension	Any hardwood	Do.
Freight-car stock	White oak, red oak	Do.
Common dimension	Any hardwood	Do.
Bridge and dock timbers.	do	Do.
Bridge plank	do	No. 1 and No. 2.
Crossing plank	do	1 grade.
Sheet piling	do	Do.
Sound square edge	do	Do.
Common timbers	do	Do.
Ties (switch and cross)	do	See rules of the American Standards Association.
Panel and wide no. 1	Poplar, cottonwood, gum	1 grade.
Panel stock	Cypress [3]	B and Better Finish.
Strips	Any hardwood	Clear, Sap (poplar only), Clear Sap (oak only), No. 1 Common, No. 2 Common, Wormy (mahogany only).
Flooring	Maple	See rules of the Maple Flooring Manufacturers' Association.
Do	Oak	See rules of the Oak Flooring Manufacturers' Association.
Hardwood molding and trim.	Any hardwood	See rules of the Hardwood Interior Trim Manufacturers' Association.
Hardwood dimensions	do	See rules of the Hardwood Dimension Manufacturers' Association.
Squares	do	Firsts and Seconds, No. 1 Common, Sound No. 2 Common, No. 3 Common.
Turning squares	do	No. 1 and No. 2 *(combined as 1 grade)*.
Furniture dimension stock	do	Clear, Selects, Common.
Rotary-cut veneer	Cottonwood, cypress, gum, poplar, sycamore, tupelo, yellow pine.	Faces, Sound Backs, Reject Backs, Drawer Bottoms, Crosshanding, Core or Center Stock, Selected or Unselected Log Run, Selected or Unselected Sheet Stock.
Do	*Red oak, white oak, chestnut.*	Faces, Sound Backs, Reject Backs, Sheet Stock.
Do	Ash, basswood, beech, birch, elm, maple.	No. 1 Grade, Select No. 1, No. 2 Grade, No. 3 Grade, Selected Sheet Stock, No. 1 Sheet Stock, No. 2 Sheet Stock.
Sawn and sliced veneer	Quartered white and red oak	Selected, Standard, Common.
Do	Plain white and red oak	Standard, Common.
Sawn veneer	Red gum	Do.
Do	Quartered red gum (figured)	Do.
Do	Quartered red gum (unfigured).	Do.
Sawn and sliced piano rim stock.	Any hardwood	1 grade.
Plywood	do	See rules of the Plywood Manufacturers' Association.

See footnote 3 on p. 4.

A brief summary of the hardwood grades is given below. This summary should not be regarded as a complete set of grading rules, as there are numerous details, exceptions, and special rules for certain species that are not included. The complete official rules of the association should be followed as the only full description of existing grades. The summary is intended only as a preliminary guide in distinguishing between the general qualities to be expected under the various grades.

SUMMARY OF STANDARD GRADES OF THE NATIONAL HARDWOOD LUMBER ASSOCIATION

WOODS INCLUDED [11]

Alder, red
Ash
Aspen
Basswood
Beech
Birch
Boxelder
Buckeye
Butternut
Cedar, red
Cherry
Chestnut
Cottonwood
Cypress
Elm:
  Rock (or cork)
  Soft
Gum:
  Black
  Red
  Tupelo
Hackberry
Hickory
Locust
Magnolia
Mahogany:
  African
  Cuban and San Domingan
  Mexican
  Philippine
Maple:
  Hard (or sugar)
  Soft
Oak:
  Red
  White
Pecan
Poplar
Sycamore
Walnut
Willow

STANDARD LENGTHS (FEET)

Standard lengths are 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16 feet, but not over 50 percent of odd lengths will be admitted.

STANDARD THICKNESSES (INCHES)

Rough	Surface 1 side (S1S)	Surfaced 2 sides (S2S)	Rough	Surface 1 side (S1S)	Surfaced 2 sides (S2S)
3/8	1/4	3/16	2 1/2	2 3/16	2 1/4
1/2	3/8	5/16	3	2 13/16	2 3/4
5/8	1/2	7/16	3 1/2	3 5/16	3 1/4
3/4	5/8	9/16	4	3 13/16	3 3/4
1	7/8	1 1/16	4 1/2		
1 1/4	1 1/8	1 3/16	5		
1 1/2	1 3/8	1 5/16	5 1/2		
2	1 13/16	1 3/4	6		

DESCRIPTION OF STANDARD HARDWOOD GRADES [1]

FIRSTS [2]

Lengths allowed (feet)	Widths allowed (inches)	Surface measure of pieces (square feet)	Percentage of each piece that must work into clear-face cuttings	Maximum number of cuttings allowed	Minimum size of cuttings required
8 to 16 (will admit 25 percent of 8 foot to 11 foot, half of which may be 8 foot and 9 foot).	6+	4 to 9	91 2/3	1	4 inches by 5 feet or 3 inches by 7 feet.
		10 to 14	91 2/3	2	
		15+	91 2/3	3	

SECONDS [2]

8 to 16 (will admit 25 percent of 8 foot to 11 foot, half of which may be 8 foot and 9 foot).	6+	4 and 5	83 1/3	1	4 inches by 5 feet or 3 inches by 7 feet.
		6 and 7	83 1/3	1	
		6 and 7	91 2/3	2	
		8 to 11	83 1/3	2	
		8 to 11	91 2/3	3	
		12 to 15	83 1/3	3	
		12 to 15	91 2/3	4	
		16+	83 1/3	4	

SELECTS

6 to 16 (will admit 30 percent of 6 foot to 11 foot, one sixth of which may be 6 foot and 7 foot).	4+	2 and 3	91 2/3	1	4 inches by 5 feet or 3 inches by 7 feet.
		4+	(3)		

[1] Inspection to be made on the poorer side of the piece, except in Selects. (See rules.)
[2] Firsts and Seconds are combined as one grade (FAS). The percentage of Firsts required in the combined grade varies from 20 to 40 percent, depending on the species. (See rules.)
[3] Same as seconds. See rule.

[11] Two of the words included, i.e., cedar (eastern red cedar) and cypress (southern cypress), are not hardwoods. Cypress lumber has a different set of grading rules from those used for the hardwoods. The cypress rules used by the National Hardwood Lumber Association are very similar to those used by the Southern Cypress Manufacturers' Association.

DESCRIPTION OF STANDARD HARDWOOD GRADES—Continued

NO. 1 COMMON

Lengths allowed (feet)	Widths allowed (inches)	Surface measure of pieces (square feet)	Percentage of each piece that must work into clear-face cuttings	Maximum number of cuttings allowed	Minimum size of cuttings required
4 to 16 (will admit 10 percent of 4 foot to 7 foot half of which may be 4 foot and 5 foot).	3+	1	100	0	4 inches by 2 feet or 3 inches by 3 feet.
		2	75	1	
		3 and 4	66⅔	1	
		3 and 4	75	2	
		5 to 7	66⅔	2	
		5 to 7	75	3	
		8 to 10	66⅔	3	
		11 to 13	66⅔	4	
		14+	66⅔	5	

NO. 2 COMMON

to 16 (will admit 30 percent of 4 foot to 7 foot, one third of which may be 4 foot and 5 foot).	3+	1	66⅔	1	3 inches by 2 feet.
		2 and 3	50	1	
		2 and 3	66⅔	2	
		4 and 5	50	2	
		4 and 5	66⅔	3	
		6 and 7	50	3	
		6 and 7	66⅔	4	
		8 and 9	50	4	
		10 and 11	50	5	
		12 and 13	50	6	
		14+	50	7	

SOUND WORMY

4 to 16 (will admit 10 percent of 4 foot to 7 foot, half of which may be 4 foot and 5 foot).	3+	(Cutting requirements same as in No. 1 Common, except that worm holes, bird pecks, sound stain, sound knots not over ¾ inch in diameter and other similar sound defects will be admitted in the cuttings.)

NO. 3A COMMON

4 to 16 (will admit 50 percent of 4 foot to 7 foot, half of which may be 4 foot and 5 foot).	3+	1+	[4] 33⅓	[5]	3 inches by 2 feet.

NO. 3B COMMON

4 to 16 (will admit 50 percent of 4 foot to 7 foot, half of which may be 4 foot and 5 foot).	3+	1+	[6] 25	[5]	1½ inches wide and containing at least 36 square inches.

[4] This grade also admits pieces which grade not below No. 2 Common on the good face and have the reverse face sound.
[5] Not specified.
[6] The cuttings must be sound; clear face not required.

The highest grade, Firsts, calls for pieces which will allow 91⅔ percent of their surface measure to be cut into clear-face material; i.e., not more than 8⅓ percent of each piece can be wasted in making the required cuttings. In the grade of Seconds, 83⅓ percent of the surface measure of the pieces must yield clear-face cuttings.[12] Both Firsts and Seconds require pieces not less than 6 inches wide and 8 feet long. In the grade Selects the minimum width is 4 inches and the minimum

[12] Boards 6 feet to 15 feet surface measure will admit of one additional cutting to yield 91⅔ percent clear face.

length 6 feet. Both Firsts and Seconds and the face side of Selects must in addition to cutting requirements also meet specified requirements as to the limitation of certain defects. The cutting requirements of Selects are 91⅔ percent clear face in pieces with 2 and 3 surface feet. In larger pieces the cutting requirements are the same as for Seconds on the face side. The reverse side of the cuttings in Selects must be sound or the reverse side of the piece not below No. 1 Common. The next two grades, No. 1 Common and No. 2 Common, call for material not less than 3 inches wide and 4 feet long and require [13] 66⅔ percent and 50 percent clear-face cuttings, respectively. The minimum size of cuttings in these two grades is reduced from 4 inches by 5 feet or 3 inches by 7 feet in Firsts, Seconds, and Selects to 4 inches by 2 feet or 3 inches by 3 feet.

In the grade of Sound Wormy the requirements are the same as in No. 1 Common except that worm holes and similar defects are allowed in the cuttings. The grade of 3A Common admits pieces that will furnish 33⅓ percent clear face in cuttings not less than 3 inches wide and 2 feet long. This grade will also admit pieces which grade not below No. 2 Common on the good face and have the reverse face of the cutting sound. The lowest grade, No. 3B Common, allows pieces that will cut 25 percent in sound material not less than 1½ inches wide and having at least 36 square inches surface measure.

The rules for grading hardwood lumber have no provisions at present for distinguishing between wood that is light and weak and wood that is heavy and strong. For example, if two pieces of ash have similar defects, the rules put them in the same grade in spite of the fact that the wood in one piece may be twice as strong as that in the other. For uses where strength is important some means under the grading rules of separating the light and heavy material would be advantageous. Density or dry weight is the best criterion of strength. The proportion of summerwood (the harder, darker part of the annual ring) in the cross section is quite frequently a good visual indicator of density. The rate of growth (number of annual rings per inch) is not a reliable indicator of density.

HARDWOOD FLOORING

Hardwood flooring is generally graded under the rules of the Maple Flooring Manufacturers' Association and the rules of the Oak Flooring Manufacturers' Association of the United States.[14] Tongued-and-grooved and end-matched hardwood flooring is commonly furnished. Square-edge and square-end strip flooring is also available, as well as parquetry flooring suitable for laying on a mastic base or on an ordinary subfloor.

The Maple Flooring Manufacturers' Association grading rules cover flooring manufactured from sugar maple (northern hard maple), beech, and birch as indicated below.

[13] Exceptions in No. 1 Common are pieces with 1 foot surface measure and 2 feet surface measure, which require 100 percent clear face and 75 percent clear face, respectively, and in No. 2 Common pieces with 1 foot surface measure, which require 66 percent clear face.

[14] Adopted by the National Hardwood Lumber Association.

MAPLE FLOORING MANUFACTURERS' ASSOCIATION

Grading rules for northern hard maple (*Acer saccharum*), beech, and birch flooring (adopted July 20, 1927—issue of July 1, 1929)

Species	Product	Grade
Sugar maple (northern hard maple), beech, and birch	Flooring	First Grade, Second Grade, Third Grade.
Sugar maple (northern hard maple)	do	White Clear (special grade).
Beech (northern beech)	do	Red Clear (special grade).
Birch (northern birch)	do	Do.

Each species has the three grades designated as First Grade, Second Grade, and Third Grade. There are also three special grades—White Clear Northern Hard Maple, Red Clear Northern Beech, and Red Clear Northern Birch—which are made up of special stock selected for uniformity of color. First Grade flooring must have one face practically free from all defects. Variations in the natural color of the wood are allowed. Second Grade flooring will admit tight, sound knots and slight imperfections but must lay without waste. Third Grade flooring has no restrictions as to defects but must be of such a character that it can be properly laid and will give a good serviceable floor. The standard thickness of maple, beech, and birch flooring is twenty-five thirty-seconds inch. Faces or widths are 1½ inches, 2 inches, 2¼ inches, and 3¼ inches. Standard lengths are from 2 to 16 feet in First Grade flooring and from 1 to 16 feet in Second Grade and Third Grade flooring.

The grading rules of the Oak Flooring Manufacturers' Association of the United States [15] cover quarter-sawed and plain-sawed oak flooring, as indicated below.

OAK FLOORING MANUFACTURERS' ASSOCIATION OF THE UNITED STATES

Oak flooring grading rules (effective Jan. 1, 1931)

Species	Product	Grade
Oak	Flooring	Quarter-sawed—Clear, Sap Clear, Select. Plain-sawed—Clear, Select, No. 1 Common, No. 2 Common.

Quarter-sawed flooring has three grades—Clear, Sap Clear, and Select. Plain-sawed flooring has four grades—Clear, Select, No. 1 Common, and No. 2 Common. The Clear grade in both plain- and quarter-sawed flooring must have one face practically free from defects except three eighths inch of bright sap. The question of color is not considered in any grade. Sap Clear quarter-sawed flooring must have one face practically clear but will admit unlimited bright sap. Select flooring (plain- or quarter-sawed) may contain sap and will admit a few defects such as pin worm holes and small tight knots. No. 1 Common plain-sawed flooring must contain material that will make a sound floor without cutting. No. 2 Common may contain defects of all kinds but must be usable with some cutting in laying a serviceable floor. Standard thicknesses of oak flooring are thirteen sixteenths inch, one half inch, and three

[15] Adopted by the National Hardwood Lumber Association.

eighths inch. Standard widths are 1½ inches, 2 inches, and 2¼ inches. Lengths in the upper grades are 2 feet and up, with a required average of 5 feet in a shipment. In the lower grades lengths are 1¼ feet and up, with a required average of 2½ or 3 feet.

The grading rules of the Southern Oak Flooring Industries of the United States [16] for oak flooring have the same grades as the rules of the Oak Flooring Manufacturers' Association and are practically identical with them. Slight differences [17] occur between the two sets of grading rules in the lengths allowed in several of the lower grades.

HARDWOOD INTERIOR TRIM

Hardwood interior trim and molding are generally graded under the rules of the Hardwood Interior Trim Manufacturers' Association [18] as indicated below.

HARDWOOD INTERIOR TRIM MANUFACTURERS' ASSOCIATION

Rules and regulations for hardwood interior trim and molding (adopted May 26, 1926)

Species	Product	Grade
Hardwoods (all species)	Interior trim and molding	Grade A.

The rules have only a single grade, designated as Grade A. This grade provides for practically clear-face trim, except for slight defects which vary with the species and are allowed in not over 10 percent of a shipment. Kiln-dried material is required, with a moisture content of not to exceed 10 percent when shipped from the mill. The design and sizes of trim and molding conform to American lumber standards.

HARDWOOD DIMENSION STOCK

Hardwood dimension stock, such as is used by furniture, cabinet, and automobile-body manufacturers, is generally graded under the rules of the Hardwood Dimension Manufacturers' Association, as indicated below.

HARDWOOD DIMENSION MANUFACTURERS' ASSOCIATION

Rules for measurement and inspection (issued Jan. 1, 1931)

Species	Product	Grade
Hardwoods (all species)	Kiln-dried glued dimension [1]	Clear Two Faces, Clear One Face, Paint, No. 1 Core, No. 2 Core.
Do	Solid dimension flat stock [1]	Clear, Select, Sound.
Do	Solid dimension squares [1]	Do.
Do	Automobile dimension [1]	Clear, Knot-Free, No. 1 Sound, No. 2 Sound.

[1] Furnished rough, semifinished, or finished as ordered.

These rules apply primarily to dimension stock cut from kiln-dried rough lumber and cover four classes of material—kiln-dried glued

[16] Effective Jan. 1, 1931.
[17] The latest rules of the Oak Flooring Manufacturers' Association and the Southern Oak Flooring Industries of the United States, effective Oct. 17, 1932, are identical.
[18] Adopted by the National Hardwood Lumber Association.

dimension, solid dimension flat stock, solid dimension squares, and automobile dimension. Each class may be rough, semifinished, or finished. Glued dimension has five grades—Clear Two Faces, Clear One Face, Paint, No. 1 Core, and No. 2 Core. Solid dimension flat stock and solid dimension squares have the same three grades—Clear, Select, and Sound. Automobile dimension has four grades—Clear, Knot Free, No. 1 Sound, and No. 2 Sound.

SOFTWOOD-LUMBER GRADING

Softwood lumber, unlike hardwood lumber, is graded under a number of different rules. Not only are the different kinds of softwoods graded under different rules, but the same softwoods in a number of cases are graded under different rules.

Various softwood sawmills originally made their own rules to suit their special conditions. While such an arrangement might be satisfactory where a mill supplied practically all the lumber used in its vicinity, as soon as mills with different rules for the same timber began to sell in the same territory, confusion and dissatisfaction were bound to result. As means of transportation grew easier and cheaper and lumber was shipped greater distances from its source, organizations of manufacturers and dealers in different regions drew up rules to enable them to handle lumber of standard sizes and with less misunderstanding as to quality. By the use of such rules manufacturers could tell more satisfactorily the quality of lumber wanted by dealers, and the dealers in turn could be surer that their orders would be correctly filled. These rules first classified the various kinds of lumber products, as siding, boards, ceiling, flooring, finishing, dimension, etc., and then specified the size and number of defects, such as knots and checks, allowed in the various grades of each product. At first the rules were comparatively simple, but they have been expanded, new ones added to cover special products, and the rules for any one product subdivided until a pamphlet of 50 or more printed pages may be required to describe the different grades, sizes, and shapes of the various lumber products of one kind of softwood.

The most common defects specified in softwood grading rules are knots, stain, shake, wane, rot, pitch, splits, seasoning checks, and manufacturing defects. Inspection is usually specified on the better or face side of the piece. However, factory lumber used for the manufacture of doors, sash, etc., which must show on both sides, is graded from the poor side of the piece.

In order to eliminate unnecessary differences in the grading rules of the various softwood lumber manufacturers' associations and to secure the improvement and simplification of these rules, American lumber standards were created. These standards were the result of a number of conferences organized by the Simplified Practice Division of the United States Department of Commerce and attended by representatives of lumber manufacturers, distributors, wholesalers, retailers, engineers, architects, and contractors. The United States Department of Agriculture through special studies by the Forest Products Laboratory of the Forest Service contributed part of the information that was needed in the formulation of the standards. The standards themselves were prepared under the auspices of the Central Committee on Lumber Standards and are issued in pamphlet

form as Simplified Practice Recommendations of the Bureau of Standards, United States Department of Commerce.[19] The members of the Central Committee on Lumber Standards are appointed by the Secretary of Commerce upon the recommendation of the lumber industry.

American lumber standards have been adopted in principle by the leading softwood lumber associations. The following is a brief summary of these standards.

SUMMARY OF AMERICAN LUMBER STANDARDS

American lumber standards at present deal with softwood lumber only. The names adopted for the various commercial softwoods as part of American lumber standards, several of the other names sometimes used, and the botanical name are given below:

NOMENCLATURE OF COMMERCIAL SOFTWOODS

(American lumber standards)

CEDARS AND JUNIPERS

Name adopted as standard under American lumber standards [1]	Other names sometimes used	Botanical name
Alaska cedar	Yellow cedar, Sitka cypress, yellow cypress	*Chamaecyparis nootkatensis.*
Eastern red cedar	Red cedar, cedar, juniper	*Juniperus virginiana.*
Incense cedar	Cedar, white cedar	*Libocedrus decurrens.*
Northern white cedar	Arborvitae, cedar, swamp cedar, white cedar	*Thuja occidentalis.*
Port Orford cedar	Lawson's cypress, Oregon cedar, white cedar	*Chamaecyparis lawsoniana.*
Southern white cedar	White cedar, swamp cedar, juniper	*Chamaecyparis thyoides*
Western juniper (this name includes 4 species).	Utah juniper	*Juniperus utahensis.*
	Alligator juniper	*Juniperus pachyphloea.*
	Rocky Mountain red cedar	*Juniperus scopulorum.*
	Western juniper	*Juniperus occidentalis.*
Western red cedar	Red cedar, cedar, western cedar	*Thuja plicata.*

CYPRESS

Red cypress [2] (coast type), yellow cypress [2] (inland type), white cypress [2] (inland type).	Cypress	*Taxodium distichum.*

DOUGLAS FIR

Douglas fir (coast type), red fir [3] (intermountain type), red fir [3] (Rocky Mountain type).	Red fir, Oregon fir, Douglas spruce, yellow fir, Puget Sound pine, fir.	*Pseudotsuga taxifolia.*

THE TRUE FIRS

Alpine fir	Balsam, white fir	*Abies lasiocarpa.*
Balsam fir (this includes 2 species).	Balsam fir	*Abies balsamea.*
	Southern balsam fir	*Abies fraseri.*
Golden fir [4]	Red fir	*Abies magnifica.*
Noble fir	do	*Abies nobilis.*
Silver fir	Red fir, white fir, fir	*Abies amabilis.*
White fir (this includes 2 species).	White fir	*Abies concolor.*
	Lowland white fir	*Abies grandis.*

[1] Where not otherwise indicated the name adopted for a single species by the Forest Service and under American lumber standards are in agreement. Where 1 name in the first column covers several species, the names in the second column are those adopted by the Forest Service.

[2] Name adopted by the Forest Service, southern cypress.

[3] Name adopted by the Forest Service, Douglas fir.

[4] Name adopted by the Forest Service, California red fir.

[19] UNITED STATES DEPARTMENT OF COMMERCE, BUREAU OF STANDARDS. LUMBER. U.S. Dept. Com., Bur. Standards, Simplified Practice Recommendation R16-29, Ed. 4. 1929.

NOMENCLATURE OF COMMERCIAL SOFTWOODS—continued

HEMLOCKS [5]

Name adopted as standard under American lumber standards	Other names sometimes used	Botanical name
Eastern hemlock	Hemlock, hemlock spruce, spruce pine	*Tsuga canadensis.*
Mountain hemlock	Weeping spruce, Alpine spruce, hemlock spruce	*Tsuga mertensiana.*
West coast hemlock [5]	Hemlock, hemlock spruce, Pacific hemlock, Alaska pine.	*Tsuga heterophylla.*

LARCH [6]

Western larch	Tamarack, larch	*Larix occidentalis.*

PINES

Arkansas soft pine (this includes 2 species).	Shortleaf pine	*Pinus echinata.*
	Loblolly pine	*Pinus taeda.*
Idaho white pine [7]	White pine, soft pine	*Pinus monticola.*
Jack pine	Scrub pine	*Pinus banksiana.*
Loblolly pine	Old-field pine, slash pine, shortleaf pine, Virginia pine, sap pine, yellow pine, North Carolina pine.	*Pinus taeda.*
Lodgepole pine	Scrub pine, spruce pine	*Pinus contorta.*
Longleaf pine	Southern pine, yellow pine, hard pine, Georgia pine, pitch pine, heart pine, fat pine, southern yellow pine.	*Pinus palustris.*
North Carolina pine (this includes 3 species).	Loblolly pine	*Pinus taeda.*
	Shortleaf pine	*Pinus echinata.*
	Virginia pine	*Pinus virginiana.*
Northern white pine	White pine, cork pine, soft pine, northern pine, pumpkin pine, eastern white pine.	*Pinus strobus.*
Norway pine	Red pine, hard pine, northern pine	*Pinus resinosa.*
Pond pine	Marsh pine, loblolly pine, spruce pine, bull pine	*Pinus rigida serotina.*
Ponderosa pine [8]	Western yellow pine, California white pine, bull pine, Arizona white pine, western soft pine, western pine.	*Pinus ponderosa.*
Shortleaf pine	Yellow pine, spruce pine, oldfield pine, Arkansas soft pine, North Carolina pine.	*Pinus echinata.*
Slash pine	Swamp pine, pitch pine	*Pinus caribaea.*
Southern pine (this includes the various commercial pines of the South.)	Longleaf pine	*Pinus palustris.*
	Shortleaf pine	*Pinus echinata.*
	Loblolly pine	*Pinus taeda.*
	Slash pine	*Pinus caribaea.*
	Pond pine	*Pinus rigida serotina.*
	Pitch pine	*Pinus rigida.*
Sugar pine	Big pine	*Pinus lambertiana.*

REDWOOD

Redwood	Sequoia, coast redwood	Sequoia sempervirens.

SPRUCES

Eastern spruce (this includes 3 species).	Red spruce	*Picea rubra.*
	White spruce	*Picea glauca.*
	Black spruce	*Picea mariana.*
Engelmann spruce	White spruce, silver spruce, balsam, mountain spruce.	*Picea engelmannii.*
Sitka spruce	Spruce, tideland spruce, western spruce, yellow spruce, silver spruce.	*Picea sitchensis.*

TAMARACK

Tamarack	Larch, hackmatack, red larch, black larch	*Larix laricina.*

YEW

Pacific yew	Yew, western yew, mountain mahogany	*Taxus brevifolia.*

[5] Name adopted by the Forest Service, western hemlock.
[6] See also tamarack.
[7] Name adopted by the Forest Service, western white pine.
[8] The name "ponderosa pine" was adopted by the Western Pine Association and by the U.S. Forest Service in 1931 to take the place of various names formerly used, such as California white pine, pondosa pine, and western yellow pine.

Figure 1 gives the classification of softwood lumber and the grade names adopted for the various classes of material. Softwood lumber is divided into three main classes—yard lumber, structural material (often referred to under the general term "timbers"), and factory and shop lumber.

YARD LUMBER—SIZE STANDARDS

Standard lengths are multiples of 2 feet except for the following odd lengths which are allowed:

2 by 4 inches, 6 by 8 inches	9 and 11 feet.
2 by 8 inches	13 feet.
2 by 10 inches	13 and 15 feet.

The thickness and widths of various yard lumber products in three conditions—rough green, rough dry, and dressed—are given in table 1. In commercial practice the dressed dimensions are considered minima, and some association rules provide for thicker and/or wider sizes than American lumber standards.

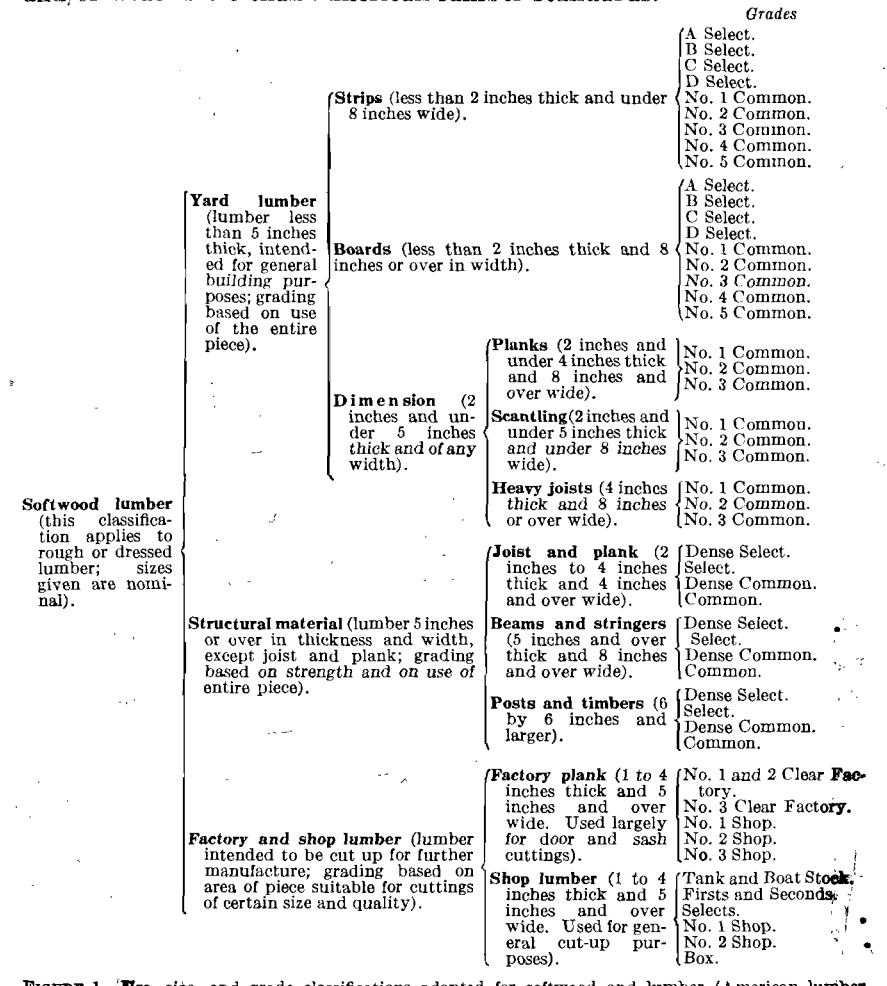

FIGURE 1.—Use, size, and grade classifications adopted for softwood and lumber (American lumber standards).

TABLE 1.—*Summary of American standard thicknesses and widths [1] for softwood yard lumber, including finish, boards, dimension, and heavy joist, siding, flooring, ceiling, partition, shiplap, and dressed and matched lumber*

Product	Rough green or nominal sizes (board measure)		Minimum rough-dry dimensions			Dressed dimensions		
			Thickness			Thickness		
	Thickness	Width	Standard yard [2]	Standard industrial	Width	Standard yard	Standard industrial	Width (face width) worked
	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Finish		3			2¾	5/16		2⅝
		4			3¾	7/16		[3] 5½
		5			4¾	9/16		[3] 4½
		6			5¾	1 1/16		[3] 5½
	1	7	29/32	[4] 39/32	6⅝	25/32	29/32	6¼
	1¼	8	1 3/16		7⅝	1 1/16		[3] 7¼
	1½	9	1 7/16		8⅝	1 5/16		[3] 8¼
	1¾	10	1 9/16		9⅝	1 7/16		[3] 9¼
	2	11	1⅝	[5] 1⅞	10⅜	1⅝	1⅝	[3] 10¼
	2½	12	2¼		11⅜	2⅛		[3] 11¼
	3		2⅝			2⅝		
Common boards and strips.	1	3	29/32	[4] 39/32	2¾	25/32	29/32	2⅝
	1¼	4	1 3/16		3¾	1 1/16		3⅝
	1½	5	1 7/16		4¾	1 5/16		4⅝
		6			5¾			5⅝
		7			6¾			6⅝
		8			7⅝			7½
		9			8⅝			8½
		10			9⅝			9½
		11			10⅝			10½
		12			11⅝			11½
Dimension and heavy joists.	2	2	1⅝	[5] 1⅞	1¾	1⅝	1⅝	1⅝
	2½	4	2¼		3¾	2⅛		3⅝
	3	6	2⅝		5¾	2⅝		5⅝
	4	8	3⅝		7⅝	3⅝		7½
		10			9⅝			9½
		12			11⅝			11½
Bevel siding		4				[6] 7/16 x 3/16		3½
		5				9/16 x 3/16		4½
		6						5½
Wide bevel siding		8				[6] 7/16 x 3/16		7¼
		10				9/16 x 3/16		9¼
		12				1 1/16 x 3/16		11¼
Rustic and drop siding (shiplapped).		4				9/16		3⅛
		5				¾		4⅛
		6						5 1/16
		8						6⅞
Rustic and drop siding (D. and M.).		4				9/16		3¼
		5				¾		4¼
		6						5 9/16
		8						7
Flooring		2				5/16		1½
		3				7/16		2⅜
		4				9/16		3¼
	1	5				25/32		4¼
	1¼	6				1 1/16		5 3/16
	1½					1 5/16		
Ceiling		3				5/16		2⅜
		4				7/16		3¼
		5				9/16		4¼
		6				1 1/16		5 3/16
Partition		3				¾		2⅜
		4						3¼
		5						4¼
		6						5 9/16
Shiplap	1	4				25/32		3⅛
		6						5⅛
		8						7⅛
		10						9⅛
		12						11⅛
Dressed and matched	1	4				25/32		3¼
	1¼	6				1 1/16		5¼
	1½	8				1 5/16		7¼
		10						9¼
		12						11¼

[1] The thicknesses apply to all widths and the widths to all thicknesses, with the following exceptions: in tongued-and-grooved flooring and in tongued-and-grooved and shiplapped ceiling 5/16, 7/16, and 9/16 inch thick, board measure, the tongue or lap shall be 3/16 inch wide, with over-all widths 3/16 inch wider than the face widths shown above. In all other patterned material, 1 1/16, ¾, 1, 1¼, and 1½ inches thick, board measure, the tongue shall be ¼ inch wide in tongued-and-grooved lumber and the lap ⅜ inch wide in shiplapped lumber, with the over-all widths ¼ and ⅜ inch wider, respectively, than the face widths shown above.

[2] 20 percent may be 1/32-inch scant.

[3] Based on kiln-dried lumber.

[4] 10 percent may be 1/32-inch scant.

[5] Minimum.

YARD LUMBER—GRADE STANDARD

Yard lumber from the standpoint of quality comprises in American lumber standards two main divisions, selects and common. Select lumber has 4 grades—A, B, C, and D. Common lumber has 5 grades—No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, and No. 5 Common. Figure 2 shows the general requirements of these grades.

SELECT-GRADE QUALITIES

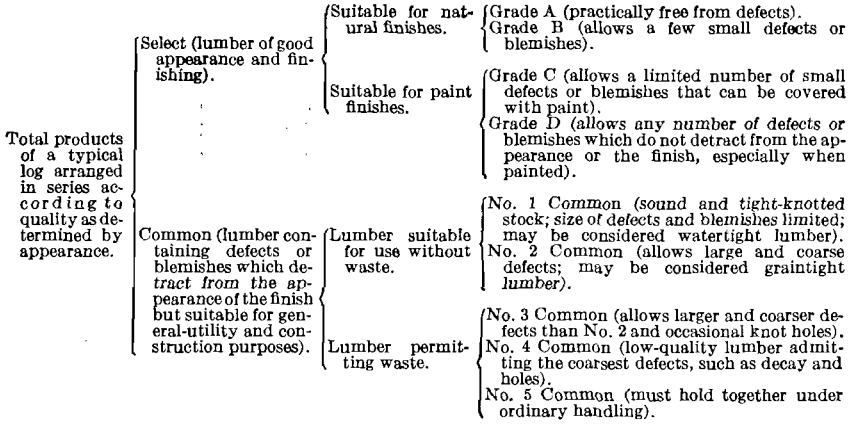

FIGURE 2.—Basic-grade classifications for softwood yard lumber (American lumber standards).

Select grades provide for good appearance and finishing qualities, grades A and B are suitable for natural, and grades C and D for paint finishes. Grade A is usually combined with grade B and sold as B and Better.

B and Better allows a few small defects. In practice these small defects take the form of minor imperfections in manufacture and seasoning, and, depending on the species, small pitch defects, or pin knots, or the like. Grade A pieces in the mixed grade are practically clear, but the average board contains one to two small defects.

Grade C is classified as allowing a limited number of small defects that can be covered with paint. Specifically the number of defects per board averages about twice that of B and Better, and the proportion of defects in grade C that are small knots is greater than in B and Better.

Grade D is classified as allowing any number of defects that do not detract from the appearance of the finish when painted. In practice the number of defects per board averages three to five times as many as in B and Better. Certain natural and manufacturing defects are not much more numerous in grade D than in grade C, but the number and size of the knots in D are considerably greater than in C, and usually the back is of somewhat lower quality. Commercial grading permits an occasional coarse defect in D that may be cut out with restrictions as to waste. Grade D is in reality a 1-face grade—that is, only one face shows in actual use.

The knots occurring in B and Better are predominantly under one half inch in diameter and have smooth, hard surfaces. A small proportion of the knots in grade C are as large as 1 inch in diameter, and a few are not of the best quality. A few knots in D are more than 1 inch in diameter and in quality are slightly soft, rough, or loose.

Seasoning defects, such as check, either in flat surfaces or at the ends of boards, are among the more frequent defects in the select grades. Seasoning defects often cause a lowering of grade. The number of defects as the result of seasoning is consiberably reduced at plants of careful manufacturers.

Pitch pocket is a relatively common defect in the select grades of several species but occurs less frequently than knots in all the important species except one. The variation among grades in the number and size of pitch pockets is not so marked as with knots. The frequency of pitch pockets as compared with other forms of pitch varies considerably among the species.

Among the other defects that are factors in the select grades are stain and chipped and torn grain and similar manufacturing defects.

COMMON-GRADE QUALITIES

Common grades contain defects that detract from the appearance of the finish but are suitable for general utility and construction purposes. The differences between the various common grades are due to the character more than to the number of defects. The number of defects in a board averages in different species about 5 to 20 per 8 board feet regardless of grade. No. 1 and No. 2 Common are for use without waste. No. 3, No. 4, and No. 5 Common permit a limited amount of waste.

No. 1 Common is described in the basic classification as sound and tight-knotted stock in which the size of the defects is limited. The provisions further state that it may be considered watertight lumber. In most species practically all boards in the grade contain knots, although in some species pitch defects are the predominant defect in the grade. The size of the knots varies with the species. From one half to three fourths of the knots are usually intergrown; the remaining knots are incased, a small proportion of which are unsound, broken, or checked.

No. 2 Common is classified as allowing large and coarse defects that may be considered grain-tight. In practice a limited amount of through-shake, through-pitch-pockets, and decay is permitted in the grade. The proportion of large knots is greater than in No. 1 Common, and whereas one third to two thirds of the knots are intergrown 10 percent or more are usually unsound, loose, or otherwise partially open. Some commercial rules allow knot holes provided they are strictly limited as to size and number.

No. 3 Common is classified as allowing larger and coarser defects than No. 2 Common and also occasional knot holes. A larger portion of large knots and increased amounts of shake, split, decay, and holes distinguish No. 3 Common from No. 2 Common.

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Grades No. 4 and No. 5 Common are provided for in American Lumber Standards but are not produced in some species. No. 4 Common is described in the basic-grade classification as a low-quality lumber admitting of the coarsest defects, such as decay and holes. The only requirement as to the quality of No. 5 Common lumber is that it hold together under ordinary handling.

In cases where commercial grading rules divide the entire range of common lumber into 3 grades instead of 5 grades as in American lumber standards, the first or highest grade of the 3-grade division will normally contain material with a wider range in quality than the first grade of the 5-grade division, and the third or lowest grade of the 3-grade division will contain lower quality material than the third grade of the 5-grade division. This situation and the differences in inherent properties of different species make it impossible to consider the common grades of corresponding name for the different woods as interchangeable in use. This is recognized in grade-use recommendations.

In most species one third to two thirds of the knots in the common grades are intergrown, whereas in the select grades intergrown knots comprise only a small proportion of the total. Intergrown knots may check if large, but they do not loosen or drop out, as they are integral parts of the wood.

In some species a large number of the incased knots remain tight, but in other species many of them loosen. The loosening becomes more pronounced in large knots and as the lumber becomes drier. As a rule incased knots comprise a larger percentage of the total number of knots in the small-knotted select grades than in the larger-knotted common grades.

Spike knots are formed by cutting a branch lengthwise rather than crosswise as is the case with round knots. Spike knots occur infrequently in grades better than No. 2 Common.

Wood that contains small areas of clearly evident decay is not permitted in grades better than No. 2 Common.

The defects found in the select grades are also found in the common grades usually to a greater degree. Split, shake, worm holes, and wane are also among the defects more frequently encountered in common grades.

STRUCTURAL MATERIAL—SIZE STANDARDS

Structural material is divided into three use classes—joist and plank, beams and stringers, and posts and timbers. Standard lengths in all three classes are in multiples of 2 feet, except for the following odd lengths which are allowed:

2 by 4, 6 by 8 inches	9 and 11 feet
2 by 8 inches	13 feet
2 by 10 inches	13 and 15 feet
8 by 8, 10 by 10, 12 by 12, 14 by 14, 16 by 16, 18 by 18 inches	11 and 13 feet
6 by 16, 6 by 18, 8 by 16, 8 by 18 inches	15 and 17 feet

The thicknesses and widths adopted as standard for each of the three classes of structural material are given in table 2.

TABLE 2.—*American standard thicknesses and widths for structural material*

Product	Thicknesses (inches)		Widths (inches)	
	Nominal	Standard [1] (S1S or S2S)	Nominal	Standard [1] (S1E or S2E)
Joist and plank	2 to 4	⅜ off	4 and up	⅜ off 4 to 7. ½ off 8 and up.
Beams and stringers	5 and up	½ off	8 and up	½ off.
Posts and timbers	6 and up	½ off	6 and up	½ off.

[1] "⅜ *off*" means ⅜ inch less than nominal.

STRUCTURAL MATERIAL—GRADE STANDARDS

Structural material is graded on a basis of strength and is intended for use where working stresses [20] are required. Each of the three use classifications of structural material given in American lumber standards has four basic grade classifications—Dense Select, Select, Dense Common, and Common. The term "dense" refers to the main requirement that the cross section must contain an average of not less than one third summer wood [21] and an average of not less than six annual rings per inch. The dense requirement applies only to southern pine, douglas fir, and western larch, in which the summer wood and spring wood are comparatively distinct and can be measured. Each of the four grades has other equally important requirements as to the number, location, and size of defects and slope of grain. These requirements are the same for the two select grades and the same but less exacting for the two common grades.

FACTORY AND SHOP LUMBER—SIZE STANDARDS

The standard lengths of factory and shop lumber are 6 feet and over in multiples of 1 foot.[22]

The standard widths are 5 inches and over.[23]

The standard thicknesses are as follows:

Nominal thickness (inches)	Finished thicknesses S1S or S2S (inches)	Nominal thickness (inches)	Finished thicknesses S1S or S2S (inches)
1	25/32 or 26/32	2¼	2⅛
1¼	1 5/32	2½	2⅜
1½	1 13/32	3	2⅞
2	1 29/32	4	3⅞

FACTORY AND SHOP LUMBER—GRADE STANDARDS

Factory and shop lumber is divided into two classes from the standpoint of use—factory plank and shop lumber—each of which has a different set of grades. These grades are based on the percentage of the area of each board or plank that will furnish cuttings of specified

[20] The allowable stress to which the piece may be subjected without fear of breakage or undue bending.
[21] The hard dark portion of the annual ring. The lighter portion is called the "spring wood."
[22] Except the Box grade of shop lumber, in which the standard lengths are 4 feet and over.
[23] Usually shipped in random widths. Specified widths may be shipped.

sizes and qualities except in the upper grades of shop lumber of all thicknesses.

Factory plank, which is 1¼ inches and thicker and used largely for door and sash cuttings, is classified under American lumber standards as shown in figure 3. The No. 1 cuttings referred to in the grade requirements for factory plank (fig. 3) must be free of defects on both sides. The No. 2 cuttings may contain any one of the following seven defects: A limited amount of blue or brown stain, a small tight knot, a small pitch pocket or streak, small season checks, and slightly torn grain. The cuttings are of various lengths and widths, depending on what door (or sash) parts they are used for.

- **Factory plank** (factory lumber graded with reference to its use for doors, sash, and other cuttings).
  - **Factory clears** (upper grades of factory plank containing a high percentage of best-quality cuttings).
    - **Nos. 1 and 2 ClearFactory** (lumber practically clear in wide sizes, to contain not less than 85 percent of no. 1 *door cuttings, not including pieces with over two* muntins, or mintins only).
    - **No. 3 Clear Factory** (lumber containing not less than 70 percent of no. 1 door cuttings, not including pieces with over two *muntins, or mintins only*).
  - ***Shop*** (lower grades of factory plank yielding smaller percentages in smaller and lower quality cuttings).
    - **No. 1 Shop** (lumber of high-quality factory grade containing not less than 50 percent of no. 1 door cuttings, *allowing, if necessary, one no. 2 stile in any piece, but* no pieces with over two muntins, or muntins only).
    - **No. 2 Shop** (lumber containing not less than 25 percent of no. 1 door cuttings, or 40 percent of no. 2 door cuttings, or 33⅓ percent of mixed door cuttings).
    - **No. 3 Shop** (lumber of a shop type below the grade of no. 2 Shop and better than box lumber).

FIGURE 3.—Basic grade classifications for softwood factory plank (American lumber standards).

- **Shop lumber** (shop lumber graded for cuttings of minimum and larger sizes, or for permissible defects, with reference to its use for general cut-up purposes).
  - **1-inch thick** (applies to northern and western pines and other west coast woods).
    - **Select** (lumber to contain not less than 70 percent of (*a*) and/or (*b*) cuttings).
    - **Shop** (lumber to contain not less than 50 percent of (*a*) and/or (*b*) cuttings).
  - **All thicknesses** (applies to cypress, redwood, and western red cedar).
    - **Tank and boat stock** (lumber admitting sound defects that do not impair the usefulness of each piece for the use intended).
    - **Firsts and seconds** (lumber of C Select or better quality on the reverse side, suitable for remanufacture into products requiring both faces of good quality).
    - **Selects** (lumber of C Select or better quality on the face side suitable for remanufacture into products requiring one face of good quality).
    - **No. 1 Shop** (lumber to contain not less than 60 percent of (*a*) and/or (*b*) cuttings).
    - **No. 2 Shop** (lumber to contain not less than 40 percent of (*a*) and/or (*b*) cuttings.
    - **Box** (lumber below the grade of No. 2 Shop to contain not less than 66⅔ percent sound cuttings not less than 3 inches wide and 18 inches long).

FIGURE 4.—Basic grade classifications for softwood shop lumber (American lumber standards).

Shop lumber, which is used for general cut-up purposes, is classified as shown in figure 4. The (*a*) cuttings referred to in the grade requirements for shop lumber must be at least 9½ inches wide and 18 inches long and the (*b*) cuttings at least 5 inches wide and 3 feet long. (*a*) Cuttings less than 3 feet long must be free from defects on both sides. Other (*a*) cuttings together with (*b*) cuttings will allow a limited number of small defects that can be covered with paint. Shop lumber grades in some woods are available in only 1-inch stock. Thick stock in these woods for cut-up purposes is bought under factory-plank rules.

SOFTWOOD ASSOCIATION GRADING RULES [24]

The following are brief statements about the principal grading rules for a number of the important species of softwoods, together with lists of the grades adopted for various softwood products by the principal lumber associations.

DOUGLAS FIR

Douglas fir is graded under the rules of the West Coast Lumbermen's Association, as are Sitka spruce, western red cedar, and west coast hemlock. Douglas fir is also graded under the rules of the Western Pine Association, as are ponderosa pine, sugar pine, Idaho white pine, western larch, white fir, Engelmann spruce, and western red cedar. The rules of the West Coast Lumbermen's Association apply to Douglas fir of the coast region, while those of the Western Pine Association apply to Douglas fir of the "Inland Empire" and California regions.

The rules of the West Coast Lumbermen's Association include over 50 lumber products manufactured from Douglas fir, such as finish, casing and base, flooring, siding, common boards, dimension, factory lumber, timbers, car material, etc., and in addition miscellaneous products, such as windmill stock, wagon bottoms, piano posts, etc.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—WEST COAST LUMBERMEN'S ASSOCIATION

Standard grading and dressing rules for Douglas fir, Sitka spruce, west coast hemlock, and western red cedar (effective July 1, 1929) and structural grades for Douglas fir (revised Aug. 30, 1932, and effective Jan. 1, 1933)

DOUGLAS FIR

Product	Grade
Yard lumber:	
Stepping (vertical grain)	B and Better, C.
Finish (flat grain and/or vertical grain).	*B and Better, C, D.*
Casing and base (flat grain and/or vertical grain).	Do.
Rough clears (flat grain and/or vertical grain).	B and Better, C.
Rough green clears (flat grain and/or vertical grain).	Do.

[24] The following is a statement prepared by the Central Committee on Lumber Standards as to the conformance of the grading rules of the principal softwood lumber manufacturers' associations to American lumber standards:

"As of Oct. 1, 1932, the grading rules of the following softwood manufacturers' associations, published upon the basis of the American lumber standards, conform to the essential provisions of the standards listed below, except in those few instances where the inherent characteristics of the species in question or the methods of their manufacture require minor variations from the standards. These variations from the standards are clearly indicated in the grading rule books.

Essential provisions

1. Species nomenclature.
2. Definitions of defects and blemishes.
3. General grading provisions.
4. Description, measurement, and tally.
5. Sizes.
6. Workings.
7. Grade names and qualities.
8. Shipment and inspection provisions.

Association	Species covered by grading rules
California Redwood Association	California redwood.
Northern Hemlock and Hardwood Manufacturers Association.	Eastern hemlock, tamarack.
Southern Cypress Manufacturers Association.	Red Cypress (coast type).
Southern Pine Association	Longleaf and shortleaf southern pine (including North Carolina pine).
West Coast Lumbermen's Association	Douglas fir, west coast hemlock, Sitka spruce, western red cedar.
Western Pine Association	Ponderosa pine, sugar pine, Idaho white pine, larch, Douglas fir (Inland Empire, and California), white fir, Engelmann spruce, incense cedar, and western red cedar."

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—WEST COAST LUMBERMEN'S ASSOCIATION—continued

DOUGLAS FIR—continued

Product	Grade
Yard lumber—Continued	
Turning squares	B and Better.
Flooring (vertical grain)	A, B, C, D, E.
Flooring (flat grain)	B and Better, C, D, E.
Drop siding, rustic (flat grain and/or vertical grain).	B and Better C, D.
Bungalow or colonial siding (flat grain and/or vertical grain).	B and Better.
Bevel siding	A, B, C.
Ceiling (flat grain and/or vertical grain).	B and Better, C, D.
Partition	Do.
Corn cribbing, green or air-dry	C and Better, Selected Common.
Silo staves	B and Better, C, Selected Common.
Battens	1 grade.
Molding stock	Do.
Moldings	B and Better.
Common boards, shiplap (D. and M.).	Selected Common, No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common.
Dimension, planks, small timbers (2 to 4 inches thick).	Selected Common, No. 1 Common, No. 2 Common, No. 3 Common.
Factory and shop lumber:	
Factory lumber (inch)	Inch Select Shop, Inch No. 1 Shop.
Door stock (1¾ inch and thicker)	Factory Select, No. 1 Shop Common, No. 2 Shop Common, No. 3 Shop Common or Sash.
Cut door stock (stiles, rails and muntins).	No. 1, No. 2, No. 3.
Structural material:	
Timbers (5 by 6 inches and larger)	Select Common, No. 1 Common, No. 2 Common, No. 3 Common.
Stringers (6 by 6 inches and larger)	Selected Common, No. 1, Common.
Posts and timbers	Dense Select Structural, Select Structural, No. 1 Timbers.
Joists, rafters, plank, small timbers	Dense Select Structural, Select Structural, No. 1 Dimension.
Stringers, girders, beams	Dense Select Structural, Select Structural.
Car material:	
Car sills	Selected Common, No. 1 Common.
Car framing (flat grain and/or vertical grain).	B and Better, C.
Running boards (flat grain and/or vertical grain).	B and Better, C, C and Better.
Car siding (vertical grain or flat grain).	B and Better, C.
Car lining	B and Better (flat grain and/or vertical grain), C (flat grain and/or vertical grain), Selected Common.
Insulation	1 grade.
Car roofing	B and Better (flat grain and/or vertical grain), C (flat grain and/or vertical grain), Selected Common.
Car decking	B and Better (vertical grain or flat grain), C (flat grain and/or vertical grain), Selected Common, No. 1 Common.
Horizontal car sheathing	B and Better (vertical grain or flat grain), C (flat grain and/or vertical grain), Selected Common.
Miscellaneous:	
Well tubing (dressed and matched), green or air-dry.	C and Better.
Windmill stock	1 grade.
Lath	No. 1, No. 2.
Bykit lath	1 grade.
Pickets	Do.
Turned porch columns	Do.
Ties	Select, No. 1, No. 2.
Walking Beams	Structural.
Wagon bottoms	B and Better (flat grain), B (vertical grain).
Pipe stave stock	1 grade.
Tank stock	Do.
Ladder and pike pole stock	Do.
Pole stock	Do.
Cross-arm stock	Do.
Piano posts	B and Better.
Ship decking	1 grade.
Ship plank (rough)	Do.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—WEST COAST LUMBERMEN'S ASSOCIATION—continued

SITKA SPRUCE

Product	Grade
Stepping (vertical grain)	B and Better, C.
Finish	Do.
Rough clears (flat grain and/or vertical grain).	Do.
Rough green clears (flat grain and/or vertical grain).	Do.
Turning squares	B and Better.
Flooring	Do.
Bungalow or colonial siding	Do.
Bevel siding	A, B, C.
Ceiling (flat grain and/or vertical grain).	B and Better.
Partition	Do.
Molding stock	1 grade.
Moldings	B and Better.
Lath	No. 1, No. 2.
Common boards	Selected Common, No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common.
Dimension and plank	Selected Common, No. 1 Common, No. 2 Common, No. 3 Common.
Factory lumber (inch)	Inch Select Shop, Inch No. 1 Shop.
Factory lumber (1¼ inches and thicker).	Factory Select, No. 1 Shop Common, No. 2 Shop Common, No. 3 Shop Common.
Cut door stock (stiles, rails, and muntins).	No. 1, No. 2, No. 3.
Ladder stock	1 grade.
Piano posts	Subject to contract.
Sounding board stock	Do.
Airplane stock	Do.
Box lumber	No. 1, No. 2, No. 3.

WESTERN RED CEDAR

Bevel siding, bungalow siding, colonial siding.	Clear, A, B, C.
Finish	B and Better, C, D.
Porch decking, flooring, ceiling	B and Better, C.
Porch columns	1 grade.
Lath	No. 1, No. 2.
Common boards, shiplap or dressed and matched).	Selected Common, No. 1 Common, No. 2 Common, No. 3 Common.
Common timbers (6 by 6 inches and larger).	No. 1 Common, No. 2 Common.
Structural posts and timbers	Structural.
Structural joists and plank	Do.
Structural stringers	Do.
Plank	No. 1 Common, No. 2 Common.
Capping	1 grade.
Grooved trunking	Do.
Moldings	B and Better
Pickets	1 grade.
Tank stock	Do.
Battens	Do.
Box	Do.
Shop lumber	Firsts and Seconds, Factory Select or Third Clear, No. 1 Shop, No. 2 Shop.
Factory plank	No. 1 and No. 2 Clear Factory, No. 3 Clear Factory, No. 1 Shop, No. 2 Shop, No. 3 Shop.
Shingles [1]	No. 1 Grade, No. 2 Grade, No. 3 Grade.

WEST COAST HEMLOCK

Stepping (vertical grain)	B and Better, C.
Finish (flat grain and/or vertical grain)	B and Better, C, D.
Casing and base (flat grain and/or vertical grain).	Do.
Rough clears	B and Better, C.
Rough green clears	Do.
Flooring (vertical grain)	A, B, C, D, E.
Flooring (flat grain)	B and Better, C, D, E.
Drop siding, rustic	B and Better, C, D.
Bungalow or colonial siding	B and Better.

[1] Graded under the rules of the Red Cedar Shingle Bureau.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—WEST COAST LUMBERMEN'S ASSOCIATION—continued

WEST COAST HEMLOCK—continued

Product	Grade
Bevel siding	B and Better, C, D.
Ceiling	Do.
Partition	Do.
Battens	1 grade.
Molding stock	Do.
Moldings	B and Better.
Lath	No. 1, No. 2.
Common boards, shiplap (dressed and matched).	Selected Common, No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common.
Dimension and plank	Selected Common, No. 1 Common, No. 2 Common, No. 3 Common.
Car siding	B and Better, C.
Car lining	B and Better (F. G. and/or V. G.), C (F. G. and/or V. G.), Selected Common.
Car roofing	B and Better (F. G. or V. G.), C (F. G. and /or V. G.), Selected Common.
Factory lumber (inch)	Inch Select Shop, Inch No. 1 Shop.
Door stock (1¼ inches and thicker)	Factory Select, No. 1 Shop Common, No. 2 Shop Common, No. 3 Shop Common or Sash.
Cut door stock (stiles, rails, or muntins)	No. 1, No. 2, No. 3.
Ladder and pike pole stock	1 grade.
Box lumber	No. 1, No. 2, No. 3.

Yard lumber [25] has B and Better as the highest grade for the select (finish) products. These products generally have two or three grades —B and Better, C, and D, or B and Better and C. Vertical grain flooring has four grades—A, B, C, and D. For flat-grain flooring the grades are B and Better, C, and D. Common boards, dimension, plank, and also timbers and stringers not placed in the structural grades all have Selected Common [26] as their highest grade, followed by No. 1 Common, No. 2 Common, etc. Many of the Douglas fir products and grades provide for either vertical grain or flat grain material or for a mixture of both.

Factory lumber (inch) has two grades—Inch Select Shop and Inch No. 1 Shop. Door stock has as its highest grade Factory Select followed by three Shop Common grades.

Douglas fir structural material under the rules of the West Coast Lumbermen's Association is divided into three use classes—posts and timbers (columns); joists, rafters, and plank; and beams, girders, and stringers. Posts and timbers (columns) have the three grades—Dense Select Structural, Select Structural, and No. 1 Timbers. Joists, rafters, and plank have the three grades—Dense Select Structural, Select Structural, and No. 1 Dimension. Beams, girders, and stringers have the two grades—Dense Select Structural and Select Structural. The density provision in the highest grade of each class calls for one end of each piece to show an average of not less than 6 rings per inch and not less than one third summer wood. The second grade, Select Structural, must show on one end of each piece an average of not less than 6 nor more than 20 rings per inch. The two highest grades, Dense Select Structural and Select Structural,

[25] Optional seasoning specifications for yard lumber have recently been incorporated in the grading rule of the West Coast Lumbermen's Association. The general provisions of these optional specifications are that finish lumber of the two grades B and Better and C shall have not more than 10 percent moisture in lumber 1 inch thick and less, and not more than 12 percent moisture in lumber 1¼ to 2 inches thick and that common lumber in the three grades Selected Common, No. 1 Common, and No. 2 Common shall have not more than 20 percent moisture in boards 1 inch thick and less and not more than 22 percent moisture in dimension and planks 2 inches thick and less.

[26] This grade not included in American lumber standards basic grade classification.

have the same limitations as to slope of grain and as to knots and checks. Any number of sound knots of certain sizes are admitted if not in clusters in posts and columns and in joists, rafters, and plank. In beams, girders, and stringers there are additional limitations as to the position of knots. In the lowest grade of posts and timbers (No. 1 Timbers) and in the lowest grade of joists, rafters, and plank (No. 1 Dimension) the requirements as to slope of grain and defects are more liberal than in the Select Structural grades.

Car material includes sills graded as Selected Common and No. 1 Common, framing graded as B and Better and C, and other car parts.

Miscellaneous Douglas fir products generally have only one grade or are manufactured in only one quality.

The rules of the Western Pine Association cover Douglas fir grown in the "Inland Empire"[27] and California. "Inland Empire" Douglas fir and western larch are commonly logged together and sold in mixture. A statement about these rules as applied to fir and larch yard lumber will be found under western larch.

"Inland Empire" and California Douglas fir structural material is graded under a supplement to the Standard Grading Rules [28] covering structural grades and dated June 15, 1931. This supplement covers two classes of material—posts and timbers, and joists and plank (see grades for ponderosa pine and other species). Each class has three grades—Select Structural, Structural, and Common Structural. The Select Structural grade has certain limitations as to defects and requires close-grained and dense material, i.e., an average of six annual rings to the inch on one end of each piece and one third or more of summer wood (the dark portion of the annual ring). Dense material is not required in the other two grades, and more defects are allowed.

EASTERN HEMLOCK

Eastern hemlock is graded under the rules of the Northern Hemlock and Hardwood Manufacturers' Association. Finishing lumber has one grade—D and Better Finish. Common boards, strips, dressed and matched shiplap, and dimension or piece stuff have six grades—No. 1 Common, No. 2 Common, Merchantable,[29] No. 3 Common, No. 4 Common, and No. 5 Common. Flooring, siding, partition, and ceiling have four grades—D and Better, No. 1 Common, No. 2 Common, No. 3 Common. Heavy joists are graded as No. 1 Common and No. 2 Common. In the No. 1 Common grade shake is admitted that does not impair the strength of the piece and also scattered sound knots up to 3 inches in diameter. Wane and open heart checks are allowed with limitations. The No. 2 Common grade for heavy joists admits more and larger defects than No. 1 Common grade as long as the defects are not in what the rules term "serious combinations." The defects in No. 2 Common are not necessarily sound. Timbers have three grades—No. 1 Common, No. 2 Common, and Mine and Dock Structural. The highest grade, No. 1 Common, may contain what the rules term "reasonably sound" knots that do not weaken the piece for general use. Some wane is allowed. The other grades of timbers have fewer limitations as to the number and quality of the defects allowed.

[27] The "Inland Empire" includes western Montana, Idaho, eastern Washington, and eastern Oregon.
[28] Rules of the Western Pine Association.
[29] A special grade, not included in American lumber standards basic grade classification.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—NORTHERN HEMLOCK AND HARDWOOD MANUFACTURERS ASSOCIATION

Official grading rules for hemlock and tamarack lumber and white cedar shingles (revision of Feb. 18, 1930)

Product	Grade
Finishing lumber	D and Better Finish.
Common boards and strips	No. 1 Common, No. 2 Common, Merchantable,[1] No. 3 Common No. 4 Common, No. 5 Common.
Dressed and matched (D and M) and shiplap.	Do.
Flooring, ceiling, partition, and siding.	D and Better, No. 1 Common, No. 2 Common, No. 3 Common.
Dimension or piece stuff	No. 1 Common, No. 2 Common, Merchantable,[1] No. 3 Common, No. 4 Common, No. 5 Common.
Byrkit lath	1 grade.
Hemlock lath	No. 1, No. 2, No. 3.
Heavy joists	No. 1 Common, No. 2 Common.
Timbers	No. 1 Common, No. 2 Common, *Mine and Dock Structural.*
Shingles (northern white cedar)	Extra Star-A-Star, Standard Star-A-Star, Sound Butts.

[1] Special grade consisting of 50 percent No. 1 Common and 50 percent No. 2 Common.

EASTERN RED CEDAR (AROMATIC RED CEDAR)

Eastern red cedar (aromatic red cedar), although a softwood, is graded under the rules of the National Hardwood Lumber Association. The only product listed is lumber. The highest grade is Firsts and Seconds followed by No. 1 Common, No. 1 Common and Better, and No. 2 Common. In the Firsts and Seconds grade lengths of 4 feet and up are allowed and widths of 3 inches[30] and up. The lowest grade, No. 2 Common, allows 2-foot lengths and 2-inch widths. Sound knots are not considered a defect.

ENGELMANN SPRUCE

Engelmann spruce is graded under the rules of the Western Pine Association. A statement about these rules, with the products and grades of Engelmann spruce, will be found under ponderosa pine.

INCENSE CEDAR

Incense cedar is used almost entirely for pencil stock. It is graded under the rules of the Western Pine Association. The rules provide for three grades of material—No. 1 Pencil Stock, No. 2 Pencil Stock, and No. 3 Pencil Stock (see grades for ponderosa pine, etc.). All pencil stock must be in the form of squares 8 inches or multiples of 8 inches in length and equal to the thickness of the piece in width. No. 1 Stock must contain 50 percent or more of squares free from defects. No. 2 must contain from 25 percent to 50 percent of squares free from defects and No. 3, 12½ percent to 25 percent of squares free from defects.

NORTHERN WHITE PINE

Northern white pine is graded under the rules of the former Northern Pine Manufacturers' Association, as are white spruce, black spruce, and tamarack. Finish lumber has three grades—B Select and Better, C Select, and D Select, as shown below. Bevel siding has four grades—B and Better, C, D, and E.[31] Common lumber, including boards and strips, has five grades—No. 1 Common, No. 2 Common,

[30] Except in 4-foot lengths in which the width must be 4 inches.
[31] This grade not included in American lumber standards basic grade classification.

etc. Flooring has four grades. The highest, D, is a select-lumber grade. The other three are common-lumber grades. They are No. 1 Common D and M, No. 2 Common D and M, and No. 3 Common D and M. Ceiling, siding, and partition are graded as No. 1 Common, No. 2 Common, and No. 3 Common. Dimension and timbers are graded as Tank Stock,[32] Select Common,[32] No. 1 Dimension and Timbers, No. 2 Dimension and Timbers, No. 3 Dimension and Timbers. Tank Stock, the highest grade of dimension and timbers, is required to be practically free from wane and shakes but may have any number of sound water-tight knots. Factory lumber has five grades—No. 1 Shop Common, No. 2 Shop Common, No. 3 Shop Common, Inch Shop Common, and Short Box.[32]

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—NORTHERN PINE MANUFACTURERS ASSOCIATION [1]

Rules for the grading of northern pine,[2] spruce,[3] and tamarack lumber (edition of Apr. 15, 1925)

Product	Grade
Finish	B Select and Better, C Select, D Select.
Bevel Siding	B and Better, C, D, E.
Common lumber (boards and strips)	No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, No. 5 Common.
Flooring	D, No. 1 Common D and M, No. 2 Common D and M, No. 3 Common D and M.
Ceiling, Drop siding, and partition	No. 1 Common, No. 2 Common, No. 3 Common.
Dimension and timbers	Tank Stock, Select Common, No. 1, No. 2, No. 3.
Factory lumber	No. 1 Shop Common, No. 2 Shop Common, No. 3 Shop Common, Inch Shop Common, Short Box.
Lath	No. 1 White Pine,[4] No. 1 Mixed,[5] No. 2.[5]

[1] Disbanded during 1930.
[2] The term "northern pine" aa here used includes northern white pine (*Pinus strobus*) and Norway pine (*P. resinosa*).
[3] The term "spruce" as here used includes white sprice (*Picea glauca*) and black spruce (*P. mariana*).
[4] Same as northern pine.
[5] Includes only northern pine and spruce.

PONDEROSA PINE

Ponderosa pine is graded under the rules of the Western Pine Association, as are sugar pine, Idaho white pine, western larch, white fir, Engelmann spruce, and western red cedar. Finish, ceiling, and drop siding manufactured from ponderosa pine have three grades—B Select and Better or No. 1 and 2 Clear, C Select, and D Select. Bevel siding, colonial siding, and bungalow siding have four grades—B and Better Siding, C Siding, D Siding, and E Siding.[32] Moldings have only one grade designated as "Standard Grade." Each of the common-lumber products, inch common and thick common, has five grades—No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, and No. 5 Common. Shiplap, grooved roofing, and drop siding are also manufactured in the five common grades. Tank stock has one grade. Factory lumber is graded as No. 3 Clear Factory, No. 1 Shop, No. 2 Shop, and No. 3 Shop. The two products —cut sash and door stock [33]—each have two grades—No. 1 and No. 2. Inch factory lumber is graded as Inch 3 Clear Factory, Inch Shop, No. 1 Box,[34] No. 2 Box,[34] and Short Box. Dimension and timbers are graded as No. 1 Dimension, No. 2 Dimension, and No. 3 Dimension.

[32] This grade name not included in American lumber standards basic grade classification.
[33] Door stock includes door stiles, rails, and muntins.
[34] No. 1 Box and No. 2 Box take the place of Inch Box Lumber and Thick Box Lumber, respectively

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—WESTERN PINE ASSOCIATION

Standard grading rules for ponderosa pine, sugar pine, Idaho white pine, larch,[1] Douglas fir, white fir, spruce,[2] and cedar [3] lumber (effective July 1, 1929)

PONDEROSA PINE, SUGAR PINE, IDAHO WHITE PINE, WHITE FIR, DOUGLAS FIR, SPRUCE, CEDAR

Product	Grade
Finish, ceiling, partition, drop siding [4]	*B Select* and Better or *1* and *2 Clear, C Select, D Select.*
Bevel siding, colonial siding, bungalow siding.	B and Better Siding, C Siding, D Siding, E Siding.
Moldings	"Standard Grade."
Inch common, thick common [5]	*No. 1 Common, No. 2 Common,* No. 3 Common, No. 4 Common, No. 5 Common.
Shiplap, grooved roofing	Do.
Tank stock	1 grade.
Factory lumber	No. 3 Clear Factory, No. 1 Shop, No. 2 Shop, No. 3 Shop.
Cut sash, door stock	No. 1 and No. 2 Sash, No. 1 and No. 2 Door Stiles, rails, and muntins.
Inch factory lumber.	Inch 3 Clear Factory, Inch Shop, No. 1 Box, No. 2 Box, Short Box.
Dimensions and timbers	No. 1, No. 2, No. 3.

DOUGLAS FIR ("INLAND EMPIRE"), LARCH [6]

Finish	C and Better, D.
Common lumber [7]	No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, No. 5 Common.
Car materials:	
Running boards	B and Better Select, C Select.
Car lining	B and Better Select, C Select, Selected Common.
Car roofing	Do.
Car siding	B and Better Select, C Select.
Car decking	Selected Common, No. 1 Common.
Sheathing (horizontal)	Selected Common.
Structural material: [8]	
Posts and timbers	Select Structural, Structural, Common Structural.
Joists and plank	Do.

INCENSE CEDAR

Pencil stock	No. 1 Pencil Stock, No 2 Pencil Stock, No. 3 Pencil Stock.

ALL SPECIES

Lath (1 species)	No. 1, No. 2.
Lath (mixed) [9]	No. 1 Mixed, No. 2 Mixed.

[1] Designated by the Forest Service as western larch (*Larix occidentalis*).
[2] Engelmann spruce (*Picea engelmannii*).
[3] Western red cedar (*Thuja plicata*).
[4] Drop siding is also made in the following common grades—No. 1 Common, No. 2 Common, No. 3 Common.
[5] Except in white fir, Douglas fir, spruce, and cedar.
[6] Western larch and Douglas fir frequently occur together in the forests of the "Inland Empire" and are commonly logged together and sold in mixture.
[7] The grading of larch and Douglas fir railroad car material in mixture is covered in a supplement to the standard Grading Rules dated June 15, 1931.
[8] Douglas fir "Inland Empire" structural material and larch structural material are both graded in a supplement to the Standard Grading Rules, dated June 15, 1931.
[9] Includes any proportions of any 2 of following—pine, spruce, fir, cedar, or larch.

PORT ORFORD CEDAR

Port Orford cedar is graded under the rules of the West Coast Lumbermen's Association. These rules include products manufactured from Port Orford cedar such as boat boards, decking, lumber, siding, door cuttings, factory and shop lumber, box lumber, battery stock, and railroad ties. Boat boards have only one grade—No. 2

Clear and Better.[35] Decking is furnished in only one quality. Finish lumber has two grades—No. 2 Clear and Better [35] and No. 3 Clear and Better.[35] Either grade may contain vertical grain or flat grain or a mixture of both. Siding has four grades—Clear,[35] A, B, and C. Common boards, dimension, and timbers have the four grades—Selected Common [35] or Merchantable,[35] No. 1 Common, No. 2 Common, and No. 3 Common. Factory and shop lumber has five grades—Factory C,[35] 1-Inch Shop, No. 1 Shop, No. 2 Shop, No. 3 Shop. Box lumber has 3 grades, battery stock 4 grades, and ties 2 grades.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—WEST COAST LUMBERMEN'S ASSOCIATION

Standard grading and dressing rules for Port Oxford cedar lumber (effective Jan. 1, 1931)

Product	Grade
Boat boards	No. 2 Clear and Better.
Decking	1 grade.
Finish lumber—under 3 inches thick	No. 2 Clear and Better V. G. and/or F. G., No. 3 Clear V. G. and/or F. G.
Finish lumber—3 to 5 inches thick, inclusive.	Do.
Finish lumber—over 5 inches thick	Do.
Bevel and bungalow siding	Clear, A, B, C.
Door cuttings	No. 1, No. 2.
Factory and shop lumber	Factory "C", Inch Shop, No. 1 Shop, No. 2 Shop, No. 3 Shop.
Box lumber	No. 1, No. 2, No. 3.
Common boards—under 2 inches thick	Selected Common Merchantable, No. 1 Common, No. 2 Common, No. 3 Common.
Common dimension—2 to 4 inches thick.	Do.
Common timbers—over 4 inches thick	Selected Common, No. 1 Common, No. 2 Common, No. 3 Common.
Standard battery stock	No. 2 Clear and Better, No. 1 Shop, No. 2 Shop, No. 3 Shop.
Railroad ties	No. 1, No. 2.

REDWOOD

Redwood is graded under the rules of the California Redwood Association. Finish lumber, casing and base, window and door-frame stock, jambs, siding, flooring, ceiling, and partition each have the three grades—Clear Heart,[35] A, and B. Common boards have three grades—No. 1 Common, No. 2 Common, and No. 3 Common. For pattern and shop lumber there are three grades—No. 1 and 2 Clear V. G. Pattern,[35] No. 1 and 2 Clear F. G. Pattern,[35] and No. 1 Shop. Several products, such as tank stock and silo staves, have only two grades—Clear Heart [35] and A. Lattice and moldings have only one grade. Structural material is classified according to American lumber standards, and each of the three classes has four grades—Super-Structural, Prime Structural, Select Structural, and Heart Structural. In the Super-Structural grade no knots are allowed and only very limited shakes and splits even in seasoned material. Provision is made for limiting the slope of the grain and the amount of sapwood. The rate of growth is limited to between 10 and 35 rings to the inch. The lower grades allow an increasing number of defects, and a greater range in rate of growth.

[35] This grade name is not included in American lumber standards basic grade classification.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—CALIFORNIA REDWOOD ASSOCIATION

Standard specifications for eastern grades of California redwood lumber (adopted Feb. 8, 1927) and California redwood in structural grades (effective Jan. 15, 1930)

Product	Grade
Yard lumber:	
Finish	Clear Heart, A, B.
Casing and base, window and door frame stock, jambs, etc.	Do.
Moldings	A and Better.
Lattice	Do.
Siding (bevel, bungalow, colonial)	Clear Heart, A, B.
Flooring, ceiling, partition	Do.
Drop siding	Clear Heart, A, B, No. 1 Common.
Tank stock	Clear Heart, A.
Silo staves	Do.
Battens, pickets, porch rail, and other millwork items.	A and Better.
Squares	Clear Heart, A.
Common boards (rough, dressed, D, and M, shiplap, barn siding, and grooved roofing).	No. 1 Common, No. 2 Common, No. 3 Common.
Dimension, heavy joists, small timbers	Do.
Factory flooring, heavy roofing, decking	No. 1 Common, No. 2 Common.
Shingles	Clear V. G., Star-A-Star.
Lath	1 grade.
Factory and shop lumber: Pattern and shop lumber.	No. 1 and 2 Clear V. G. Pattern; No. 1 and No. 2 Clear F. G. Pattern; No. 1 Shop.
Structural material:	
Joists and plank (4 inches and thinner)	Super-structural, Prime Structural, Select Structural, Heart Structural.
Beams and stringers (5 inches and thicker).	Do.
Posts and timbers (6 by 6 inches and larger).	Do.

SITKA SPRUCE

Sitka spruce is graded under the rules of the West Coast Lumbermen's Association. The select products include stepping, finish, rough clears, flooring, and siding (p. 23). These products generally have two grades, B and Better and C. Flooring and bungalow siding have only one grade, B and Better. Bevel siding has three grades, A, B, and C. The common lumber products—common boards, dimension, and plank—are graded as Selected Common,[37] No. 1 Common, No. 2 Common, and No. 3 Common. Common boards have also a No. 4 Common grade. Factory lumber (inch) is graded as Inch Select Shop and Inch No. 1 Shop. Factory lumber (1¼ and thicker) is graded as Factory Select, No. 1 Shop Common, No. 2 Shop Common, and No. 3 Shop Common. Such special products as piano posts, sounding board stock, and airplane stock are furnished subject to contract.

SOUTHERN CYPRESS

Southern cypress is graded under the rules of the Southern Cypress Manufacturers' Association and under the rules of the National Hardwood Lumber Association. The Southern Cypress Manufacturers' Association issues 2 separate sets of rules for grading tidewater red cypress (coast type), 1 set for lumber and 1 set for structural material. The products and grades covered in these two sets of rules are shown below.

[37] This grade name is not included in American lumber standards basic grade classification.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION

Standard grades and classifications of cypress (published Jan. 1, 1932), and standard specifications and working stresses for structural grades of tidewater red cypress (adopted July 1, 1932)

Product	Grade
Yard lumber: [1]	
Finish [1]	Clear Heart Finish, A Finish, B Finish, C Finish, D Finish.
Common lumber [1]	No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, Peck.
Panel stock [1]	B & Better Finish.
Bevel siding and bungalow siding	A, B, C, D.
Flooring, ceiling, drop siding, and shiplap.	Do.
Partition	Do.
Window and door-frame stock, jambs, etc.	B and Better, C and Better.
Pickets	No. 1, No. 2.
Battens	No. 1 Common and Better.
Moldings	B and Better.
Turning squares [1]	1 grade.
Factory lumber [1]	Tank and Boat Stock, Firsts and Seconds, Selects, No. 1 Shop, No. 2 Shop, Box.
Timber and railroad material:	
Timbers	No. 1.
Switch ties	Do.
Crossties	Standard No. 1 Peck.
Car roofing and siding	C and Better.
Car lining	1 grade.
Miscellaneous:	
Washing-machine tub stock	Do.
Shingles	No. 1, Bests, Primes, Economy, Clippers.
Lath	No. 1, No. 2.
Structural material:	
Joist and plank	Select Structural Heart, Common Structural.
Beams and stringers	Do.
Posts and timbers	Do.

[1] The grades adopted for this product are also used by the National Hardwood Lumber Association.

The lumber rules provide for five grades of finish lumber—Clear Heart Finish,[38] A Finish, B Finish, C Finish, and D Finish; and five grades of common lumber—No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, and Peck.[38] For factory lumber the grades are Tank and Boat Stock, Firsts and Seconds, Selects, No. 1 Shop, No. 2 Shop, and Box. The various kinds of siding, ceiling, flooring, and partition each have the four grades A, B, C, and D. Several products, such as panel stock, moldings, turning squares, timbers, and car lining, have only one grade. The rules for structural material provide for three classes of product—joist and plank, beams and stringers, and posts and timbers. Each class has two grades—Select Structural Heart and Common Structural. The grade Selective Structural Heart requires timber with an average of not less than six annual rings per inch and 85 percent of heartwood. There are also restrictions as to knots and other defects. The grade Common Structural may have any number of rings per inch and has no requirements as to heartwood. The restrictions as to knots and other defects are somewhat more liberal than those for the higher grade.

Tidewater red cypress shingles are manufactured in five grades—No. 1, Bests, Primes, Economy, and Clippers. The two highest grades—No. 1 and Bests—admit only clear heartwood. No. 1 requires vertical grain. Bests will admit flat grain. The third grade, Primes, will admit a few defects, and the two lowest grades, Economy and Clippers, will allow a proportionately greater number of defects.

[38] This grade name is not included in American lumber standards basic grade classification.

No. 1, Bests, and Primes are manufactured in 16-inch lengths and 4-inch, 5-inch, and 6-inch widths. Five butts must measure 2 inches when dry.

The rules of the National Hardwood Lumber Association are used in the grading of all types of southern cypress—i.e., red cypress (coast type), yellow cypress of the inland type, and white cypress of the inland type. The rules of the hardwood association cover factory lumber, yard lumber (finish and common lumber), and panel stock only (p. 4 and 5), and for these products are practically identical with the rules of the Southern Cypress Manufacturers' Association.

SOUTHERN PINE

Southern pine includes longleaf pine, shortleaf pine, loblolly pine, slash pine, and associated pines of minor importance, such as pitch pine and pond pine. Southern pine is graded under the rules of the Southern Pine Association.

The Southern Pine Association issues 2 separate sets of rules for domestic shipments—1 for lumber and timber and 1 for car material. The Southern Pine Association also issues a set of rules used largely for export shipments known as "The Gulf Coast Classification of Pitch Pine." The products and grades covered in the two sets of Southern Pine Association rules for domestic shipments are shown below.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—SOUTHERN PINE ASSOCIATION

Grades of southern pine lumber and timber [1] and car material [2]

Products	Grade
Lumber (yard):	
Finish	A, B, C.
Molded casing and base, window and door jambs.	Do.
Moldings	B and Better.
Flooring	Flat Grain—A, B, C, D, No. 1 Common, No. 2 Common, No. 3 Common. Vertical Grain—A, B, C, D, No. 1 Common, No. 2 Common.
End-matched flooring	Flat Grain—First Grade, Second Grade, Third Grade, Fourth Grade; Vertical Grain—First Grade, Second Grade, Third Grade.
Wagon bottoms	A, B.
Ceiling	A, B, No. 1 Common, No. 2 Common, No. 3 Common.
End-matched ceiling	First Grade, Second Grade, Third Grade, Fourth Grade.
Partition	A, B, No. 1 Common, No. 2 Common, No. 3 Common.
End-matched partition	First Grade, Second Grade, Third Grade, Fourth Grade.
Drop siding	A, B, No. 1 Common, No. 2 Common, No. 3 Common.
End-matched drop siding	First Grade, Second Grade, Third Grade, Fourth Grade.
Bevel siding	A, B, No. 1 Common, No. 2 Common, No. 3 Common.
Common boards and strips	No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common.
Dressed and matched, shiplap, and barn siding.	No. 1 Common, No. 2 Common, No. 3 Common.
Grooved roofing	No. 1 Common, No. 2 Common.
End-matched concrete form lumber.	1 grade.
End-matched sheathing and subflooring.	Do.
Southern pine lath	No. 1 Lath, No. 2 Lath.
Byrkit lath	1 grade.
Pickets (square or flat)	Do.
Southern pine shingles	Select Grade, No. 1 Grade, Prime Grade, No. 2 Grade.

[1] See Standard Specifications for Grades of Longleaf Southern Pine Lumber and Timbers, effective Sept. 1, 1932.

[2] See Southern Yellow Pine Car Material Specifications, dated July 1, 1919.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—SOUTHERN PINE ASSOCIATION—continued

Products	Gaade
Timber:	
Longleaf yellow pine:	
Structural timbers [3]	Select Structural Longleaf, Prime Structural Longleaf, Merchantable Structural Longleaf, Structural Square Edge and Sound Longleaf, No. 1 Structural Longleaf.
Timbers	Longleaf Square Edge and Sound.[4]
Structural joist and plank	Longleaf Prime Structural, Longleaf Merchantable Structural, Longleaf Structural Square Edge and Sound.
Factory flooring	Longleaf Select Merchantable, Longleaf Standard, No. 1 Longleaf, No. 2 Longleaf.
Heavy roofing plank	Longleaf Select Merchantable [5] Longleaf Standard.
Decking	No. 1 Longleaf, No. 2 Longleaf.
Heavy shiplap	Do.
Dimension	No. 1 Longleaf, No. 2 Longleaf, No. 3 Longleaf.
Small timbers	No. 1 Longleaf.
Shortleaf yellow pine:	
Structural timbers	Dense Select Structural, Dense Structural, Dense Structural Square Edge and Sound, Dense No. 1 Structural.
Timbers	Shortleaf Square Edge and Sound.[4]
Structural joist and plank	Dense Structural, Dense Structural Square Edge and Sound, Dense No. 1 Structural.
Factory flooring	Shortleaf Dense Standard, No. 1 Shortleaf, No. 2 Shortleaf.
Heavy roofing plank	Shortleaf Dense Standard.
Decking	No. 1 Shortleaf, No. 2 Shortleaf.
Heavy shiplap	Do.
Dimension	No. 1 Dense Shortleaf, No. 1 Shortleaf, No. 2 Shortleaf, No. 3 Shortleaf.
Small timbers	No. 1 Dense Shortleaf, No. 1 Shortleaf, No. 2 Shortleaf.
Car material:	
Car siding	B and Better, No. 1 Common, No. 2 Common.
Car lining and roofing	Do.
Car decking and flooring	All Heart, Heart Face, No. 1 Common.
Car sills and framing	No. 1 Common Heart, No. 1 Common.

[3] Includes timbers with unequal faces (beams and stringers) and square timbers, usually posts and similar timbers.
[4] In the absence of knot limitations or limitations with respect to slope of grain no stress value can be assigned to material under this grade.
[5] May all be specified "All heart."

In the rules for lumber and timber the first product listed under lumber is finish, which has the three select grades A, B, and C. Molded casing and base, and window and door jambs have the same grades as finish. Flooring may be either vertical grain or flat grain and has the grades A, B, C, D, No. 1 Common, and No. 2 Common. Flat-grain flooring also has the grade No. 3 Common. Wagon bottoms have two grades A and B. Ceiling, partition, drop siding, and bevel siding each have five grades—A, B, No. 1 Common, No. 2 Common, and No. 3 Common. In end-matched flooring (vertical or flat grain), end-matched ceiling, end-matched partition, and end-matched drop siding the grades are designated as First Grade,[39] Second Grade,[39] Third Grade,[39] and Fourth Grade.[39] Common boards and strips have four common grades. Dressed and matched, shiplap, and barn siding have three common grades. Grooved roofing has two common grades, while end-matched concrete form lumber, sheathing, and subflooring are furnished in only one grade.

The grading rules for lumber of the Southern Pine Association have a provision that embodies a distinct advance in lumber grading—i.e., they provide for definite moisture-content limitations in a number of grades. For example, in select kiln-dried lumber 1 inch and 1¼ inches thick in the grades A, B, and C the moisture content must not exceed 12 percent in 90 percent of the pieces in a shipment and must

[39] This grade name is not included in American lumber standards basic grade classification.

not be over 15 percent in the remainder of the shipment. In air-dried dimension in the grades No. 1 Common and No. 2 Common the moisture content must not exceed 19 percent in 90 percent of the pieces in a shipment. This moisture provision is especially valuable in the case of flooring and other products in which a minimum of shrinkage and swelling is required for satisfactory service.

In the portion of the rules for lumber and timber devoted to timber the two species of southern pine—longleaf and shortleaf—are considered separately. The term "longleaf" as used in the rules means botanical longleaf (*Pinus palustris*) and refers only to material which has not less than six annual rings to the inch and contains not less than one third summer wood,[40] and which is cut from original-growth trees.[41] The term "shortleaf" as used in the rules includes the southern pines other than longleaf, and also longleaf not cut from original growth trees and true botanical longleaf that does not meet the density requirement.

The rules include grades for nine timber products for longleaf and grades for the same nine products for shortleaf. These nine products are: Structural timbers, [42] timbers, structural joist and plank, factory flooring, heavy roofing plank, decking, heavy shiplap, dimension, and small timbers. Structural timbers cut from longleaf have five grades. The highest grade is Select Structural Longleaf, followed by Prime Structural Longleaf, etc. Structural timbers cut from shortleaf have four grades. The highest grade is Dense Select Structural, followed by Dense Structural, etc.

All longleaf grades require dense material, i.e., it must have at least six annual rings to the inch and at least one third summer wood in the cross section. The grades also include limitations as to the number, kind, size, and location of defects.

Some of the shortleaf grades require dense material while others do not. The shortleaf grades also include limitations as to defects.

The Southern Pine Association rules for car material [43] include car siding, lining, and flooring in the grades of B and Better, No. 1 Common, and No. 2 Common. Car decking has the three grades, All Heart,[44] Heart Face,[44] and No. 1 Common. Sills and framing are graded as No. 1 Common Heart [44] and No. 1 Common.

The Gulf Coast Classification of Pitch Pine, issued by the Southern Pine Association for the export trade, covers such products as flooring, boards and planks, deals, decking, and dimension. The grade names are entirely different from those used in American lumber standards. The sizes also differ from American lumber standards. The Gulf coast rules also include the requirements of lumber products under the River Plate standard andthe grade requirements for West Indian shipments. The products and grades for export shipments are as follows:

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[40] See density rule adopted by the American Society for Testing Materials, Aug. 21, 1915 and reproduced in the grading rule book of the Southern Pine Association dated September 1, 1932.

[41] Longleaf grown on areas from which the original forest has been cut is not acceptable under the rules as longleaf.

[42] Includes timbers with unequal faces (usually beams and stringers) and square timbers (usually posts and similar timbers).

[43] Adopted as recommended practice by the Master Car Builders' Association and the American Railway Master Mechanics' Association, now combined and known as the Mechanical Division of the American Railway Association.

[44] This grade name is not included in American lumber standards basic grade classification.

GRADES ADOPTED FOR SOFTWOOD LUMBER PRODUCTS BY PRINCIPAL LUMBER ASSOCIATIONS—SOUTHERN PINE ASSOCIATION.

The Gulf coast classification of pitch pine resawn lumber and sawn timber (dated 1923)

Product	Grade
Flooring	Heart Rift, Sap Rift, Crown or French Flooring, Prime, Genoa Prime, Merchantable, Square Edge.
Boards and planks	Crown, Prime, Genoa Prime, Merchantable, Square Edge.
Deals	Crown, Prime, Genoa Prime (Rio), Merchantable, Square Edge.
Decking	First Quality, Second Quality.
Scantling	Crown, Prime, Genoa Prime, Merchantable, Square Edge.
Dimension	Crown, Prime, Merchantable, Square Edge.
Kiln-dried saps	One grade.
Air-dried saps	Do.
Merchantable sawn timber	Do.
	RIVER PLATE STANDARD
Kiln-dried strips	One grade.
Boards and planks	Do.
Scantling and deals	Do.
	WEST INDIAN
Strips, boards, planks, scantling and deals.	First Class, Second Class, 85 percent Heart, All Heart.

SPRUCE

Spruce produced in the Lake States and graded under the rules of the former Northern Pine Manufacturers' Association includes only white spruce (*Picea glauca*) and black spruce (*P. mariana*). A description of the Northern Pine Manufacturers' Association rules will be found under northern white pine (p. 27) where are also given the products and grades of spruce. In the New England States the term "spruce" also includes red spruce (*P. rubra*). There spruce is sometimes sold by individual manufacturers under the rules of the former Spruce Manufacturers' Association. These rules are no longer printed and are not based on American lumber standards.

SUGAR PINE

Sugar pine is graded under the rules of the Western Pine Association (p. 28). Finish, ceiling, and drop siding have three grades—B Select and Better or 1 and 2 Clear, C. Select, and D Select. Bevel siding, colonial siding, and bungalow siding have four grades—B and Better Siding, C Siding, D Siding, and E Siding.[45] Moldings have only one grade designated as "Standard Grade." Each of the common lumber products, inch common and thick common, has five grades—No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, and No. 5 Common. Shiplap, grooved roofing, and drop siding are also manufactured in the five common grades. Tank stock has one grade. Factory lumber is graded as No. 3 Clear Factory, No. 1 Shop, No. 2 Shop, and No. 3 Shop. The two products, cut sash and door stock (the latter including door stiles, rails, and muntins), each have two grades—No. 1 and No. 2. Inch factory lumber is graded as Inch 3 Clear Factory, Inch Shop, No. 1 Box, No. 2 Box.[46] and Short Box. Dimension and timbers are graded as No. 1 Dimension, No. 2 Dimension, and No. 3 Dimension.

[45] This grade name is not included in American lumber standards basic grade classification.

[46] No. 1 Box and No. 2 Box take the place of Inch Box Lumber and Thick Box Lumber, respectively. See Aug. 11, 1932, supplement to the July 1, 1929, Standard Grading Rules of the Western Pine Association.

TAMARACK

Tamarack is graded under the rules of the Northern Hemlock and Hardwood Manufacturers' Association and under the rules of the Northern Pine Manufacturers' Association. A description of the Northern Hemlock and Hardwood Manufacturers' Association rules will be found under eastern hemlock, and the products and grades listed under these rules on page 26. A description of the Northern Pine Manufacturers' Association rules will be found under northern white pine and the products and grades listed under these rules on page 27.

WESTERN HEMLOCK (WEST COAST HEMLOCK)

Western or west coast hemlock is graded under the rules of the West Coast Lumbermen's Association. The select products include stepping finish, casing and base, rough clears, flooring, and siding (p. 23 and 24). These products have from 2 to 5 grades. B and Better is generally the highest grade, followed by C, D, and sometimes byE.[46] Vertical-grain flooring has five grades, A, B, C, D, and E.[46] Common lumber products cut from western hemlock include common boards, shiplap, dimension, and plank. The highest grade is Selected Common,[47] followed by No. 1 Common, No. 2 Common, etc. Factory lumber has two grades—Inch Select Shop and Inch No. 1 Shop. Door stock has four grades—Factory Select, No. 1 Shop Common, No. 2 Shop Common, and No. 3 Shop Common or Sash. All of the products (except box lumber) cut from western hemlock are also cut from Douglas fir, and the grade names for like products are the same. The grade requirements of the two species are also the same except that provision is made in the western hemlock rules for defects peculiar to that species, such as black burls, bark seams, and bark pockets.

WESTERN LARCH

Western larch and Douglas fir frequently occur together in the forests of the "Inland Empire" and are commonly logged together and sold in mixture. Western larch and Douglas fir lumber in mixture is graded under the rules of the Western Pine Association (p. 28). Four products are listed—finish, common lumber, car material, and lath. Finish has two grades—C and Better and D. Common lumber has five grades—No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, and No. 5 Common. Car material is divided into 6 items with 1 to 3 grades for each. Runningboards have two grades—B and Better Select and C Select. Car lining has three grades—B and Better Select, C Select, and Selected Common. Car roofing has two grades, etc. Lath are graded as No. 1 Mixed and No. 2 Mixed.

Western larch structural material is graded under a supplement to the Standard Grading Rules of the Western Pine Association, dated June 15, 1931. Two classes of structural material are provided, posts and timbers,[48] and joists and plank. Each class has three grades—Select Structural, Structural, and Common Structural. The highest grade, Select Structural, has certain limitations as to defects and requires close grained and dense material, i.e., an average

[47] This grade name is not included in American lumber standards basic grade classification.
[48] Includes timbers with unequal sides and square timbers

of not less than eight annual rings per inch and in addition one third or more summer wood (the dark portion of the annual ring). The other two grades do not require dense material and allow more defects.

WESTERN RED CEDAR

Western red cedar lumber is graded under the rules of the West Coast Lumbermen's Association and under the rules of the Western Pine Association. Western red cedar shingles are graded under the rules of the Red Cedar Shingle Bureau.

The West Coast Lumbermen's Association rules for western red cedar include such select products as siding, finish, porch decking, flooring, and ceiling (p. 25). The 3 kinds of siding have 4 grades—Clear,[49] A, B, and C. Finish has three grades—B and Better, C, and D. The other select products have the two grades—B and Better and C. The common-lumber products include common boards, shiplap, and common timbers. Common boards have four grades—Selected Common,[49] No. 1 Common, No. 2 Common, and No. 3 Common. Common timbers have two grades—No. 1 Common and No. 2 Common. All structural material has the one grade—Structural. This grade provides for limitations as to slope of grain. It allows any number of tight knots below certain sizes if not in clusters. Sapwood is limited to one third the width of a piece and one fourth the thickness. A number of products, such as capping, pickets, battens, and tank stock, have only one grade. Shop lumber is graded as Firsts and Seconds, Factory Select or Third Clear, No. 1 Shop, and No. 2 Shop. Factory plank has the following five grades: No. 1 and No. 2 Clear Factory, No. 3 Clear Factory, No. 1 Shop, No. 2 Shop, No. 3 Shop.

The rules of the Western Pine Association are used for grading western red cedar and a number of other species. A description of these rules will be found under ponderosa pine. The products and grades covered by the rules are given on page 28.

The Red Cedar Shingle Bureau provides for two classes of shingles—random-width shingles and dimension shingles. Random-width shingles have three grades—No. 1 Grade, No. 2 Grade, and No. 3 Grade. Each of the three grades is furnished in 16-inch, 18-inch, and 24-inch lengths. Dimension shingles have two grades—No. 1 Grade and No. 2 Grade. No. 1 Grade is furnished in three dimensions—24 inches long by 6 inches wide, 18 inches long by 5 inches wide, and 18 inches long by 6 inches wide. No. 2 Grade is furnished in two dimensions—16 inches long by 5 inches wide and 16 inches long by 6 inches wide. Red cedar shingles are packed in bundles and sold by the "square". A square is a space 10 by 10 feet, or 100 square feet. Four bundles laid at the prescribed exposure to the weather will cover a square, but shingles for side walls required only three bundles to cover a square.

WESTERN WHITE PINE (IDAHO WHITE PINE)

Western or Idaho white pine is graded under the rules of the Western Pine Association. Finish, ceiling, and drop siding have three grades—B Select and Better or 1 and 2 Clear, C Select, and D Select (p. 28). Bevel siding, colonial siding, and bungalow siding

[49] This grade name is not included in American lumber standards basic grade classification.

have four grades—B and Better Siding, C Siding, D Siding, and E Siding.[50] Moldings have only one grade designated as Standard Grade. Each of the common lumber products, inch common and thick common, has five grades—No. 1 Common, No. 2 Common, No. 3 Common, No. 4 Common, and No. 5 Common. Shiplap, grooved roofing, and drop siding are also manufactured in the five common grades. Tank stock has one grade. Factory lumber is graded as No. 3 Clear Factory, No. 1 Shop, No. 2 Shop, and No. 3 Shop. The two products, cut sash and door stock (the latter including door stiles, rails, and muntins), each have two grades—No. 1 and No. 2. Inch factory lumber is graded as Inch 3 Clear Factory, Inch Shop, No. 1 Box, No. 2 Box,[51] and Short Box. Dimension and timbers are graded as No. 1 Dimension, No. 2 Dimension, and No. 3 Dimension.

WHITE FIR

White fir is graded under the rules of the Western Pine Association. A statement about these rules will be found under ponderosa pine. The products and grades of white fir are given on page 28.

EXAMPLES OF SPECIFICATIONS FOR THE PURCHASE OF LUMBER

The following examples of specifications are presented largely for the information of those who have occasion to call for bids on lumber to be used by the Federal Government. No rigid form has been adhered to in the examples, and no attempt has been made to include all the species that might be included in any one sample specification. The intention has been to frame the examples in such a way as to give the bidder a clear idea of the material wanted and to make it as certain as possible that the buyer would receive what he asked for. The sample specifications are based on Federal Specification No. MM-L-751, Lumber and Timbers, Softwood, and several of them incorporate suggestions in Circular Letter No. 71, which deals with methods of purchasing lumber and is issued by the Office of the Chief Coordinator. Specification No. MM-L-751, and Circular Letter No. 71 are reproduced in the appendix.

EXAMPLE A

Yellow poplar, in accordance with the latest rules of the National Hardwood Lumber Association; to be kiln dried; lengths 8 to 16 feet, averaging at least 12 feet.

1,000 square feet, surface measure--	Firsts and Seconds. Thickness, ⅜ inch S2S to 3/16 inch. Widths, 6 to 11 inches random, averaging at least 8 inches.
1,000 square feet, surface measure--	Firsts and Seconds. Thickness, ⅜ inch S2S to 3/16 inch. Widths, 12 to 15 inches random, averaging at least 13 inches.
5,000 feet b.m----------	Firsts and seconds. Thickness, 1¼ inches S2S to 1 1/16 inches. Widths, 6 to 11 inches, random, averaging at least 8 inches.

[50] This grade name is not included in American Lumber Standards basic grade classification.
[51] No. 1 Box and No. 2 Box take the place of Inch Box Lumber and Thick Box Lumber, respectively See Aug. 11, 1932, supplement to the July 1, 1929, Standard Grading Rules of the Western Pine Association

EXAMPLE B

Structural timbers: Douglas fir stringers of the grade Structural according to the latest rules of the West Coast Lumbermen's Association, or southern pine structural timber of the grade Structural Square Edge and Sound Longleaf according to the latest rules of the Southern Pine Association, or redwood stringers of the grade Prime Structural according to the latest rules of the California Redwood Association. Bidder will state which species he intends to furnish. Each timber to bear the grade mark and trade mark and mill-identification mark of the association under whose rules it is graded. Each piece may also bear the national-tree symbol. Bidders should state whether they propose to furnish timbers bearing the national-tree symbol.

40 pieces 8 by 16 inches, S4S to 7½ by 15½ inches, by 16 feet in length.

EXAMPLE C

Northern white pine (*Pinus strobus*) in accordance with the rules of the former Northern Pine Manufacturers' Association (edition of Apr. 15, 1925); or western (Idaho) white pine (*P. monticola*) in accordance with the latest rules of the Western Pine Association. To be kiln-dried. Bidder shall state which species he intends to furnish.

10,000 feet b.m.—— Finish, B Select and Better; for high-grade finish and pattern work.
Lengths, 6 to 16 feet, averaging at least 12 feet.
Thickness, 1 inch S2S to $^{25}/_{32}$ inch.
Widths, 6, 8, and 10 inches, averaging at least 8 inches, and S2E to 5⅝, 7⅝, and 9⅝ inches, respectively.

10,000 feet b.m.—— Finish, B Select and Better; for high-grade pattern work.
Lengths, 6 to 16 feet, averaging at least 12 feet.
Thickness, 4 inch S2S to 3⅝ inches.
Widths, 6, 8, and 10 inches, averaging at least 8 inches, and S2E 5⅝, 7⅝, and 9⅝ inches, respectively.

EXAMPLE D

Factory lumber (not stock widths):

Quantity, 180,000 feet b.m.
Thickness, ¼ inch S2S to $^{13}/_{16}$ inch.
Widths, random 3 inches and wider.
Length, 4 feet and longer.

The following are the names of the species that may be furnished and the grade required. Each grade to be in accordance with the latest rules of the association listed with the grade. To be kiln-dried.

Species	Grade	Association
Ponderosa pine	Inch Shop	Western Pine Association.
Western (Idaho) white pine	——do	Do.
Sugar pine	——do	Do.
Western (west coast) hemlock	Inch No. 1 Shop	West Coast Lumbermen's Association.
Sitka spruce	——do	Do.

Bidder will state which species he intends to furnish. Shipment to be accompanied by an official certificate of inspection issued by the association under whose rules it is graded.

EXAMPLE E

Flooring: Maple (sugar or hard), First Grade in accordance with the latest rules of the Maple Flooring Manufacturers' Association. Lengths 2 to 16 feet, averaging at least 9 feet. To be kiln-dried.

1,000 feet b.m____ Dressed thickness, $^{25}/_{32}$ inch.
Dressed width (face), 2¼ inches.

Southern pine (close grain) B and Better Heart Face, in accordance with the latest rules of the Southern Pine Association. Lengths 8 to 16 feet, averaging at least 12 feet. To be kiln-dried.

(1) 5,000 feet b.m____ Dressed thickness, $^{25}/_{32}$ inch.
Dressed width (face), 2⅜ inches.
Flat grain.
(2) 10,000 feet b.m___ Dressed thickness, $^{25}/_{32}$ inch.
Dressed width (face), 2⅜ inches.
Vertical grain.

Oak, in accordance with the rules of the Oak Flooring Manufacturers' Association. Lengths 2 feet and up, not to exceed 20 percent under 4 feet. Average length at least 5 feet. To be kiln-dried.

(1) 5,000 feet b.m____ Clear grade, quarter-sawed.
Dressed thickness, $^{25}/_{32}$ inch.
Dressed width (face), 2¼ inches.
(2) 10,000 feet b.m___ Select grade, plain-sawed.
Dressed thickness, $^{15}/_{32}$ inch.
Dressed width (face), 2 inches.

EXAMPLE F

Ponderosa pine, No. 2 Common boards, in accordance with the latest rules of the Western Pine Association; to be air-dried or kiln-dried; each piece to bear the association grade mark and trade mark and mill-identification mark; each piece may also bear the national-tree symbol. Bidders should state whether they propose to furnish lumber bearing the national-tree symbol.

10,000 feet b.m____Thickness, 1 inch S2S to $^{25}/_{32}$ inch.
Width, 10 inches and wider S2E to not more than ⅜ inch scant of nominal.
Length, 8 feet and longer.

EXAMPLE G

Southern cypress (tidewater red cypress), grade A Finish, in accordance with the latest rules of the Southern Cypress Manufacturers' Association. To be kiln-dried. The shipment to be accompanied by an official certificate of inspection issued by the Southern Cypress Manufacturers' Association.

70,000 feet b.m_____ Thickness, 1 inch S2S to $^{25}/_{32}$ inch.
Width, 10 inches S2E to 9½ inches.
Lengths, 8 to 20 feet.

EXAMPLE H

Boards and strips for boxing and crating:

Quantity, 200,000 feet b.m.
Thickness, ¼ inch S2S to $^{25}/_{32}$ inch.
Width, 3 inches and wider.
Lengths, 8 feet and longer.

Following are the names of the species that may be furnished and the grade required. Each grade to be in accordance with the latest rules of the association listed with the grade. To be air-dried or kiln-dried.

Species	Grade	Association
Chestnut	No. 2 Common	National Hardwood Lumber Association.
Basswood	do	Do.
Cottonwood	do	Do.
Red gum (including sap gum)	do	Do.
Tupelo (including black gum)	do	Do.
Eastern spruce	No. 4 Common	Former Northern Pine Manufacturers' Association.
Northern white pine and Norway pine in mixture	do	Do.
Ponderosa pine	do	Western Pine Association.
Sugar pine	do	Do.
Western (Idaho) white pine	do	Do.
Sitka spruce	No. 2 Common	West Coast Lumbermen's Association.
Douglas fir	do	Do.
Western (west coast) hemlock	do	Do.
Southern pine	do	Southern Pine Association.
Eastern hemlock	do	Northern Hemlock and Hardwood Manufacturers' Association.

Bidder will state which species he intends to furnish. Shipment to be accompanied by an official certificate of inspection issued by the association under whose rules it is graded except eastern spruce, northern white pine, and Norway pine, for which association certificates of inspection are not obtainable. This situation makes necessary more rigid Federal inspection than in the case of species accompanied by certificates of inspection.

EXAMPLE I

Douglas fir, in accordance with the latest rules of the West Coast Lumbermen's Association, or southern pine (longleaf or shortleaf), in accordance with the latest rules of the Southern Pine Association. Bidder will state which species he intends to furnish. Each piece to bear the grade mark and trade mark of the association under whose rules it is bought and the mill-identification mark, with or without the national-tree mark, or shipment to be accompanied by an official certificate of inspection issued by the association under whose rules it is graded.

Boards and strips: No. 1 Common; air dried or kiln-dried; lengths 8 to 20 feet, averaging at least 14 feet.

(1) 10,000 feet b.m—— Thickness, 1 inch S2S to $^{25}/_{32}$ inch. Width, 4 inches S2E to 3⅝ inches.

(2) 12,000 feet b.m—— Thickness, 1½ inches S2S to 1¼ inches. Width, 6 inches S2E to 5⅝ inches.

Finish: B and Better; kiln-dried; lengths 10 to 20 feet, averaging at least 12 feet.

(1) 20,000 feet b.m—— Thickness, 1 inch S2S to $^{25}/_{32}$ inch. Width, 10 inches S2E to 9½ inches.

(2) 20,000 feet b.m—— Thickness, 2 inches S2S to 1⅝ inches. Width, 12 inches S2E to 11½ inches.

EXAMPLE J

Shingles: Western red cedar No. 1 Grade, in accordance with the latest rules of the Red Cedar Shingle Bureau, or cypress Bests, in accordance with the latest rules of the Southern Cypress Manufacturers' Association, or redwood Clear Vertical Grain, in accordance with the rules of the California Redwood Association; 16-inch lengths. Five butts to measure 2 inches when dry. Random widths.

Amount required, 50 squares, based on 5-inch exposure to weather.

EXAMPLE K

Dimension: Eastern hemlock, No. 1 Common Dimension, in accordance with the latest rules of the Northern Hemlock and Hardwood Manufacturers' Association, or eastern spruce, No. 1 Dimension, in accordance with the rules of the former Northern Pine Manufacturers' Association (edition of Apr. 15, 1925). Lengths 8 to 16 feet. To be air-dried or kiln-dried.

5,000 feet b.m	Thickness, 2½ inches S2S to 2⅛ inches. Width, 6 inches S2E to 5⅝ inches.

EXAMPLE L

Black walnut (American), grade Selects, in accordance with the latest rules of the National Hardwood Lumber Association. Lengths, 6 to 16 feet. To be kiln-dried.

5,000 square feet surface measure	Thickness, ½ inch S2S to 5/16 inch. Widths, 4 inches and wider.
1,000 feet b.m	Thickness, 1¼ inches S2S to 1 1/16 inches. Widths, 4 inches and wider.

Birch (yellow or sweet), grade No. 1 Common, in accordance with the latest rules of the National Hardwood Lumber Association. Lengths, 5 to 16 feet. To be kiln-dried.

2,000 feet b.m	Thickness, 1 inch S2S to 13/16 inch. Width, S2E to 8 inches.

APPENDIX

FEDERAL SPECIFICATION NO. MM-L-751, FOR LUMBER AND TIMBER, SOFTWOOD

This general specification was approved for promulgation by the Federal Specifications Board on March 7, 1933, for the use of the departments and independent establishments of the Government in the purchase of this commodity, and shall become mandatory for all departments and independent establishments of the Government not later than September 15, 1933. It may be put into effect, however, at any earlier date after promulgation.

A. APPLICABLE FEDERAL SPECIFICATIONS:

A-1. There are no other Federal specifications applicable to this specification.

A-2. Special requirements of individual departments of the Government are noted in section H.

B. SPECIES, CLASSES, AND GRADES OF LUMBER

B-1. This specification covers the principal species of softwood grown in the United States; the three classes of softwood lumber and timber [1]—yard lumber,[2] structural material,[3] and factory and shop lumber [4] and the grades in the current grading rules of the various associations of softwood lumber manufacturers that conform to American lumber standards.[5]

C. MATERIAL AND WORKMANSHIP

C-1. See section E.

D. GENERAL REQUIREMENTS

D-1. As specified under section E.

E. DETAIL REQUIREMENTS

E-1. Softwood lumber shall conform to the grading rules [6] of the various lumber associations in effect at the date of invitation for bids where such grading rules are approved by the Central Committee on Lumber Standards as in conformance with American lumber standards.[5]

E-2. In cases where lumber of a special width, length, or thickness is needed, such lumber shall conform to the standard grades of the lumber associations concerned except in the matter of width, length, and thickness.

E-3. Where it is advisable to purchase softwood lumber of species not graded under association or commercial rules in conformance with American lumber standards as interpreted by the Central Committee on Lumber Standards, specifications for such lumber shall be based on American Lumber Standards.[5]

E-4. In cases where lumber of special quality is needed, such lumber shall be purchased under specifications prepared by the Government organization which needs it with such assistance as they may deem necessary. Airplane lumber is an example.

E-5. Requests for bids on softwood lumber or timber should include information as to:

1. Quantity: Feet, board measure, number of pieces if of definite size and length, etc.
2. Size: Thickness in inches—nominal and also actual if surfaced on faces. Width in inches—nominal and also actual if surfaced on edges. Length in feet—may be nominal average length, limiting lengths or a single uniform length.
3. Grade: No. 1 Common, B and Better, etc., as indicated in grading rules of lumber manufacturers' associations.
4. Species of wood: Douglas fir, southern cypress, etc.
5. Product: Flooring, siding, timbers, boards, etc.
6. Condition of seasoning: Air-dry, kiln-dry, commercially shipping dry, etc.
7. Surfacing: Indicate whether rough (unplaned) or dressed (surfaced) stock is desired. S1S means surfaced on one side. S2S means surfaced on two sides. S1S1E means surfaced on one side and one edge. S4S means surfaced on four sides.
8. Association rules: Southern Pine Association, Western Pine Association, etc.
9. Methods of inspection.

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[1] For the purposes of this specification the term "lumber" includes both lumber and timber.

[2] Yard lumber—used with little or no further cutting, for general building purposes.

[3] Structural material—used where strength is the primary consideration and working stresses are required. Structural material is often referred to under the general term "timbers."

[4] Factory and shop lumber—used for further cutting into smaller pieces required in the manufacture of sash, doors, and general millwork.

[5] See Simplified Practice Recommendation R16-29 of the U.S. Department of Commerce, entitled "Lumber" (fourth edition), effective July 1, 1929, or later editions.

[6] Copies of these rules may be obtained from the associations either without cost or on payment of a nominal sum.

F. METHODS OF INSPECTION

F-1. In order to provide for the Government securing the grade of lumber ordered, one of three methods of procedure can be used: (1) The order can specify grade-marked lumber, i.e., lumber that bears the grade mark and trade mark of the association under whose rules it is bought (see E-1) and the mill-identification mark, with or without the national-tree mark; (2) the order can specify that the shipment must be accompanied by a certificate of grading (inspection) issued by the association under whose rules it is bought; or (3) the order can specify that inspection will be made by an inspector from the Federal agency making the purchase. Methods (1) or (2) are generally preferable, as it is not feasible for the majority of Government organizations using lumber to maintain lumber-inspection facilities. See also Circular Letter No. 71, dated November 4, 1932, of the Office of the Chief Coordinator.

G. PACKING

G-1. Any special requirements of the individual departments are noted under section H.

G-2. *Packing.*—Unless otherwise specified, the subject commodity shall be delivered in such fashion as to insure acceptancy by common or other carriers, for safe transportation, at the lowest rate, to the point of delivery.

H. REQUIREMENTS APPLICABLE TO INDIVIDUAL DEPARTMENTS

H-1. The following departmental specifications of the issue in effect on date of invitation for bids shall respectively form a part of this specification.

H-1a. Navy: Navy Department General Specification for Inspection of Material.

I. NOTES

I-1. Lumber is wood cut from a tree to definite sizes and shapes. It is of two kinds—hardwood and softwood. Hardwood lumber is cut from broad-leafed trees, such as oaks, birches, and maples. Softwood lumber is cut from coniferous or needle-leafed trees, such as pines, spruces, firs, and hemlocks. The foregoing requirements have to do with softwood lumber.

I-2. The Federal Specifications Board believes that the grading of softwood lumber should be founded on basic principles and uniform provisions and is in hearty accord with such principles and provisions as embodied in American Lumber Standards for Softwood Lumber, adopted by the various General Conferences of Manufacturers, Distributors, and Consumers of Lumber at Washington, D.C., and hopes it will be possible to proceed steadily with the development of American standards for lumber, particularly with respect to standards of dryness and definite definitions of basic grade quality.

I-3. The following is a statement prepared by the Central Committee on Lumber Standards as to the conformance of the grading rules of the principal softwood lumber manufacturers' associations to American Lumber Standards.

As of October 1, 1932, the grading rules of the following softwood manufacturers' associations, published upon the basis of the American lumber standards, conform to the essential provisions of the standards listed below, except in those few instances where the inherent characteristics of the species in question or the methods of their manufacture require minor variations from the standards. These variations from the standards are clearly indicated in the grading-rule books.

Essential provisions

1. Species nomenclature.
2. Definitions of defects and blemishes.
3. General grading provisions.
4. Description, measurement, and tally.
5. Sizes.
6. Workings.
7. Grade names and qualities.
8. Shipment and inspection provisions.

Association	Species covered by grading rules
California Redwood Association, 405 Montgomery Street, San Francisco, Calif.	California redwood.
Northern Hemlock and Hardwood Manufacturers' Association, Oshkosh, Wis.	Eastern hemlock, tamarack.
Northern Pine Manufacturers' Association (disbanded in 1930 but rules still in use).	Northern white pine, Norway pine, spruce, tamarack.
Southern Cypress Manufacturers' Association, Barnett National Bank Building, Jacksonville, Fla.	Tidewater red cypress.
Southern Pine Association, New Orleans, La.	Longleaf and shortleaf southern pine (including North Carolina pine).

Association	Species covered by grading rules
West Coast Lumbermen's Association, Stuart Building, Seattle, Wash.	Douglas fir, west coast hemlock, Sitka spruce, western red cedar.
Western Pine Association, Yeon Building, Portland, Oreg.	Ponderosa pine, sugar pine, Idaho white pine, larch, Douglas fir ("Inland Empire" and California), white fir, Engelmann spruce, incense cedar, and western red cedar.

NOTE.—The American lumber standards with respect to the quality of lumber permissible in each American standard grade and in commercial practice the American standards rough and finished sizes are minima. Manufacturers' associations in publishing grading rules based on the American standards may provide, and in some cases have provided, for higher grade qualities and for thicker and/or wider sizes than those required by the standards.

I-4. The following is a list of the species of softwood commonly used for lumber or timber and the names of the various lumber manufacturers' associations under whose rules [7] each species is graded.

Species:	Graded under rules of—
Douglas fir	West Coast Lumbermen's Association (coast region).
	Western Pine Association ("Inland Empire" and California region).
Eastern hemlock	Northern Hemlock and Hardwood Manufacturers' Association.
Eastern red cedar (aromatic red cedar)[8]	National Hardwood Lumber Association.
Eastern spruce (red spruce, black spruce, and white spruce)[9]	Northern Pine Manufacturers.
Engelmann spruce	Western Pine Association.
Incense cedar	Do.
Northern white pine [9]	Northern Pine Manufacturers.
Norway pine (red pine) [9]	Do.
Ponderosa pine	Western Pine Association.
Port Orford cedar	West Coast Lumbermen's Association.
Redwood	California Redwood Association.
Sitka spruce	West Coast Lumbermen's Association.
Southern cypress (only 1 type—tidewater red cypress)	Southern Cypress Manufacturers' Association.
Southern cypress (no grading distinction as to types—rules cover white cypress, yellow cypress, and red cypress)	National Hardwood Lumber Association.
Southern pine (includes the various commercial pines of the Southeast, such as longleaf pine, shortleaf pine, slash pine, loblolly pine, etc.)	Southern Pine Association.
Sugar pine	Western Pine Association.
Tamarack (eastern larch)	Northern Hemlock and Hardwood Manufacturers' Association.
Western hemlock (west coast hemlock)	West Coast Lumbermen's Association.
Western larch	Western Pine Association.
Western red cedar	West Coast Lumbermen's Association.
Western white pine (Idaho white pine)	Western Pine Association.
White fir	Do.

I-5. This specification governs all United States Government purchases of this commodity. Users are requested to retain this specification in permanent file until a revision is issued. As an aid to Federal officers in the preparation of lumber specifications and the purchase of lumber, attention is called to a publication of the Federal Government, entitled "How Lumber is Graded," which is supplemented by a separate set of grade-use tables giving the grades of lumber recommended by the principal lumber associations for various types of construction. The supplement is obtainable free from the Forest Service, U.S. Department of Agriculture.

[7] See note I-4.
[8] Although a softwood, eastern red cedar is graded under Hardwood Association rules.
[9] The rules of the former Northern Pine Manufacturers' Association are still in use by manufacturers of northern white and Norway pine and red, black, and white spruce.

I-6. Interested parties are advised that an Alphabetical Index of Federal Specifications may be obtained upon application as noted in paragraph next below, at a cost of 10 cents.

I-7. Copies of this specification may be obtained upon application, accompanied by money order or coupon, or cash, to Superintendent of Documents, Government Printing Office, Washington, D.C. Price, 5 cents.

FEDERAL COORDINATING SERVICE, OFFICE OF CHIEF COORDINATOR

ROOM 5026 INTERIOR BUILDING, WASHINGTON

NOVEMBER 4, 1931.

CIRCULAR LETTER NO. 71

To the heads of all departments and establishments:

SUBJECT: Procurement; Purchase of lumber.

This circular letter supersedes and cancels supplement no. 5 (Revised) of bulletin no. 109, dated July 9, 1930.

In view of the limited lumber inspection facilities in some departments and establishments, and in order to broaden the field of competition, it is suggested that, when practicable, Federal activities purchase lumber in accordance with the following forms of bids and procedure:

FORMS OF BIDS

Softwood lumber

Bid A.—Lumber to be * * * (specify species and grade, such as southern pine, B and Better, S1S1E, air-dry) and to be graded in accordance with the latest rules of the * * * (specify name of the association whose rules are applicable and to be employed, such as Southern Pine Association). Each piece of lumber is to bear the grade mark and trade mark of the association under whose rules the lumber is purchased, and the mill-identification mark. Each piece may also bear the national-tree symbol. Bidders should state whether they propose to furnish lumber bearing the national-tree symbol.

Bid B.—Lumber to be * * * (specify species and grade, such as southern pine, B and Better, S1S1E, air-dry) and to be graded in accordance with the latest rules of the * * * (specify name of the association whose rules are applicable and to be employed, such as Southern Pine Association) and to be accompanied by a certificate of grading issued by that association.

Bid C.—Lumber to be * * * (specify species and grade, such as southern pine, B and Better, S1S1E, air-dry) and to be graded in accordance with the latest rules of the * * * (specify name of the association whose rules are applicable and to be employed, such as Southern Pine Association) and to be inspected by an inspector from the * * * (specify name of Federal department or establishment, such as War Department).

The above bids comply with the requirements set forth in Federal Specification No. MM-L-751 (F.S.B. no. 533a), Lumber; softwood, factory and yard.

Hardwood lumber

Bid A.—Lumber to be * * * (specify species and grade, such as white oak, common timbers, rough, any stage of seasoning) and to be graded in accordance with the latest rules of the National Hardwood Lumber Association and to be accompanied by a certificate of grading issued by that association.

Bid B.—Lumber to be * * * (specify species and grade, such as white oak, common timbers, rough, any stage of seasoning) and to be graded in accordance with the latest rules of the National Hardwood Lumber Association and to be inspected by an inspector from the * * * (specify name of Federal department or establishment, such as War Department).

The above bids comply with the requirements for hardwood lumber set forth in Federal Specification no. MM-L-701 (F.S.B. no. 24), Lumber.

CARLOAD LOTS OR MORE

Bids for softwood lumber should be invited under relevant options A and/or B, together with option C. Bids for hardwood lumber should be invited under relevent options A and B.

LESS THAN CARLOAD LOTS

Unless it is considered advisable by the purchaser to do otherwise, bids for softwood lumber should be invited under relevant options A and C, omitting option B, as the prorated cost per thousand feet board measure for an association certificate of grading covering small quantities would generally be excessive. Bids for hardwood lumber should be invited under relevant option B only, for the same reason.

MAKING AWARDS

Softwood lumber

In making awards for softwood lumber where there are tie low bids, preference should be given to the bidder proposing to furnish grade-marked and trade-marked lumber as covered by bid A, over the bidder proposing to furnish lumber to be accompanied by an association certificate of grading as covered by bid B, and also over the bidder who is to furnish lumber which will be inspected by an inspector employed by a Federal agency, as covered by bid C. Likewise, in the case of tie low bids between bid B and bid C, preference should be given to bid B over bid C, as outlined above. In case of tie, low bids under bid A, lumber bearing, in addition, the national-tree symbol, should be given preference on account of the additional financial guaranty to the Government.

Bid A or bid B offers an economic advantage over bid C, in that Government inspection for grade is facilitated. Bid A offers a practical advantage over bid B in that each piece of lumber bears a grade mark, which is a convenience in sorting, storing, issuing, and using lumber.

Hardwood lumber

In making award for hardwood lumber, where there are tie low bids, preference should be given to the bidder proposing to furnish lumber to be accompanied by an association certificate of grading as covered by bid A over the bidder who proposes to furnish lumber which will be inspected by an inspector employed by a Federal agency as covered by bid B. Bid A offers an economic advantage over bid B, in that Government inspection for grade is facilitated.

The above preferences in making award, in the case of tie low bids, should be fully set forth in invitation for bids.

GENERAL REQUIREMENTS

The following should be fully set forth in invitations for bids:

All items of lumber of which the quantity is equal to or in excess of one minimum carload should be delivered in solid carloads, one item to each car. Less than carload lots may be loaded at the convenience of the contractor, items being separated.

Shipping documents and invoices covering shipments of lumber graded under the rules of a commercial lumber association which require an association certificate of grading should be accompanied by a copy of the official certificate of grading issued by the association whose rules are being employed.

T. T. CRAVEN, *Chief Coordinator.*

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