Standard no. 17
GRADING RULES FOR

WEST COAST LUMBER

EFFECTIVE SEPTEMBER 1, 1991
REVISED OCTOBER 1, 2015

DOUGLAS FIR
HEM FIR
WESTERN RED CEDAR
SPRUCE–PINE–FIR SOUTH
AND OTHER SOFTWOOD SPECIES

Published by
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INSPECTION BUREAU
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GRADING and DRESSING RULES

for

DOUGLAS FIR
WESTERN HEMLOCK
WESTERN RED CEDAR
SPRUCE-PINE-FIR SOUTH
AND OTHER SPECIES

LUMBER

Effective September 1, 1991
Revised October 1, 2015

Superseding, canceling and annulling all previous rules of the West Coast Lumber Inspection Bureau

Approved by the Board of Directors of the
WEST COAST LUMBER INSPECTION BUREAU

AMERICAN LUMBER STANDARD SIZES AND GRADES

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Email: info@wclib.org
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**Para. 200. Stress Grades**
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- 204. Rate of Growth
- 206. Mechanically Stress Rated Lumber
- 210. End Joint Certification (Finger Joint)
- 250. Size Standards
- 260. Table of Random Lengths
- 280. Abbreviations
- 300. Reinspection
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INTRODUCTION

1. The West Coast Lumber Inspection Bureau is an Oregon non-profit corporation. It is a service organization which functions for the convenience and protection of buyer, seller and consumer alike, and provides its services at approximate cost.

Bureau activities include publication and distribution of West Coast Grading Rules, supervision of the grading and manufacturing practices of subscriber plants, grade stamping of West Coast lumber with official Bureau stamps, certificate inspection of lumber shipments, reinspection of lumber in dispute at destination, and assistance to specification agencies, buyers and consumers of West Coast lumber products. The Bureau renders such services on request, but only on condition that those requesting and obtaining such services assume all liability arising out of or in connection therewith, including claims of third parties.

In the United States these rules apply to lumber species manufactured from timber grown in the West Coast region which includes the summit area of the Cascade Mountains and west to the Pacific Ocean in the states of Washington and Oregon, and in the entire state of California, and to those species of foreign origin specifically listed in these rules.

California redwood may be graded under the current grading rules of the Redwood Inspection Service. Ponderosa pine, Idaho white pine, Sugar pine, Lodgepole pine, Engelmann spruce and Western larch may be graded under the current grading rules of the Western Wood Products Association. Stock so graded under the supervision of West Coast Lumber Inspection Bureau shall be subject to reinspection by WCLIB at its current rates. Inclusion of the term “WWPA RULES” in the grade stamp indicates that the lumber was graded under WWPA rules. WCLIB grade stamps applied to redwood will include the word “REDWOOD” to indicate that the lumber was graded under RIS rules.

The purpose of West Coast grade stamps is to identify lumber to the consumer, in terms of intended use. References to use in these rules are only to general adaptability of the grade. West Coast grade stamps are applied only by a West Coast inspector, or at a licensed
INTRODUCTION

operation where the grading practices are under the supervision of the West Coast Lumber Inspection Bureau.

The grade as stamped shall signify that the lumber conforms to the grade, size and seasoning provisions of these rules unless otherwise noted on the stamps.

Grade stamps applied to lumber surfaced to less than standard size shall show the size in the stamp.

Under these rules, grade stamping is restricted chiefly to yard grades of West Coast lumber, such as finish, paneling, casing, base, flooring, ceiling, siding, stepping, boards, dimension, decking and timbers, which are graded under current rules of the West Coast Lumber Inspection Bureau.

Grade stamps applied to boards and dimension lumber 4" and thinner, dried to 19% or less moisture content and surfaced to “DRY” sizes, shall include the designation “S-DRY” or “KD” in the stamps, or if dried to a maximum moisture content of 15%, the symbol “MC 15” or “KD 15” may be used. (See Para. 3d-f.)

Grade stamps applied to 4" and thinner framing lumber surfaced at a moisture content in excess of 19% shall include the designation “S-GRN.”

West Coast yard grades are identified by letters, names or stress values in the center of the grade stamp. West Coast Lumber Inspection Bureau grade stamps also include the Bureau’s registered symbol, inspector or mill identification, moisture content when applicable, and identification of species. Bureau grade stamps bearing the designation “WESTERN WOODS” are provided to identify a mixture of species. Design values are those for the lowest species or species group in the combination.

GRADE STAMPING OF “HEM-FIR”

The species combination “HEM-FIR” includes Western hemlock, Pacific silver fir, Noble fir, Grand fir, California red fir, and White fir. All of the species included in this group, singly or in combination, may be stamped “HEM-FIR.” Manufacturers producing a single species of this group, or those who can separate individual species, verified by Bureau supervision, may identify the individual species.
INTRODUCTION

The design values shown in the tables, Para. 200, will apply. Non Dimension grades of Western hemlock may use the values shown for that species.

GRADE STAMPING OF “SPRUCE-PINE-FIR SOUTH”

The species combination “SPRUCE-PINE-FIR SOUTH” includes Sitka spruce, Engelmann spruce, Lodgepole pine, Balsam fir, Jack pine, Red pine, and Eastern spruces. Any one of these species or any combination may be grade stamped as “SPRUCE-PINE-FIR-SOUTH.”

GRADE STAMPING OF “WESTERN WOODS”

The species combination “WESTERN WOODS” includes Douglas fir, Bigcone Douglas fir, Larch, Western hemlock, Pacific silver fir, Noble fir, Grand fir, California red fir, White fir, Mountain hemlock, Sitka spruce, Engelmann spruce, Subalpine fir, Idaho white pine, Ponderosa pine, Sugar pine, Jeffrey pine, Bishop pine, Coulter pine, Digger pine, Knobcone pine, Limber pine, Whitebark pine, and Lodgepole pine. Any one of these species or any combination may be grade stamped as “WESTERN WOODS.”

Applied to lumber dried to 19% or less moisture content at time of surfacing. This moisture level qualifies the piece to be surfaced to the dry size, as denoted by the word “DRY” in the stamps.

Applied to lumber exceeding 19% moisture content at time of surfacing to standard surfaced green sizes.
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Applied to stress graded lumber in boardsizes, showing dimension grade name and “SRB”.

Applied to a mixture of species surfaced unseasoned.

Applied to No. 1 Douglas Fir dried to 19% maximum moisture content and surfaced to the standard dry size.
INTRODUCTION

GRADE STAMPING OF “WESTERN CEDAR”
The species combination “WESTERN CEDAR” includes Western red cedar, Incense cedar, Port Orford cedar and Alaska cedar. Any one of these species or any combination of them sold as “WESTERN CEDAR” may be grade stamped with the designation “WESTERN CEDAR.” Any one of these species shipped separately may be marked with grade stamps showing that species. The combination values shown in the tables of Para. 200 shall apply, unless species specific values are listed.

GRADE STAMP ABBREVIATIONS
West Coast species and species combinations are shown in abbreviated form on the grade stamps. Examples of these abbreviations are:

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<th>Abbreviation</th>
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<td>Aus.Spr</td>
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<td>Douglas fir</td>
<td>DF</td>
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<td>Douglas fir - Larch</td>
<td>DF-L</td>
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<td>Hem-fir</td>
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<td>Mountain hemlock</td>
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<td>Scot.P or Sc.P</td>
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<td>Western cedar</td>
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Imported species include designation (I)
A Bureau Certificate of Inspection is the buyer’s assurance that the shipment involved has been carefully inspected by a qualified inspector who is regularly supervised for grading efficiency by the Bureau.

Bureau certificates are available to all producers whether subscribers to the Bureau or not, or users of West Coast species, in market as well as producing areas. Certificates can be furnished for West Coast grades and for any practical special specification if a copy of the specification is supplied. This service is performed at approximate cost.

The main objectives of the Bureau are to maintain uniform standards of lumber grading and manufacture, to promote the use of grade stamped lumber as assurance to buyer, seller and consumer that the interests of each are fully protected, and to assist in efficient distribution and use of West Coast lumber products.

Any lumber producer and remanufacturer operating in the areas served by the West Coast Lumber Inspection Bureau may subscribe to the Bureau.

inspection and grading services of the Bureau are available to any producer, user, distributor or dealer handling West Coast lumber products.

The affairs and work of the Bureau are directed from the main office in Portland, Oregon. All reinspection requests are routed through the Portland office and are assigned to the proper field representatives.

Lumber which has been inspected by a Bureau authorized inspector may be identified in a Certificate of Inspection issued by the Bureau.
A Bureau Certificate of Inspection is a document listing in detail the following items:

(a) Name of shipping mill or place at which inspection was made.

(b) Car number, or name of vessel, when available.

(c) Name of Bureau Inspector or Certified Mill Inspector.

(d) Description of material (species, sizes, lengths, applicable grades, tally of pieces, type or class of material).

(e) Lot markings, hammer brands, paint daubs, or other means of identification.

(f) Order numbers of buyer and seller (if necessary).

(g) Certifying signature of Bureau Agent.
**INSPECTION CERTIFICATE**

Issued at PORTLAND, OREGON, on Month X, YEAR. Inspected on Month X, YEAR. Lumber herein listed has been inspected and tallied under Grading and Dressing Rules 17 in accordance with the order and specifications furnished the Inspector(s) by the Shipper at time of inspection at plant of WEST COAST SAWMILL COMPANY, Portland, OR, by Bureau Inspector(s) Richard Roe. Shipment made via SP 123456.

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### WEST COAST LUMBER INSPECTION BUREAU

GENERAL OFFICE

6980 S W Varns Road • Portland Oregon 97223  
P.O. Box 23145 • Portland Oregon 97281-3145

**ROUGH GREEN DOUGLAS FIR**

<table>
<thead>
<tr>
<th>Size</th>
<th>Grade</th>
<th>Quantity</th>
<th>Total</th>
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<tr>
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<tr>
<td>2x6 85/8</td>
<td>75/10</td>
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<td>60/16</td>
</tr>
</tbody>
</table>

Total 1,169 pcs. 12,539' 

**CONSUMER ORDER NO.:** 250 A  
**MILL ORDER NO.:** 125  
**HAMMER BRAND:** (XO)

This Certificate refers only to the form and condition of the material at the time of inspection.

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West Coast Lumber Inspection Bureau
GENERAL GRADING PROVISIONS

2. Because they are the limiting factors, the natural characteristics of lumber are emphasized throughout these rules. At no time, in whatever grade, should the inherent and wonderful properties of wood be forgotten. Often less than one percent of the piece is made up of the “characteristics” so prominently mentioned. Rarely does the total exceed ten percent. The remaining wood has beauty or strength, or both, plus all the other qualities which have made lumber so tremendously useful for thousands of years.

Every tree, every log, every piece of lumber, has individual characteristics. Because of the wide variation in the raw material, an infinite number of grades could be developed. For convenience in distribution and merchandising, grades are limited to a few general classifications. These may be roughly described as appearance grades, construction grades, and combination grades which have both fine appearance and high construction qualities. There are some uses for lumber so limited in volume that a specific rule is not practical. These needs are filled by special agreement between buyer and seller. Use of basic grades wherever practical, however, will reduce the cost of both manufacture and distribution.

These general grading provisions apply to all paragraphs in these rules except as otherwise specifically provided.

2-a. A lumber grade is a grouping of pieces, all slightly different, with regard to the end use for which the grade was intended. The purpose of a grading rule is to describe as accurately as possible the pieces which may be accepted in specific grades. Each grade description lists major characteristics which may be accepted and usually limits them as to location, type, area, size or number. When characteristics are not listed, they are appraised in relation to the characteristics permitted or limitations prescribed for the grade under consideration and are allowed if judged by the inspector to be equivalent in effect to those listed.

The grade is determined by the number, size, type and position of knots, shake, wane or other visible characteristics. Each piece is considered and its grade determined by its general character, the sum of all its characteristics, and with reference to its suitability for the use for which the grade was designed.
Basic dimensions are specified for some grades. Basic dimensions for flooring, for example, are one inch by four inches by 12 feet. These are what is called the “nominal” dimensions.

Whenever width or thickness is mentioned in these rules, reference is made to the nominal width or thickness unless otherwise specifically stated. The use of nominal sizes in these rules is for convenience and follows industry practice. No inference should be drawn that nominal sizes are actual size.

The number or size of the characteristics permitted in a grade vary as the area of the piece increases or decreases in relation to the basic dimensions.

Lumber grades are broad manufacturing categories, providing the extent and limitations of the characteristics permitted in the particular grade. Grades overlap, and pieces may be selected from a grade to comprise another grade. However, a specific shipment shall not be made up only of pieces containing characteristics of the maximum number or size permitted in the grade.

2-b. The inspection of lumber is the visual analysis, with regard to end-use, of each piece. As a result, a reasonable difference of opinion between inspectors is recognized. A parcel or shipment of lumber is considered on grade if on reinspection ninety-five percent (95%) or more is found to be of the grade specified. In mixed parcels or shipments, each grade and kind is considered separately.

The grade of lumber, as determined by the inspector, applies to the size, form, condition or degree of seasoning at time of original inspection; any subsequent change in the lumber must be disregarded in determining the accuracy of the original grade.

2-c. Dimension, framing, joists, timbers and similar items are graded for strength. Characteristics on all four sides are considered in relation to their effect on the strength of the piece. Other yard lumber, when rough or surfaced two sides, is graded from the face or best side. If surfaced one face only, it is graded from the surfaced face except when otherwise specified. The reverse face may have characteristics approximately one grade lower than the
face. Bright sapwood is not limited in any grade except as specifically provided. Discoloration through exposure to the elements is permitted in all construction grades.

2-d. Except in the case of such items as factory lumber, material supplied in accordance with these rules is not intended to be suitable for remanufacturing to smaller sizes.

2-e. Characteristics permitted and limitations for rough lumber are the same as those for dressed lumber of like kind and grade. In addition, such characteristics which are likely to disappear in dressing rough lumber to standard sizes are allowed.

2-f. The principal factors which govern the strength of a piece of lumber are the slope of grain, size of knots and their location, and in Douglas fir the number of annual rings and percentage of summerwood. It is primarily on the basis of these factors that the stress value of any grade is assigned. Other characteristics of wood which have a lesser effect on strength, such as shake, splits, etc., are then restricted or not permitted so that the assigned values for the grades are assured. Some characteristics such as pitch streaks, pitch pockets and wane may be restricted merely for the sake of appearance. Knots not firmly fixed, unsound knots and knot holes, which have no more effect on strength than sound knots, are restricted in most grades in order to improve appearance. Para. 200 gives additional information on stress grades.

2-g. All lumber under these rules is trimmed for the removal of sniped, splintered or uneven log ends. It must be trimmed full to the length specified and if 2" and thinner, not more than 3" over length, unless otherwise stated in the contract of purchase.

Double-end-trimmed (DET) lumber is trimmed reasonably square by a saw on both ends. It does not mean equalized lengths unless the order so specifies.

Precision-end-trimmed (PET) lumber is trimmed square and smooth on both ends to uniform lengths with a manufacturing tolerance of 1/16" over or under in length in 20% of the pieces.
GENERAL GRADING PROVISIONS

Square-end-trimmed lumber is trimmed square permitting slight manufacturing tolerance of 1/64” for each nominal 2” of thickness or width.

2-h. A variation of 1/32” over or under in thickness is permitted in the product resulting from resawing surfaced lumber. For SAW-SIZED, see Para. 739.

2-i. Lumber not conforming to standard sizes or grades, or intended for special uses, should be governed by special contract.

Standard thicknesses and widths are shown in Para. 250 of these rules. The dressed thicknesses and widths as shown are considered standard for corresponding nominal sizes as shown. Lumber of any size, rough or dressed, is described by its nominal dimensions in customary use and in these rules. However - invoices should show the net size of surfaced lumber. Standard lengths are multiples of 1’ but are customarily shipped in multiples of 2’ in most items.

2-j. Except moulding, which is tallied in linear feet, lumber is tallied board measure. Board measure is the term used to indicate that a board foot is the quantity of lumber contained in or derived by drying, planing or working from a piece of rough unseasoned lumber.

The board measurement of dry lumber, rough or dressed, is based on the corresponding nominal dimensions of rough unseasoned lumber. The board measurement of lumber less than 1” thick is based on the nominal surface dimensions (width by length).

In shipments measured with a board rule, a piece tally in feet shall be made and this tally shall be the number of feet, board measure, of 1” lumber. The tally of lumber thicker than 1” shall be multiplied by the thickness as expressed in inches and fractions of an inch.

In material measured with a board rule on actual widths, pieces measuring to the even half foot shall be alternately counted as of the next higher and lower foot count; fractions below the one-half foot shall be dropped and fractions above counted as of the next higher foot.
2-k. Lumber finished to special non-standard size is tallied as being of the basic rough (nominal) size necessarily used in its manufacture, and the actual thickness and width of such lumber as indicated on the invoice. Lumber of standard sizes is tallied by the number of pieces of each size and length in the shipment.

2-l. In these rules, there are paragraphs detailing special provisions and limitations for each standard grade of each item. These specific rules cannot be used to determine the grade of such item without also giving consideration to applicable provisions of other paragraphs in these rules.

2-m. Edge-glued, face-glued, and end-glued in any combination is intended to be interchangeable in use with one-piece stock of the comparable grade. The characteristics of the grade are the same as for one-piece stock. Additional requirements for which the producer is responsible are:

(a) Exterior glue line equal to heat-cured 50-50 melamine urea glue.
(b) Adequate glue line strength for usual handling and fastening.
(c) Appearance shall be suitable for intended finishing of each grade.

Grade stamps applied under these rules to edge or end-glued material shall indicate only the quality of the pieces of lumber in the glued unit.

2-n. Upon written request, the Bureau may, at its option and under conditions established by the Bureau, permit publication of the rules, in whole or in part, including all applicable provisions with all quoted parts clearly so indicated. Any such publication shall carry reference to the source of the rules and their effective date, and be revised to conform with any subsequent changes in the rules, giving the effective dates thereof.

2-o. The Bureau performs its services at approximate cost and reserves the right to demand prepayment of all charges or a deposit to cover estimated costs of such charges.
2-p. The interpretation of these rules and decisions on grades is vested in the West Coast Lumber Inspection Bureau.

National grades for softwood dimension lumber 2" to 4" thick contained herein were developed by representatives of the regional rules-writing agencies serving on task groups appointed by American Lumber Standard Committee, and were subsequently adopted by the National Grading Rules Committee, which is composed of representatives of lumber inspection agencies, building codes, home builders, engineers, architects, consumer groups, Federal Housing Administration, Defense Supply Agency, United States Forest Products Laboratory and National Institute of Standards and Technology. These national grades are required to appear in identical form in the rules of all agencies certified by American Lumber Standard Committee to write rules for softwood lumber. Thus, grades for dimension lumber will be the same and will be uniformly applied in all regions for all commercial softwood species. Written interpretations of the national grading rules have been prepared by the National Grading Rules Committee to promote the uniform application of these rules. Copies of the interpretations are available from the West Coast Lumber Inspection Bureau.
SEASONING PROVISIONS

3. Sizes referred to in these rules are sizes applicable to the pieces at the time of manufacture.

All lumber swells and shrinks within narrow limits with changes in moisture content much as most other materials swell and shrink with changes in temperature. Natural shrinkage in width and thickness under usual changes in moisture content may average approximately 4%. Individual pieces may have more or less shrinkage.

3-a. When lumber has been subjected to drying conditions after manufacture, causing an appreciable loss in moisture content, an allowance must be made for the resulting shrinkage. In such cases, the shrinkage allowance is 1% reduction in size for each 4% reduction in moisture content, based on the moisture content specified for dry items and 30% moisture content for unseasoned items. The same tolerance for expansion will be applied for surfaced dry items that have re-absorbed moisture. Shrinkage occurring in sizes too large to permit accurate testing for moisture content with the regularly used meters will be assessed by the inspector and a reasonable allowance made, based on his judgment.

3-b. Boards, dimension or clears specified to be kiln dried or air dried in these rules, or ordered kiln dried or air dried, will be dried as follows:

3-b(1). SEASONED CLEARS. All grades of seasoned clears 2" or less in thickness represented as kiln dried shall be dried to 15% maximum moisture content. Clears over 2" thick shall be dried to 19% maximum moisture content. Orders for lumber of a moisture content varying from the above shall be subject to special agreement. Moisture content of lumber thicker than 4" also is subject to special agreement.

3-b(2). SEASONED BOARDS AND DIMENSION 4" AND THINNER. Boards and dimension 4" or less in thickness sold as “DRY” shall be dried to 19% maximum moisture content.

3-c. AIR DRY. Air Dry is the state of seasoning in which wood has been dried to a moisture content varying from 12 to 19%, it being in approximate equilibrium with the average moisture conditions of the atmosphere. This varies with the climate and local weather conditions.
3-d. **KILN DRY.** Kiln dry lumber is lumber which has been seasoned in a chamber or kiln to a predetermined moisture content by the application of heat.

3-e. Lumber dried to 19% maximum moisture content may be grade stamped with stamps including the designation “S-DRY,” indicating the lumber was surfaced at 19% or less moisture content. Lumber kiln dried to 19% maximum moisture content may substitute “KD” in place of “S-DRY.”

3-f. Lumber dried to 15% maximum moisture content may be grade stamped with stamps including the symbol “MC15,” to indicate the lumber was surfaced at 15% or less moisture content. Lumber kiln dried to 15% maximum moisture content may substitute “KD15” in place of “MC15.”

3-g. Lumber graded under Para. 154 and dried to 16% maximum moisture content may be grade stamped with stamps including the symbol “MC16” or “KD16”, if kiln dried, to indicate that the lumber was surfaced at 16% or less moisture content.
WEST COAST SPECIES

DOUGLAS FIR
(Pseudotsuga Menziesii)

90. Douglas fir from the West Coast is one of the strongest woods, pound for pound, that has ever been tested. It enjoys a reputation throughout the world as an all-purpose wood of great dependability, and is supreme for both heavy and light construction.

West Coast Douglas fir, which is available everywhere, is the most serviceable of all American softwoods, being manufactured into more use items than any other lumber species.

Through years of the most favorable growing conditions, West Coast Douglas fir has acquired the characteristics necessary to fine construction uses — stiffness, strength, ease of working, durability and comparative freedom from warping, cupping or twisting.

90-a. Larch (Larix occidentalis) sometimes grows in intermingled stands with Douglas fir. Wood of this species has similar strength properties and can be manufactured together with Douglas fir with identical design values.

HEM-FIR

91. Hem-fir is a combination species, including Western hemlock (Tsuga heterophylla), California red fir (Abies magnifica), Grand fir (Abies grandis), Noble fir (Abies procera), Pacific silver fir (Abies amabilis), and White fir (Abies concolor). Western hemlock lumber possesses characteristics which rank it among the foremost commercial woods. The true firs found on the Pacific coast often grow in intermingled stands with Western hemlock. Wood of these species is similar in appearance, has similar strength properties and takes similar spans. Therefore, they usually are manufactured and shipped together under identical design values as Hem-fir. The true firs included in the Hem-Fir grouping may be marketed and grade stamped exclusive of Western hemlock (Tsuga heterophylla) as “White Fir.” The assigned design values for Hem-Fir apply to this grouping.

Since Hem-fir lumber is fine-textured, straight grained, stiff, and easily worked, it adapts itself readily to many uses. It is particularly distinguished by its strength, freedom from
pitch, freedom from splintering, and its ease in working.

91-a. In these rules, black burls in Hem-fir are interchangeable with knots. Bark pockets are interchangeable with pitch pockets. Dark streaks peculiar to Hem-fir are permitted in any grade.

MOUNTAIN HEMLOCK
(Tsuga mertensiana)

92. Mountain hemlock is a timber tree grown at high elevations in the mountains, and in the West Coast region is found principally in the Cascade Range at elevations around 4500 feet or higher.

Mountain hemlock is similar in appearance to Western hemlock (Tsuga heterophylla) and when cut into lumber is practically indistinguishable. Its strength properties are very similar to those of Western hemlock, having slightly higher bending strength and slightly lower modulus of elasticity (stiffness).

It is used for the same purposes as Western hemlock.

SITKA SPRUCE
(Picea sitchensis)

93. The unusual characteristics of Sitka spruce enable it to meet the requirements of a wide variety of items from box lumber to piano sounding boards, from general construction lumber to the finest of clears used by cabinet makers, airplane and ladder manufacturers. Extremely resilient, it has the highest strength-to-weight ratio of any wood in the world.

Sitka spruce is tough, even-grained and soft textured. It is easily worked and has little tendency to split or splinter. It dries easily, stays in place well and shrinks only moderately. It is tasteless and odorless.
WEST COAST SPECIES

WESTERN RED CEDAR
(Thuja plicata)

94. The Western red cedar is among the largest and finest of the cedars grown anywhere in the world, its heartwood being famed for extraordinary resistance to decay.

Its wood is of exceptionally light weight – one of the lightest of all commercial species – of soft texture and close, even, straight grain. It is very easily worked, can be finished to a smooth, silky surface with little effort, is free from pitch, takes and holds stains, paints and enamels excellently, and has superior gluing qualities.

The wood contains a natural preservative oil which renders its heartwood resistive to decay and gives it durability without artificial preservative treatment. When left in its natural state, it weathers to a beautiful, soft, driftwood gray.

A number of Western mills manufacture specialty products of Western red cedar, designed for precise application, to take advantage of the inherent qualities of this species.

From the clear portion of the log such standard products as bevel siding, finish, paneling, pickets and ceiling are manufactured as well as various specialty items. The remainder of the log is manufactured into tight knotted siding and paneling, tank and pipe stock, standard construction material such as boards and dimension, decking and wall plank, and any other special uses that take full advantage of Western red cedar’s many qualities.

94-a. Three cedar species in addition to Western red cedar (Thuja plicata) may be graded under these rules. They are Incense cedar (Libocedrus decurrens), Port Orford cedar (Chamaecyparis lawsonia), and Alaska cedar (Chamaecyparis nootkatensis). Items sold as Western cedar may be any one of the above species, or any combination of them.

95. In addition to the species previously listed, WCLIB members produce products in the following species, which are found in the West Coast region: Engelmann spruce (Picea engelmannii), Bigcone Douglas fir (Pseudotsuga macrocarpa), Idaho white pine (Pinus monticola), Knobcone pine (Pinus attenuata), Lodgepole pine (Pinus contorta), Ponderosa pine (Pinus ponderosa), Sugar pine
WEST COAST SPECIES

(Pinus lamertiana), Jeffrey pine (Pinus jeffreyi), Bishop pine (Pinus muricata), Coulter pine (Pinus coulteri), Digger pine (Pinus sabiniana), Limber pine (Pinus flexilis), Whitebark pine (Pinus albicaulis), and Subalpine fir (Abies lasiocarpa). Lumber of any of the above species, except the Cedar species, may be grade stamped as “WESTERN WOODS.” “WESTERN WOODS” may also include any of the species specified in the species groupings of Douglas Fir North, Hem-Fir North, and Spruce-Pine-Fir as listed and defined in the grade rules of the National Lumber Grades Authority (NLGA) of Canada.

96. Foreign species - When foreign species graded under these rules are grade stamped, the grade stamp shall include the designation “(I)” with the species group identification. Design values developed in accordance with PS20-15 may be published in these rules when available.

Foreign species graded under these rules include Austrian spruce (Picea excelsa), Norway spruce (Picea abies), Scots pine (Pinus sylvestris), Douglas fir (Pseudotsuga menziesii), and European Larch (Larix decidua). Structural allowable properties are specific to the regional source of origin. See Para. 200 for specific allowable properties.

In addition to the species listed above, foreign species graded under these rules as Span Rated Decking (Para. 126) and non-structural grades include Mexican pines from Michoacan and neighboring states (P. leiophylla, P. chihuahuana, P. lumholtzii, P. arizonica, P. engelmannii, P. durangensis, P. jeffreyi, P. cooperi, P. montezumae, P. douglasiana, P. rudis, P. hartwegii, P. michoacana, P. pseudostrobus, P. maximinoi, P. oaxacana, P. nubicola, P. patula, P. oocarpa, P. pringlei, P. teocote, P. lawsoni, P. herrerai), Mexican pines from the states of Chihuahua and Durango (P. leiophylla, P. chihuahuana, P. lumholtzii, P. arizonica, P. engelmannii, P. durangensis, P. jeffreyi, P. cooperi, P. montezumae, P. douglasiana, P. rudis, P. hartwegii, P. michoacana, P. pseudostrobus, P. maximinoi, P. oaxacana, P. nubicola, P. patula, P. oocarpa, P. pringlei, P. teocote, P. lawsoni, P. herrerai) and Radiata pine from Chile and New Zealand. Note that all grades of Span Rated Decking for both Mexican pine groupings require a minimum of 4 rings per inch.
101. **FINISH** is customarily shipped kiln dried and surfaced four sides. Grade descriptions are based on a piece 8" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

Pieces of FINISH 5" and narrower are graded from the best face and both edges. Pieces 6" and wider are graded from the best face and one edge.

There are two grades of FINISH: “C & BTR” and “D.”

Unless otherwise specified, pieces are VG, FG or MG at shipper’s option.

101-c. **“C & BTR”-VG, FG or MG FINISH.** This grade includes the highest type products produced from the clear portion of the log. FINISH of this grade is recommended and widely used for interior trim and cabinet work with natural, stain or enamel finishes where finest appearance is important.

Characteristics and limiting provisions are:

- Medium stained sapwood. Heart stain firm.
- Short splits in not more than 5% of the pieces.
- Small seasoning checks, well scattered.
- Light torn or raised grain.
- Occasional very light skips on edge or back.
- Two small, sound, tight knots or equivalent smaller, or a small pitch streak or four small pitch or bark pockets or equivalent smaller.
- Warp - light in occasional pieces.

A 3" cutout 3' or more from either end of pieces 12' and longer is permissible in 5% of the shipment if the piece is otherwise of high type.
101-d. **“D” - FINISH.** “D” FINISH includes some of the high appearance features of “C & BTR” grade. Although the grade is generally less restricted than “C & BTR”, it is suitable where the requirements for finishing are less exacting. When “D” VG FINISH is ordered, pieces may have an angle of grain from vertical to 60 degrees from vertical.

Characteristics and limiting provisions are:

- Stained wood.
- Short splits.
- Medium seasoning checks, scattered.
- Limited pin holes
- Torn or raised grain.
- Hit and miss skips or skips on one edge up to 1/8" scant.
- Medium pitch streak.
- Four medium pitch or bark pockets or equivalent smaller.
- Firm white speck, narrow streak or equivalent.
- Wane 1/4 the thickness and 1/8 the width for 1/4 the length.
- Four fixed one-inch (1") knots or equivalent smaller.
- Warp - medium.

A 3" cutout 3’ or more from either end of pieces 12’ and longer is permissible in 10% of the shipment.

Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.
FINISH, PANELING AND CEILING
WESTERN RED CEDAR
VG, FG OR MG, KD
FINISH & PANELING
2" and Thinner
2" and Wider

102. Western red cedar Finish is customarily shipped kiln dried and surfaced four sides. Grade descriptions for Finish and Paneling are based on a piece 8" wide and 12' long. Grade descriptions for Ceiling are based on a piece 4" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

   Pieces of Finish 5" and narrower are graded from the best face and both edges. Pieces 6" and wider are graded from the best face and one edge.

   Pieces of Paneling and Ceiling run to pattern may be partially surfaced or hollow or scratched back.

   “SAW TEXTURE” is available in all clear grades of Western red cedar and, as the name implies, is a texture put on a piece of siding or lumber by a saw to give it a texture or resawn appearance. Material supplied with this finish shall in all ways adhere to the grades, sizes and patterns as specified except it shall be graded from the textured face.

   There are three grades of Western red cedar Finish, Paneling and Ceiling: “CLEAR HEART,” “A” and “B.”

   If FG or VG only is desired, it must be so specified. Otherwise mixed grain (MG) may be shipped at shipper’s option.

102-b. “CLEAR HEART” - Western red cedar Finish, Paneling and Ceiling. Finish, Paneling and Ceiling of this grade is recommended and widely used for interior and exterior trim and cabinet work with natural, stain or enamel finishes where finest appearance is important.

   This is the highest grade of Finish, Paneling and Ceiling produced and many pieces are absolutely clear. Pieces may exhibit a few minor characteristics which do not detract from their high appearance and quality.
Characteristics and limiting provisions are:
  Very light torn grain.
  Very light skips on back.
  Very light warp.

102-c. “A” - Western red cedar FINISH, PANELING and CEILING. The “A” grade is also recommended for interior and exterior uses where fine appearance is important. This grade is only slightly less restrictive than “CLEAR HEART.” The “A” grade is ideally suited to applications where finishing requirements are less exacting.

Characteristics and limiting provisions are:
  Small seasoning checks.
  Light torn or raised grain.
  Occasional very light skips on edges and backs.
  Two small, sound, tight knots or their equivalent.
  Light warp.

102-d. “B” - Western red cedar FINISH, PANELING and CEILING. Although the “B” grade permits larger and more numerous characteristics than “CLEAR HEART” and “A” grades, it is highly serviceable and often yields short lengths of fine appearance from longer stock. Many pieces have a fine appearance on one side, the reverse side showing larger and more numerous characteristics.

Characteristics and limiting provisions are:
  Short splits.
  Seasoning checks.
  Limited pin holes.
  Torn grain.
  Hit and miss skips on either face, or skip approximately 1/8" scant on edge.
  Four knots approximately 1" or their equivalent.
  Warp - medium.
Wane 1/8 the width for 1/4 the length and 1/4 the thickness, or its equivalent, in an occasional piece.

A 3" cutout 3' or more from either end of pieces 12' and longer is permissible in 10% of the shipment.

All or nearly all of the permissible characteristics of the grade are never present in maximum size or number in any one piece. Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.

102-e. GLUED-UP FINISH, PANELING AND CEILING. End-glued, edge-glued or a combination of end and edge-glued Finish, Paneling and Ceiling is intended to be interchangeable in use value with one-piece stock of the comparable grade.

The characteristics of the grade are the same as for one-piece stock. Additional requirements for which the producer is responsible are:

(a) Exterior glue line equal to heat-cured 50-50 melamine urea glue.

(b) Adequate glue line strength for usual handling and fastening.

(c) Appearance shall be suitable for intended finishing of each grade.
103. Casing and Base are customarily shipped kiln dried and usually run to a pattern. Grade descriptions are based on a piece 4" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. Unless otherwise specified, pieces are VG, FG or MG at shipper’s option.

There are three grades of Casing and Base: “C & BTR,” “D” and “E.”

In addition to the following specific provisions applicable to Casing and Base, the appropriate provisions in all other paragraphs in the rules apply.

103-c. “C & BTR” — CASING and BASE. Casing and Base of this grade are recommended and widely used for interior trim with natural, stain or enamel finishes where excellent appearance is important. When “C & BTR” VG Casing and Base are ordered, the face must present a vertical grain appearance.

Pieces of this grade are of sound wood. Most pieces are entirely clear or have only a few minor and unimportant characteristics, such as:

- Medium stained sapwood. Heart stain firm.
- Short splits in not more than 5% of the pieces.
- Small seasoning checks.
- Light torn or raised grain.
- Occasional very light skips on edges and back.
- Warp - light in occasional pieces.
- One small, sound, tight knot or its equivalent, or two small pockets or their equivalent, or a small pitch streak.

A 3" cutout 3’ or more from either end of pieces 12' and longer is permissible in 5% of the shipment if the piece is otherwise of a high type.
103-d. “D” — CASING and BASE. Casings and Base of this grade are recommended for interior trim where excellent serviceability is required but appearance is not of primary importance. When “D” VG Casing and Base is ordered, pieces may have an angle of grain from vertical to 60 degrees from vertical.

Pieces of this grade may have one or more characteristics which are of such size or number that the piece is not of “C & BTR” grade.

Pieces may have:
- Stained wood.
- Short splits.
- Seasoning checks.
- Limited pin holes.
- Torn or raised grain.
- Medium pitch streak.
- Hit and miss skips on either face or skip on edge approximately 1/8" scant.
- Warp - medium.
- Two knots approximately 1" or their equivalent.
- Two medium pockets or their equivalent.
- Firm white specks, 25% of face.
- Wane 1" wide for 1/6 the length and 1/4 the thickness.
- A 3" cutout 3' or more from either end of pieces 12' and longer is permissible in 10% of the shipment.

Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.

103-e. “E” — CASING and BASE. Graded under the provisions for “E” FLOORING, Para. 104-e.
104. Flooring is customarily shipped kiln dried and surfaced two sides, tongue and groove. The reverse side may be partially surfaced or hollow or scratched back. Grade descriptions are based on a piece 4" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

Unless otherwise specified, pieces are VG, FG or MG at shipper’s option.

There are three grades of Flooring: “C & BTR,” “D” and “E.”

In addition to the following specific provisions applicable to Flooring, the appropriate provisions in all other paragraphs in the rules apply.

104-c. “C & BTR” - FLOORING. Flooring of this grade is recommended and widely used where a combination of fine appearance and good resistance to wear is required.

Pieces of this grade are of sound wood. When “C & BTR” VG Flooring is ordered the face must present a vertical grain appearance with not less than 4 annual rings per inch. Most pieces are entirely clear or have only a few minor and unimportant characteristics such as:

- Medium stained sapwood. Heart stain firm.
- Two small seasoning checks.
- Light torn or raised grain.
- An occasional very light skip.
- Warp - light in occasional pieces.
- Two small, sound, tight knots or their equivalent, or three small pockets or their equivalent.
- Tongue 1/16" narrow.

A 3" cutout 4' or more from either end of pieces 12' and longer is permissible in 5% of the shipment if the piece is otherwise of a high type.

104-d. “D” - FLOORING. Flooring of this grade is recommended for use where good resistance to wear is desirable. It is a highly serviceable grade, designed for use
FLOORING
ALL WEST COAST SPECIES

where appearance is not of primary importance. When “D” VG Flooring is ordered, pieces may have an angle of grain from vertical to 60 degrees from vertical.

Pieces of this grade may have one or more characteristics which are of such size or number that the piece is not of “C & BTR” grade. Some pieces may have:

- Stained wood.
- Medium splits.
- Seasoning checks.
- Limited holes - one 1" or equivalent smaller in 8' to 14' and two 1" or equivalent in 16' and longer.
- Torn or raised grain.
- Large pitch streaks.
- Hit and miss skips on face or grooved edge.
- Warp - medium.
- Four fixed knots approximately 1" or their equivalent.
- Four medium pockets or their equivalent.
- Narrow tongue, which must be at least 1/16" in width.
- Firm white specks, 25% of face.

A 3" cutout 4' or more from either end of pieces 12' and longer is permissible in 10% of the shipment. Resultant pieces shorter than 8' must be free of holes.

Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.

104-e. “E” - FLOORING. This grade is recommended for subfloors, sheathing, and similar uses. Pieces contain characteristics too large or numerous to be accepted in the higher grades. Short lengths of good quality often may be obtained from it however, and its utility value is good.

All characteristics which do not interfere with use of the piece full length are permitted. In pieces over 6' long, characteristics which interfere with use of the piece full length are permitted if not located within 2' of either end and provided also that 75% of such a piece can be used after cutting into two or three pieces. Pieces 6' and shorter are usable full length.
105. Ceiling and Siding are customarily shipped kiln dried and surfaced two sides, tongue and groove or shiplap, and usually run to a pattern. The reverse side may be partially surfaced or hollow or scratched back. Unless otherwise specified, pieces are VG, FG or MG at shipper’s option. Grade descriptions are based on a piece 6” wide and 12’ long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. An occasional piece of “C & BTR” grade Siding with a tongue or lap 1/16” narrow is permitted. An occasional piece of “C & BTR” grade Ceiling with a tongue 1/8” or more in width is permitted. Special patterns will be graded according to these paragraphs unless otherwise specified.

There are three grades of Ceiling and Siding: “C & BTR,” “D” and “E.”

In addition to the following specific provisions applicable to Ceiling and Siding, the appropriate provisions in all other paragraphs in the rules apply.

105-c. “C & BTR” - CEILING and SIDING. Ceiling and Siding of this grade are recommended and widely used where the finest appearance is required.

Pieces of this grade are of sound wood. Most pieces are entirely clear or have only a few minor and unimportant characteristics such as:

- Medium stained sapwood. Heart stain firm.
- Three small seasoning checks.
- Light torn or raised grain.
- Warp - light in occasional pieces.
- Three small, sound, tight knots or their equivalent, or five small pockets or their equivalent.

A 3” cutout 4’ or more from either end of pieces 12’ and longer is permissible in 5% of the shipment if the piece is otherwise of a high type.
105-d. “D” - CEILING and SIDING. Ceiling and Siding of this grade are recommended for use where good utility is required. It is a highly serviceable grade designed for use where appearance is not of primary importance.

Pieces of this grade may have one or more characteristics which are of such size or number that the piece is not of “C & BTR” grade.

Pieces may have:

Stained wood.
Medium splits.
Seasoning checks.
Limited holes - one 1” or equivalent smaller in 8’ to 14’, and two 1” or equivalent in 16’ and longer.
Torn or raised grain.
Large pitch streaks.
Hit and miss skips on face or grooved edge.
Warp - medium.
Four fixed knots approximately 1” or their equivalent.
Five medium pockets or their equivalent.
Narrow tongue or lap, which must be at least 1/16” in width.
Firm white specks, 25% of face.

A 3” cutout 4’ or more from either end of piece 12’ and longer is permissible in 10% of the shipment. Resultant pieces shorter than 8’ must be free of holes.

Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.

105-e. “E” - CEILING and SIDING. Graded under the provisions for “E” FLOORING, Para. 104-e.
Western red cedar Bevel Siding is produced by resawing kiln dried surfaced lumber on a bevel to produce two pieces thicker on one edge than the other and is most commonly used as exterior siding, giving a horizontal shadow line effect. Except for siding intended for rough side use, bevel siding is graded on the surfaced side with characteristics and limiting provisions enumerated in the grades applying to the exposed width. Grade descriptions are based on a piece 6" wide by 12' long. Occasional tolerance in thickness is permitted, approximately 1/32" over or under in any one piece. The thick edge permits minor characteristics that do not detract from the appearance of the piece in use.

“SAW TEXTURE” is available in all clear grades of Western red cedar and as the name implies, is a texture put on a piece of siding or lumber by a saw to give it a textured, rough and/or resawn appearance. Material supplied with this finish shall in all ways adhere to the grades, sizes and patterns as specified, except that it shall be graded from the textured face.

There are four grades of Western red cedar Bevel Siding: “CLEAR VG HEART,” “A,” “B” and “C.” Special items, namely 1/2" x 4" and 1/2" x 5" sizes, 1/2" x 6" square edged and 3/4" x 6" rabbeted siding, are usually graded “CLEAR VG HEART” and “A” combined for the first grade.

Normal head lap for regular Bevel Siding is 1". This portion of the thin edge may contain characteristics that will be covered when laid and will provide a suitable backing. In rabbeted siding, depth of rabbet conforms to thickness of thin edge, width of rabbet is 1/2". Finished Sizes:
BEVEL SIDING
WESTERN RED CEDAR

<table>
<thead>
<tr>
<th>Nominal Size Board Measure (Inches)</th>
<th>Dressed Sizes (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>Width</td>
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<td>1/2</td>
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<td>3/4</td>
<td>10</td>
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<tr>
<td>3/4</td>
<td>12</td>
</tr>
</tbody>
</table>

Lengths are 3' and longer in multiples of 1'. (NB) Nested Bundling:

Bundles are 6' to 18' or longer. Bundles 10' and longer contain specified layers of 3' to 7' lengths.

(FLB) Full Length Bundling.

All pieces in the bundle correspond to length of the bundle. The length assortment is normally 6' to 18' or longer but may include a percentage of 3' to 5' bundles, as specified by the shipper.

Shorts:
“CLEAR” and “A” Grade -

6" and narrower, not more than 20% of the footage may be 6' and 7' bundles.

8" and wider, not more than 15% of the footage may be 6' and 7' bundles.

“B” Grade -

Not more than 20% of the footage may be 6' and 7' bundles.
Bundling Schedule:

<table>
<thead>
<tr>
<th>Size Thickness X Width</th>
<th>FLB &amp; NB Layers Per Bundle</th>
<th>NB Only Layers Nested in 10' &amp; Longer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot; x 6&quot; to 12&quot;</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>1/2&quot; x 5&quot; to 8&quot;</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>5/8&quot; x 8&quot; and 10&quot;</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>1/2&quot; x 4&quot;</td>
<td>12</td>
<td>4</td>
</tr>
</tbody>
</table>

106-aa. “CLEAR VG HEART” - BEVEL SIDING. “CLEAR VG HEART” - Bevel Siding is intended for use where highest quality is indicated. The exposed width is all heartwood and free from imperfections and presents a vertical grain appearance for 3/4 the width from the thick edge. The thick edge may contain light torn or raised grain.

106-a. “A” - BEVEL SIDING. “A” - Bevel Siding is intended for use where good appearance is desired. It may be furnished in mixed grain.

Characteristics and limiting provisions are:

- Very light torn or raised grain.
- One sound, tight, small knot or two sound, tight pin knots in the occasional piece.
- Light torn or raised grain on the thick edge.
- Very light skips on the thick edge.

106-b. “B” - BEVEL SIDING. “B” - Bevel Siding is a quality paint grade with excellent serviceability. It may be furnished in mixed grain.

Characteristics and limiting provisions are:

- Light torn or raised grain.
- Very light skips.
- Four small, sound, tight knots in the occasional piece.
- Limited pin holes, well scattered, in the occasional piece.
- Thick edge will permit medium torn or raised grain or light skips in dressing on the occasional piece.
Cutouts are permitted which can be removed by cutting out not more than 5% of the length of the piece, not exceeding one cutout in pieces 6’ to 9’ and two cutouts in pieces 10’ and longer.

All or nearly all of the permissible characteristics are never present in maximum size or number in any one piece.

106-c. “C” - BEVEL SIDING. “C” - Bevel Siding is suitable for temporary construction or use on buildings where a higher grade is not needed. Although this grade admits larger or more numerous characteristics than “B” grade, it often yields short lengths of fine quality. This grade may include stock too thin to dress to standard sizes. Lengths are random with percentages as specified by the shipper.

106-d. FACTORY PRIMED BEVEL SIDING. Factory priming is intended as a part of the complete paint system requiring final painting per the primed siding producer’s recommendations. Factory primed products shall be identified with a stamp or label by the producer.

106-e. GLUED-UP BEVEL SIDING. End-glued, edge-glued or a combination of end and edge-glued Bevel Siding is intended to be interchangeable in use value with one-piece stock of the comparable grade. The characteristics of the grade are the same as for one-piece stock. Additional requirements for which the producer is responsible are:

(a) Exterior glue line equal to heat cured 50-50 melamine urea glue.

(b) Adequate glue line strength for usual handling and fastening.

(c) Appearance shall be suitable for intended finishing of each grade.
There are two grades of Western hemlock; Bevel Siding: “C & BTR” and “D.” Since introduction of this popular wall covering, the 3/4" thickness sizes have been known to the trade as “Bungalow” siding. Unless otherwise specified, pieces are VG, FG or MG at shipper’s option.

Grade descriptions are based on a piece 6" wide and 12' long. Minimum head lap for 6" and narrower is usually 1". For widths wider than 6" the head lap is usually 1-1/4". This portion of the thin edge, which will be covered when laid, is not given the same consideration as the uncovered portion.

Bright sap is permitted in both grades. Occasional tolerance in thickness is permitted, approximately 1/32" over or under in any one piece.

In addition to the following specific provisions applicable to Bevel Siding, the appropriate provisions in all other paragraphs in the rules apply.

Finished Sizes:

<table>
<thead>
<tr>
<th>Nominal Size Board Measure (Inches)</th>
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<tr>
<td>3/4</td>
<td>12</td>
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</tbody>
</table>

Bundling: Standard bundles are 8' and up. 1/2" stock is bundled 10 layers to bundle. In bundles 10' and longer three layers of 3' to 7' lengths are included in each bundle. 3/4" stock is bundled 6 layers to bundle. In bundles 10' and longer two layers of 3' to 7' lengths are included in each bundle. Lengths - Multiples of 1'.
107-c. “C&BTR” - BEVEL SIDING. Siding of this grade is well manufactured and characteristics are so limited that it is suitable for use where finest appearance is required.

Characteristics permitted are:

- Very light torn or raised grain, and one of the following:
  - 4 small pockets, none open through, or 4 sound, tight pin knots.

  In 6" and wider siding the angle of grain for 3/4 of face from thick edge does not deviate from vertical more than 45 degrees.

107-d. “D” - BEVEL SIDING. Siding of this grade is a utility grade permitting characteristics which can be covered by paint or removed by trimming with a limited amount of waste.

Characteristics permitted are:

- Stained wood.
- Very light skips.
- Torn or raised grain.
- Pockets, none open through.
- Sound and tight knots.

  Cutouts are permitted which can be removed by cutting out not more than 5% of the length of the piece, not exceeding one cutout in pieces 6' to 9' and two cutouts in pieces 10' and longer.

  Percentage of lengths not guaranteed. Large percentage of shorts permitted at shipper’s option.

  In 6" and wider siding the angle of grain for one half of face from thick edges does not deviate from vertical more than 45 degrees.

**NOTE:** Other species may be graded on the foregoing paragraphs except Cedar. For Cedar Bevel Siding, see Para. 106.
109. Stepping is customarily shipped kiln dried, surfaced three sides and bull-nosed on one edge. The recommended standard for Stepping of 1-1/4" thickness is to round the nosed edge to a radius of 5/8". Grade descriptions are based on a piece 12" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. When Stepping is put in place, about 1" of the face on the riser edge does not show. There may be any number of various characteristics in this area so long as the utility of the piece is not affected.

There are two grades of Stepping: “C&BTR” and “D.”

In addition to the following specific provisions applicable to Stepping, the appropriate provisions in all other paragraphs in the rules apply.

109-c. “C&BTR” - VG STEPPING. Stepping of this grade is recommended where a combination of strength, excellent appearance and high resistance to wear is required.

Pieces of this grade are of sound wood and vertical grain for 1/2 the width or more nearer the wearing edge.

Pieces may have a few minor or unimportant characteristics such as:

- Medium stained sapwood.
- Heart stain firm.
- Small seasoning checks, not through.
- Light torn or raised grain.
- Occasional very light skips on back. Riser edge may have hit or miss skips.
- Warp - light.
- Four small, sound, tight knots or two 1" knots or their equivalent, or nine small pockets or their equivalent, or two small pitch streaks.
VG STEPPING, KD DOUGLAS FIR AND WESTERN HEMLOCK (HEM-FIR)

A 3" cutout 3' or more from either end of pieces 12' and longer is permissible in 5% of the shipment if the piece is otherwise a high type.

109-d. “D” - VG STEPPING. Stepping of this grade is recommended for use where a combination of strength and good resistance to wear is desirable. It is a highly serviceable grade and valuable where appearance is not of primary importance.

Pieces of this grade may have one or more characteristics which are of such size or number that the piece is not of “C&BTR” grade.

Pieces may have the angle of grain ranging from vertical to 60 degrees from vertical for 1/2 the width or more nearer the wearing edge.

Pieces may contain characteristics which have no important effect on the utility of the piece, such as:
- Stained wood.
- Short splits.
- Seasoning checks.
- Limited pin holes.
- Torn or raised grain.
- Medium pitch streaks.
- Hit and miss skips.
- Medium warp.
- Six small fixed knots, or their equivalent.
  - None over 1-1/2".
- Six medium pockets or their equivalent.
- Firm white specks, 25% of face.
- A 3" cutout 3' from either end in pieces 12' and longer is permissible in 10% of the shipment.

Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.
110. A substantial quantity of West Coast species is used for Paneling, notable for its beauty and fine finishing qualities, and, except as otherwise provided, is graded under the Finish Para. 101, and also under the Flooring Para. 104. For Cedar Paneling, see Para. 102.

PANELING
WESTERN RED CEDAR
TIGHT KNOTTED STOCK ROUGH OR DRESSED
(Knotty Paneling & Sidings)
For patterns, see Para. 400

111. Western red cedar Paneling may be shipped kiln dried, air dried, or green. The basis of Knotty Paneling and Sidings grades are knots, burls, and other natural markings which are of fairly uniform distribution and add to the decorative character of the piece. Knots form the major portion of the markings. Tight Knotted Paneling and Sidings grades are intended for use where only one face is exposed. Unless otherwise specified, characteristics which do not interfere with the intended use are permitted on the reverse side.

“SAW TEXTURE” is available in Tight Knot Paneling and Sidings of Western red cedar and as the name implies, is a texture put on a piece of siding or lumber by a saw to give it a textured, rough and/or resawn appearance. Material supplied with this finish shall in all ways adhere to the grades, sizes and patterns as specified, except that it shall be graded from the textured face.

There are two grades of Tight Knot Paneling and Sidings: “SELECT KNOTTY” and “QUALITY KNOTTY.”

111-e. “SELECT KNOTTY”
Pieces may contain the following characteristics or their equivalent:

Light torn grain.
Very light skips on back.
Very light warp.
Short splits in 5% of pieces.
PANELING
WESTERN RED CEDAR

Sound, tight knots; star checked and/or slightly chipped knots permitted.
Spike knots approximately 1/2 the width of piece.

111-f. “QUALITY KNOTTY.”

Pieces may contain the following characteristics or their equivalent:
Seasoning checks, medium surface, occasional through.
Limited pin holes, well scattered.
Medium torn or raised grain.
Very light skips.
Warp - light.
Short splits.
Sound, tight knots. Two 1" not firmly fixed or unsound per 12 lineal feet.
Star checked and/or chipped knots permitted.
Spike knots equivalent to other knots.

A 3" cutout 3' or more from either end is permissible in 20% of the pieces in 12' and longer lengths.
112. Gutter is shipped in a number of patterns. Grade descriptions are based on a piece 4" x 5" - 20'. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. There is only one grade of Gutter: “GUTTER.” In addition to the following specific provisions applicable to Gutter, the appropriate provisions in all other paragraphs of the rules apply.

112-a. “GUTTER”

Pieces of this grade are of sound wood and are watertight. Pieces are clear or have only a few minor and unimportant characteristics such as:

- Medium stained sapwood.
- Medium seasoning checks.
- Heavy torn or raised grain.
- Medium pitch streaks.
- Very light skips.
- Light warp.
- Three 1" sound, tight knots or their equivalent.
- Four medium pockets or their equivalent.

BATTENS, KD
ALL WEST COAST SPECIES

Standard widths are:

- Flat Battens - 3" nominal 1/4"x2-1/2" net
- O.G. Battens - 2" nominal 3/4"x1-3/4" net
- O.G. Battens - 2-1/2" nominal 3/4"x2-1/4" net
- O.G. Battens - 3" nominal 3/4"x2-1/2" net

113. Battens are surfaced S1S1E or S4S at shipper’s option unless otherwise provided. The grade description of Battens is based on a piece 12’ long. The number of characteristics may vary in proportion to the length of the piece.

There is only one grade of Battens: “BATTENS.”

In addition to the following specific provisions applicable to Battens, the appropriate provisions in all other paragraphs in the rules apply.
113-a. Battens of this grade are of sound wood. Pieces are clear or have only a few minor and unimportant characteristics such as:

- Stained wood.
- Very light skips.
- Medium torn grain.
- Two sound, tight pin knots.
- Two small pockets or their equivalent.

**PICKETS**

**ALL WEST COAST SPECIES**

**KD OR UNSEASONED**

Standard sizes of Pickets are:

- 1-1/4" square S4S to 1-1/16"x1-1/16"
- 1-1/2" square S4S to 1-5/16"x1-5/16"
- 1 x3" flat S4S to 3/4"x2-1/2"

115. There are two grades of Pickets: “NO. 1” and “NO. 2.” Grades are based on a piece 1"x3"x4'.

In addition to the following specific provisions applicable to Pickets, the appropriate provisions in all other paragraphs in the rules apply.

115-a. “NO. 1” — PICKETS

Most pieces of this grade are entirely clear or have only a few minor and unimportant characteristics, such as:

- Small seasoning checks.
- Light torn grain.
- One small, sound, tight knot or its equivalent.
- Occasional very light skips.

115-b. “NO. 2” — PICKETS

Pieces of this grade may have one or more characteristics which are of such size or number that the piece is not of “NO. 1” grade.
PICKETS
ALL WEST COAST SPECIES

Pieces may contain characteristics which have no important effect on the utility of the piece, such as:
- Seasoning checks.
- Limited pin holes.
- Torn grain.
- Two knots approximately 1” or their equivalent.
- Very light skip.

LATH
ALL WEST COAST SPECIES
DRY or UNSEASONED

3 pieces to 1" - in thickness
1-1/2" or 1-5/8" - in width

116. Lath, unless otherwise specified, is shipped either dry or unseasoned at shipper’s option. There are two grades of Lath: “NO. 1” and “NO. 2.” In addition to the following specific provisions applicable to Lath, the appropriate provisions in all other paragraphs in the rules apply.

116-a. “NO. 1” — LATH Pieces of this grade are entirely clear or may have one of the following or its equivalent:
- Pin knots.
- Limited pin holes.
- Small pitch or bark pockets.
- Stained wood.

Pieces are uniformly manufactured with scantness in width in unseasoned pieces limited to 1/16” and in seasoned pieces to 3/32”.

Seasoned pieces may be scant in thickness but not more than 1/16” for three pieces. All pieces are within 1/4” of full nominal length.

116-b. “NO. 2” — LATH Pieces of this grade are either so scant in size or contain characteristics of such number that the pieces cannot be included in “No. 1” grade.
LATH
ALL WEST COAST SPECIES

Pieces may contain the following or their equivalent:
Knots.
Small holes.
Pitch or bark pockets.
Stained wood.
Wane.

Pieces are not over 1/4'' scant in width nor 3/4'' scant in length. Each piece is at least 1/4'' thick.

FENCE BOARDS
ALL WEST COAST SPECIES

117. Fence Boards may be rough or surfaced. Air Dried, Kiln Dried, or green. There are three grades: No. 1, No. 2, and No. 3. No. 1 and No. 2 Fencing boards are selected for tight construction. The grade is determined from the best face. The reverse side may have characteristics approximately one grade lower than the face.

117-a. “NO. 1 FENCING.” (SELECT)

Characteristics and limiting provisions are:

Checks.
Pinclholes.
Shakes - fine.
Skips - hit and miss.
Splits - short.
Knots - sound and tight.
Spike knots - approximately 1/2 face width or equivalent.

S1S Boards may have a tolerance of 1/16'' over or under the net invoiced thickness.

Rough-sawn Boards may have a tolerance of 1/16'' over or under the invoiced thickness. In rough widths a variation along the length of the piece of 1/8'' from maximum to minimum width shall be permitted in not to exceed 20% of the pieces.
117-b. “NO. 2 FENCING.” (QUALITY)

Characteristics and limiting provisions are:

Checks.
Skips - hit or miss.
Pinholes.
Splits - medium.
Shakes - fine.
Wane 1/2 thickness, 1/3 width.
Unsound wood - small spots or equivalent streaks.
White speck not limited, firm honeycomb 1/3 width.
Knots - sound and tight.
Knots not firmly fixed or unsound, approximately 1/3 the width.
Spike-knots - approximately 3/4 face width.
Holes - maximum 1", 2 per 6', grub or teredo - equivalent smaller in not more than 50% of the pieces.

S1S Boards may have a tolerance of 1/16" over or under the net invoiced thickness.

Rough-sawn Boards may have a tolerance of 1/16" over or under the invoiced thickness. In rough widths a variation along the length of the piece of 1/8" from maximum to minimum width shall be permitted.

117-c. “NO. 3 FENCING.” (RUSTIC) Lumber of this grade is suitable for low grade Fencing and permits all characteristics which do not interfere with use of the piece.

S1S Boards may have a tolerance of 3/16" over or under the net invoiced thickness.

Boards resawn from surfaced stock permits edge skips not to exceed 1/4".

Rough-sawn Boards may have a tolerance of 1/4" over or under the invoiced thickness.

Variation in width not to exceed 1/2" in rough material.
**BOARDS**
**ALL WEST COAST SPECIES**
**ROUGH OR SURFACED**
Nominal Sizes up to 1-1/2" Thick
2" and Wider

118. Boards that are rough or surfaced two sides or surfaced one side are graded from the best face. The reverse side may have characteristics approximately one grade lower than the face.

There are five grades of Boards: “SELECT MERCHANTABLE,” “CONSTRUCTION,” “STANDARD,” “UTILITY” and “ECONOMY.”

In addition to the following specific provisions applicable to Boards, the appropriate provisions in all other paragraphs in the rules apply.

118-a. “SELECT MERCHANTABLE” – BOARDS.
Lumber of this grade is intended primarily for use in housing and light construction where it is exposed, as paneling, shelving, and other uses where a knotty type of lumber with the finest appearance is required.

Pieces of this grade are of sound wood and free from wane on the face. Pieces may have on the face a few minor and unimportant characteristics such as:

- Medium stained sapwood. Heart stain firm.
- Limited pin holes.
- Short splits.
- Medium seasoning checks, scattered.
- Medium torn or raised grain in scattered spots.
- Small pitch streaks or light pitch.
- Medium pitch or bark pockets, scattered.
- Light skips on edges and back.
- Tongue or lap 1/16" narrow.
- Warp - light.

Knots, sound and tight, approximately:
Face Width | Knot Size
---|---
2" | 1"
3" | 1-1/4"
4" | 1-1/2"
5" | 1-3/4"
6" | 2"
8" | 2-1/2"
10" | 3"
12" and wider | 3-1/2"

Spike knots are permitted if judged to have no more effect than other knots.

In occasional pieces a 1" sloughed knot not through the thickness is permitted, based on 12' lengths.

Black knots, sound and tight, are limited to 1/2 the size of other knots.

Tight separate roller checks totaling up to 1/2 the length on the reverse side are permitted if not through.

118-b. “CONSTRUCTION” - BOARDS. Lumber of this grade is recommended and widely used for subfloors, roof and wall sheathing, concrete forms and similar types of construction. Where they occur, characteristics are limited to assure a high degree of serviceability.

Pieces may have:

- Stained wood.
- Pin holes.
- Short splits.
- Seasoning checks.
- Medium torn grain.
- Pitch streak.
- Medium pitch or bark pockets.
- Light skips on face, medium on edges in occasional pieces. Hit and miss on the reverse face.
BOARDS
ALL WEST COAST SPECIES

Tongue or lap 1/16" narrow.

Warp - light.

Wane approximately 1" wide on face, 1/2 the thickness and 1/6 the length equivalent.

Knots, approximately:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Firm &amp; Tight Knots</th>
<th>Unsound or Not Firmly Fixed Knots</th>
<th>Holes*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>1&quot;</td>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1-1/4&quot;</td>
<td>5/8&quot;</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1-3/4&quot;</td>
<td>7/8&quot;</td>
<td>7/8&quot;</td>
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<tr>
<td>5&quot;</td>
<td>1-7/8&quot;</td>
<td>7/8&quot;</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>2-1/2&quot;</td>
<td>1-1/4&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>3-1/2&quot;</td>
<td>1-3/4&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>Over 12&quot;</td>
<td>4&quot;</td>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
</tr>
</tbody>
</table>

* Two holes of maximum size or equivalent smaller are permitted for each 12’ of length.

Spike knots are permitted if judged equivalent to other knots.

118-c. “STANDARD” - BOARDS. “STANDARD” Boards are available in larger quantity and are more widely used than other grades for general construction purposes. Boards of this grade are used for subfloors, roof and wall sheathing concrete forms and similar types of construction. Although appearance is given consideration, pieces are graded chiefly for serviceability as they are seldom used in exposed construction.

Characteristics and limiting provisions are:

Stained wood.

Pin holes.

Splits 1/6 the length.

Seasoning checks.
BOARDS
ALL WEST COAST SPECIES

Heavy torn or raised grain.
Pitch streaks.
Pitch or bark pockets.
Hit and miss skips and in addition 10% of pieces may be hit or miss.
One edge may be 1/8" scant if one edge is surfaced.
Tongue or lap not over 1/8" narrow.
Warp - medium.
Wane 1/2 the thickness and 1/6 the width or equivalent.
Firm white specks limited to 1/3 of face area.
Shake tight through. Short separate shakes permitted full length or equivalent roller checks.

Knots:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Firm &amp; Tight</th>
<th>Unsound or Loose Knots and Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
<td>1&quot;</td>
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<tr>
<td>4&quot;</td>
<td>2-1/2&quot;</td>
<td>1-1/4&quot;</td>
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<tr>
<td>5&quot;</td>
<td>2-3/4&quot;</td>
<td>1-3/8&quot;</td>
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<tr>
<td>6&quot;</td>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
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<tr>
<td>8&quot;</td>
<td>3-1/2&quot;</td>
<td>1-3/4&quot;</td>
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<tr>
<td>10&quot;</td>
<td>4&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>4-1/2&quot;</td>
<td>2-1/4&quot;</td>
</tr>
<tr>
<td>Over 12&quot;</td>
<td>5&quot;</td>
<td>2-1/2&quot;</td>
</tr>
</tbody>
</table>

2 holes of maximum size or equivalent smaller are permitted for each 12' length.

Spike knots equivalent to other knots.
Any piece with an unusual combination of characteristics which affects normal serviceability is excluded from the grade.

118-d. “UTILITY” - BOARDS. “UTILITY” Boards
are based primarily on utility value instead of appearance and combine a high degree of usefulness and low cost for general construction purposes.

It is permissible at the shipper’s option to ship “UTILITY” Boards in mixed West Coast species. On any order calling for one of these species, any combination may be shipped unless the order specifically excludes the other species.

Where they occur, the characteristics of this grade are so limited that each piece may be used full length. Characteristics and limiting provisions are:

- Stained wood.
- Pin holes.
- Splits 1/4 the length.
- Seasoning checks.
- Torn and raised grain.
- Pitch streaks.
- Pitch or bark pockets.
- Hit or miss skips. One edge may be 1/8" scant if other edge is surfaced.
- Tongue at least 1/8" wide. Lap or groove 3/16" wide.
- Warp - heavy.
- Wane 1/4 the width or equivalent, but not through the thickness, except as equivalent to holes permitted.
- White speck and firm honeycomb.
- Unsound wood in small spots and streaks, well scattered.
- Shake - not serious.
Knots:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Firm &amp; Tight</th>
<th>Unsound or Loose Knots and *Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>3-1/4&quot;</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>3-1/2&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>2/3 width</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2/3 width</td>
<td>3&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2/3 width</td>
<td>3-1/2&quot;</td>
</tr>
<tr>
<td>Over 12&quot;</td>
<td>2/3 width</td>
<td>4&quot;</td>
</tr>
</tbody>
</table>

* Holes from any cause, of the sizes listed above, are permitted if limited to one per one foot of length or equivalent smaller.

Spike knots equivalent to other knots.

Serious burls and distorted grain not permitted.

Any piece with an unusual combination of characteristics which affects normal serviceability is excluded from the grade.

**118-e. “ECONOMY” - BOARDS.** Lumber of this grade is suitable for low grade sheathing, crating, bracing and similar uses. It is frequently used in temporary construction. Short lengths of higher grade material may often be obtained from this grade by crosscutting.

It is permissible at the shipper’s option to ship “ECONOMY” Boards in mixed West Coast species. On any order calling for one of these species, any combination may be shipped unless the order specifically excludes the other species.

All characteristics which do not interfere with use of the piece full length are permitted. In pieces over 6’ long, characteristics which interfere with use of the piece full length are permitted if not located within 2’ of either end; at least 75% of such a piece, however, must be usable after it has been cut into two or three pieces. Pieces 6’ and shorter are usable full length. Skips in S4S stock are permitted but pieces must not be scant of the surfaced size more than 1/4" in width or 1/8" in thickness in the usable portion.
ALTERNATE BOARD GRADES
ALL SPECIES
Rough or Surfaced
All Widths and All Thicknesses

118-w. In addition to the Board grades listed in Paras. 118a-e, some manufacturers may choose to manufacture boards of some species under the Common board grade rules of the Western Wood Products Association. Those rules are republished here as Para.118w.

30.0 Certain characteristics found in Board lumber are difficult to evaluate to an exact degree because of the nature of the portion of the log from which Boards are produced.

Some limiting characteristics must be evaluated by applying sound judgment and all characteristics must be considered in determining the grade. Any piece judged to contain a serious combination of the listed characteristics, even though some of the characteristics may not be limiting by themselves, is excluded from the grade. Likewise, an otherwise “high line” piece may be placed in a grade even though one or two of its characteristics may slightly exceed the limitations described in the rules. Such pieces will be of exceptional quality otherwise and might grade one or more grades higher, except for such characteristics. Therefore, each individual piece is considered in its entirety in determining the grade.

When characteristics are listed as applying to a specific size piece (such as 1" x 8" x 12') the number and extent of the same characteristics in larger and smaller pieces may vary in proportion to the size of the piece.

Knot descriptions are given in Section 718.00. Because most Board lumber is produced from the inner portion of the log, the size of a knot may not be the determining factor in establishing a particular grade. Therefore, some pieces of a lower grade may have smaller knots than some pieces of a higher grade. Knot sizes cannot be satisfactorily established to an exact degree for any particular grade of Board lumber. It is generally the character or condition of the knot and not the size that determines the grade of the piece. Spike knots are permitted in all grades of Board lumber, providing they have no more effect than the other knots permitted in an individual grade.
ALTERNATE BOARD GRADES

30.10 COMMONS The five Common Board grades are: 1 COMMON (COLONIAL - IWP), 2 COMMON (STERLING - IWP), 3 COMMON (STANDARD - IWP), 4 COMMON (UTILITY - IWP), and 5 COMMON (INDUSTRIAL - IWP).

STANDARD SIZES for COMMON BOARDS (Including Thick Lumber Shipped Under Board Rules)

DRY LUMBER

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Surfaced</th>
<th>Widths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inch</td>
<td>mm</td>
</tr>
<tr>
<td>3/4</td>
<td>5/8</td>
<td>16</td>
</tr>
<tr>
<td>4/4</td>
<td>3/4</td>
<td>19</td>
</tr>
<tr>
<td>5/4</td>
<td>1-5/32</td>
<td>29</td>
</tr>
<tr>
<td>6/4</td>
<td>1-13/32</td>
<td>36</td>
</tr>
<tr>
<td>7/4</td>
<td>1-19/32</td>
<td>40</td>
</tr>
<tr>
<td>8/4</td>
<td>1-13/16</td>
<td>46</td>
</tr>
<tr>
<td>9/4</td>
<td>2-3/32</td>
<td>53</td>
</tr>
<tr>
<td>10/4</td>
<td>2-3/8</td>
<td>60</td>
</tr>
<tr>
<td>11/4</td>
<td>2-9/16</td>
<td>65</td>
</tr>
<tr>
<td>12/4</td>
<td>2-3/4</td>
<td>70</td>
</tr>
<tr>
<td>16/4</td>
<td>3-3/4</td>
<td>95</td>
</tr>
</tbody>
</table>

Note: metric sizes converted from sizes in inches and rounded to the nearest 1 mm. Inch units shall be considered the standard.

Surfaced square size shall be governed by thickness. At manufacturer’s option, dry 4/4 may be 25/32" Standard lengths are 6' and longer in multiples of 1'.

30.11 1 COMMON (COLONIAL - IWP) Lumber of this grade, while not usually carried in stock in large quantities, may be ordered when the ultimate in fine appearance of knotty material is required. This grade includes all sound, tight-knotted stock with the size and character of the knot the determining factor of the grade.

Characteristics and limiting provisions are:

Checks - Four small surface seasoning checks in a 1" x 8" x 12".
ALTERNATE BOARD GRADES

Knots - Sound, tight knots and smooth red knots limited as follows:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>5/8&quot;</td>
<td>8&quot;</td>
<td>2-1/4&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>7/8&quot;</td>
<td>10&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1-1/4&quot;</td>
<td>12&quot;</td>
<td>2-3/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-3/4&quot;</td>
<td>14&quot;</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

& wider

The knot sizes listed above will generally be the maximum size found in this grade. However, there may be pieces of otherwise exceptional quality which may contain slightly larger knots than those shown.

Black knots must be smooth, sound, tight and small. An occasional piece may have one angling 3/8" hole on the edge, extending into the wide face not more than 1/2" and into not more than 1/2 the thickness.

Pitch - Light pitch over not more than 1/8 the area.
Pith - Firm heart pith, 1/4" wide, 1/6 the length.
Pockets - Two very small, dry pockets in a 1" x 8" x 12'.
Skip - Three very light skips on one edge or two light on back in a 1" x 8" x 12'.
Split - Very short splits, limited to one on each end.
Stain - Light stain over not more than 1/3 of face.
Torn or Raised Grain - Very light.
Wane - On back, 1/2 thickness, 1/8 width, 1/4 length in occasional pieces.
Warp -

Crook - As shown in Section 752(e).
Cup - Very Light. See Section 752(c).
Twist - 7/4 and thinner, very light. 8/4 and thicker, 1/2 of very light. See Section 752(d).
30.12 2 COMMON (STERLING - IWP) Lumber of this grade is intended primarily for use in housing and light construction where it is exposed such as in paneling, shelving and other uses where a knotty type of lumber with fine appearance is required. Since knots can easily be sealed off for painting, this also is an excellent grade for siding, cornice, soffits, fascia and other exterior uses.

Characteristics and limiting provisions are:

Checks - Two medium seasoning checks or equivalent smaller in a 1" x 8" x 12'. Light roller checks on back, not more than 1/4 the length.

Knots - Knots are limited as follows:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Red Knots Sound and Tight</th>
<th>Black Knots Sound and Tight</th>
<th>Face Width</th>
<th>Red Knots Sound and Tight</th>
<th>Black Knots Sound and Tight</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>1&quot;</td>
<td>3/8&quot;</td>
<td>8&quot;</td>
<td>3&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1-1/4&quot;</td>
<td>1/2&quot;</td>
<td>10&quot;</td>
<td>3-1/4&quot;</td>
<td>1-3/8&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>2&quot;</td>
<td>3/4&quot;</td>
<td>11&quot;</td>
<td>3-3/4&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>2-1/2&quot;</td>
<td>1&quot;</td>
<td>14&quot; &amp; wider</td>
<td>4&quot;</td>
<td>1-3/4&quot;</td>
</tr>
</tbody>
</table>

The knot sizes listed above will generally be the maximum size found in this grade. However, there may be pieces of exceptional quality otherwise, which may contain slightly larger knots than those shown.

An occasional piece may have two small fixed knots or one angling 3/4" hole on the edge extending into the wide face not more than 1" and not over 1/2 the thickness of the piece.

Black knots of maximum size in this grade are accepted in pieces of high quality and limited to one in the 16' and longer lengths, and proportionately smaller in the shorter lengths.

Pieces containing numerous smaller black knots shall be of quality in keeping with the requirements of this grade.

Pin Holes - A dozen scattered pin holes in a 1" x 8" x 12'.
ALTERNATE BOARD GRADES

Pitch - Streaks and patches of light to medium pitch covering 1/2 of face or two very small streaks of heavy pitch.

Pith - Firm heart pith, not more than 1/2" wide, 1/2 the length.

Pockets - Three small, dry well scattered pockets or equivalent smaller in a 1" x 8" x 12'.

Shake - Light shake, not over 1/6 the length.

Skip - Medium skip on back limited to 1/4 of length, medium on edge limited to 1/3 of length.

Split - Short splits, limited to one on each end.

Stain - Medium stained wood over entire face on pieces of otherwise high quality.

Torn or Raised Gain - Light.

Wane - On back, 1/2 thickness, 1/6 width, 1/3 length or equivalent in an occasional piece.

Warp -
  Crook - As shown in Section 752(e).
  Cup - Light. See Section 752(c).
  Twist - 7/4 and thinner, very light. 8/4 and thicker, 1/2 of very light. See Section 752(d)

30.13 3 COMMON (STANDARD-IWP) Lumber of this grade is widely used for a large range of building purposes where appearance and strength are both important. With characteristics limited to assure a high degree of serviceability, this grade is often used for shelving, paneling and siding and is especially suited for fences, boxes, crating, sheathing and many industrial uses.

Characteristics and limiting provisions are:

  Checks - Medium seasoning checks.
  Roller checks (See Shake).
Knots - Knots are limited as follows:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Red Knots Sound and Tight</th>
<th>Unsound Knot Loose Knot Hole</th>
<th>Face Width</th>
<th>Red Knots Sound and Tight</th>
<th>Unsound Knot Loose Knot Hole</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”</td>
<td>1-3/16”</td>
<td>3/8”</td>
<td>8”</td>
<td>3-1/2”</td>
<td>1-1/2”</td>
</tr>
<tr>
<td>3”</td>
<td>1-1/2”</td>
<td>5/8”</td>
<td>10”</td>
<td>4”</td>
<td>1-3/4”</td>
</tr>
<tr>
<td>4”</td>
<td>2-1/2”</td>
<td>3/4”</td>
<td>12”</td>
<td>4-1/2”</td>
<td>2-1/4”</td>
</tr>
<tr>
<td>6”</td>
<td>3”</td>
<td>1-1/4”</td>
<td>14” &amp; wider</td>
<td>5”</td>
<td>2-1/2”</td>
</tr>
</tbody>
</table>

The knot sizes listed above will generally be the maximum size found in this grade. However, there may be pieces of exceptional quality otherwise, which may contain slightly larger knots than those shown.

Black knots may be 2/3 size of allowable red knots, two maximum in each 12' of length or equivalent smaller tight black knots.

Fixed knots may be equal to knot hole in size and are limited to two per 12' of length when not in serious combinations with other characteristics.

Only one maximum size knot hole is permitted in any one piece, but two equivalent smaller knot holes may be permitted if well spaced and the piece is otherwise of high quality.

Pin Holes - 30 per square foot or four small holes in a 1"x 8"x 12'.

Pitch - Heavy pitch over 1/2 the area or two small streaks of massed pitch.

Pockets - Medium, well scattered.

Shake - Light to medium shake, scattered full length in otherwise 2 Common type or one 3' light roller check on face, light to medium roller check 2/3 length on back.

Skip - One medium skip on face, hit and miss skips on back for 2/3 the length. One edge may have 1/8" skip for 1/2 the length or 1/6" skip full length.

Split - 1/6 the length.
ALTERNATE BOARD GRADES

Stain - Medium to heavy stained wood over the entire face.

Torn Grain - Medium.

Unsound Wood - Similar to firm white speck, limited to 1/8 the area.

Wane - On back, 2/3 thickness, 1/4 width, 1/2 length or equivalent in an occasional piece.

Warp -
   Crook - As shown in Section 752(e).
   Cup - Medium. See Section 752(c).
   Twist - 7/4 and thinner, light. 8/4 and thicker, 1/2 of light. See Section 752(d).

30.14 4 COMMON (UTILITY-IWP) Lumber of this grade is more widely used than other grades for general construction purposes. Boards of this grade are used for sub-floors, roof and wall sheathing, concrete forms, low cost fencing, crating and similar types of construction. It is a popular grade in general construction and industry use. Although appearance is given consideration, pieces are graded chiefly for serviceability, as they are seldom used in exposed construction.

Characteristics and limiting provisions are:

Checks - Large seasoning checks. Medium to heavy roller checks full length on back, light to medium 2/3 length on face.

Knots - Knots are limited as follows:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Fixed Knots Firm and Tight Knots</th>
<th>Loose Knots Knot Holes</th>
<th>Face Width</th>
<th>Fixed Knots Firm and Tight Knots</th>
<th>Loose Knots Knot Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>1-5/16&quot;</td>
<td>3/4&quot;</td>
<td>8&quot;</td>
<td>2/3 width</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1-3/4&quot;</td>
<td>1&quot;</td>
<td>10&quot;</td>
<td>2/3 width</td>
<td>3&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
<td>12&quot;</td>
<td>2/3 width</td>
<td>3-1/2&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>3-1/2&quot;</td>
<td>2&quot;</td>
<td>14&quot; &amp; wider</td>
<td>2/3 width</td>
<td>4&quot;</td>
</tr>
</tbody>
</table>
ALTERNATE BOARD GRADES

Knot holes and/or loose knots of maximum size are limited to three for each 12’ of length.

Pin Holes - Pin holes or small holes, not limited.

Pitch - Heavy streaks and patches of massed pitch over 1/2 area in otherwise high quality pieces.

Pockets - Large.

Shake - Medium to heavy shake full length.

Skip - Hit and miss skip on face, 1/16" skip full length if surfaced one side. One edge may have 1/4" skip for 1/2 the length or 1/8" skip full length.

Split - 1/3 length.

Stain - Heavy stained wood.

Torn Grain - Heavy.

Unsound Wood - scattered spots of unsound wood or not firm honeycomb over 1/4 the face.

Wane - 1/2 thickness, 1/8 width, 1/6 length on face. Heavy wane on back, but equivalent to knot holes if through thickness.

Warp -

Crook - As shown in Section 752(e).

Cup - Heavy. See Section 752(c).

Twist - 7/4 and thinner, medium. 8/4 and thicker, 1/2 of medium. See Section 752(d).

White speck and Honeycomb - Firm.

30.15 5 COMMON (INDUSTRIAL - IWP) Lumber of this grade is intended for use in construction where lumber of a higher grade is not needed. This grade permits characteristics such as stain, large knots, very large holes, unsound wood, massed pitch, heavy shake, splits and wane in varying stages or degrees singly or in combinations. Many pieces in this grade are only slightly lower than the 4 Common (Utility-IWP) grade while others will be at the opposite end of the grade level. Although 5 Common is the lowest Common Board grade, it is suitable for uses in economical construction where appearance and strength are not basic requirements.
119. When lumber in nominal sizes 1-1/2" and thinner is required for uses demanding assured minimum strength properties, it may be graded under the provisions for the stress-rated dimension grades under Paras. 123 and 124. Pieces so graded are entitled to use the strength values listed in the appropriate tables of Para. 200.

Grade stamps applied to boards graded under the provisions of stress grades must show the dimension grade name and “SRB” designating stress rated boards, and in addition, conform to all other provisions for grade stamping set forth in Para. 1.
120. NATIONAL GRADING RULE for DIMENSION LUMBER.

120-a. INTRODUCTION. Product Standard 20-15 “American Softwood Lumber Standard” published by the U.S. Department of Commerce, stipulates that a National Grading Rule Committee composed of members competent in the field of lumber technology shall “establish, maintain and make fully and fairly available nomenclature and descriptions of grades for dimension lumber.” It provides further that “grading rules of an agency shall not be certified as conforming to the American Softwood Lumber Standard if the Board of Review determines that the dimension lumber rules therein fail to conform to the provisions of the National Grading Rule for dimension lumber” established in conformance with Section 11 of PS20-15. The National Grading Rule applies to all species of softwood lumber which are covered by grading rules developed and approved under PS20-15.

120-b. SCOPE. For purposes of the National Grading Rule for Dimension Lumber, “dimension” is limited to surfaced softwood lumber of nominal thicknesses from 2 through 4 inches and nominal widths 2 inches and wider; and which is designed for use as framing members such as joists, planks, rafters and studs. (For Redwood, dimension is further classified as consisting only of structural and stud grades.) It does not apply to those grades that are segregated for special uses but which are sometimes manufactured to the “dimension” sizes provided that descriptions for such special grades are included in the applicable agency grading rules.

Lumber grades provide standard specifications for segregating the lumber cut from logs into appropriate use categories. Use categories may be developed based on appearance, structural capacity, suitability for secondary manufacturing, or a combination of these. The grade specifications in the National Grading Rule for Dimension Lumber are based primarily on structural performance. Limitations for appearance characteristics are established principally to ensure good suitability and utility of the material in covered structural or industrial framing uses.
The following are examples of special products excluded from the National Grading Rule for Dimension Lumber:

Crossarms
Factory and Shop Lumber
Finish (Selects)
Foundation Lumber
Industrial Clears

Ladder Stock
Laminating Stock
Railroad Stock
Rough Lumber
Scaffold Planks

Ship Decking and Plank Stock
Stadium Plank
Worked Lumber

120-c. CLASSIFICATION. The National Grading Rule for Dimension Lumber classifies dimension into 3 width categories and 4 use categories. Dimension up to 4" wide is classified as “Structural Light Framing” and “Light Framing.” Dimension 2" and wider is classified as “Studs.” Dimension 5" and wider is classified as “Structural Joists and Planks.”

The basic grade descriptions for Dimension lumber provide good structural capacity, serviceability, and general good appearance, however sometimes, structural grades with a higher appearance level are desired. An Appearance classification is also available that provides standard specifications for such uses. The Appearance category provides the same level of structural performance as the applicable NGR grade, but with added restrictions on manufacture, wane, skip, and warp. Any NGR grade may be graded or ordered with “Appearance” limitations. “Appearance” shall be designated by either including the term “Appearance” or the abbreviation “App” on the grade stamp or by specifically identifying “Appearance” in the purchase and shipping documents.
2-4" Thick, 2-4" Wide
STRUCTURAL LIGHT FRAMING
Grade Name (and abbreviation)
Select Structural (Sel. Str.)
  1
  2
  3

LIGHT FRAMING
Grade Name (and abbreviation)
Construction (Const)
Standard (Stand)
Utility (Util)

2-4" Thick, 2" & Wider
STUDS
Grade Name
Stud

2-4" Thick, 5" & Wider
STRUCTURAL JOISTS & PLANKS
Grade Name (and abbreviation)
Select Structural (Sel. Str.)
  1
  2
  3

APPEARANCE
Grade Name (and abbreviation)
NGR grade name and Appearance
(NGR grade name plus APP)
Applicable to all NGR grades

DIMENSION UP TO 4" WIDE
Structural Light Framing grades are designed to fit those engineered applications where higher design values are needed. There are four grades included in this category. Light Framing grades are designed to provide dimension of good appearance at lower design values for all those uses where high design values coupled with high appearance are not needed. A single Stud grade is also provided.
DIMENSION 5" AND WIDER

Structural Joist and Plank grades are designed especially to fit engineering applications for lumber 5 inches and wider. There are four grades in this category. A single stud grade is also provided.

120-d. GENERAL. The major characteristics encountered in grading of softwood lumber are listed for each grade herein. Not all the listed characteristics will occur in lumber of any particular grade. When characteristics unique to a single species are encountered which are not included in the grade description, the characteristics shall be assessed in comparison to the most similar characteristic listed, and permitted to the same degree. All grade descriptions set forth the major limiting characteristics that occur in lumber in each grade. Hence, the rules describe the poorest pieces permitted in a grade. All or nearly all of the permissible characteristics of a grade are rarely present in maximum size or number in any one piece.

Any piece with a combination of characteristics which are judged to be more severe than the maximum characteristics permitted in the grade, even though each if taken individually is permitted, shall be excluded from the grade. The grading of lumber cannot be considered an exact science because it is based on a visual inspection of each piece and the judgment of the grader and/or on the results of a method of mechanically determining the strength characteristics of structural lumber. The National Grading Rule for Dimension Lumber establishes a maximum of 5 percent below grade as the tolerance allowed between graders.

Knots, checks, shakes and slope of grain in visually graded lumber shall be measured in accordance with the provisions of ASTM D245 except that no increase in slope of grain or size of knots is permitted outside the middle one-third of the length. Except as otherwise provided herein, knots appearing on narrow faces are limited to the same displacement as knots specified at edges of wide faces. The limitations on knot sizes and other characteristics governing strength shall not be exceeded. Compression wood shall be limited in effect to other appearance or strength reducing characteristics permitted in the grade.
121. There is only one grade of Studs: “STUD.”

121-c. “STUD.” See base design values and width adjustments shown in Tables 4 & 6 (a&b), Para. 200. For measurement of knots, see Para. 201-b.

Characteristics permitted and limiting provisions shall be:

Checks - Seasoning checks not limited. Through checks at ends are limited as splits.

Knots - Not limited as to quality but are well spaced and are permitted in the following sizes or their equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Width Face</th>
<th>Centerline Wide Face</th>
<th>Holes* (Any cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1-1/4&quot;</td>
<td>1-1/4&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1-3/4&quot;</td>
<td>2-1/2&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>2-1/4&quot;</td>
<td>3&quot;</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>2-3/4&quot;</td>
<td>3-3/4&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3-1/2&quot;</td>
<td>4-1/2&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>4-1/2&quot;</td>
<td>5-1/2&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>5-1/2&quot;</td>
<td>6-1/2&quot;</td>
<td>3-1/2&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>6&quot;</td>
<td>7&quot;</td>
<td>4&quot;</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 1 linear ft.


Pitch and pitch streaks - not limited.

Pockets - pitch or bark - not limited.

Shake - if through at ends, limited as splits. Elsewhere through shakes 1/3 the length.

Skips - hit or miss on any face, with a maximum of 10% of the pieces containing heavy skips on wide faces only. See Paras. 720 (e) and (g).

Slope of grain - 1 in 4.

Splits - equal in length to twice the width of the piece.
STUDS - ALL WEST COAST SPECIES

Stain - stained sapwood. Firm heart stain or firm red heart.

Unsound wood - must not destroy nailing edge. See Paragraph 710(e). In spots or streaks limited to 1/3 the cross section at any point along the length.

Wane - 1/3 the thickness and 1/2 the width full length, or equivalent on each face, provided that wane not exceed 1/2 the thickness and 3/4 the width for up to 1/4 the length. See Para. 750.

Warp - 1/2 medium. See Para. 752.

White speck and honeycomb - firm.
There are four grades of Light Framing: “CONSTRUCTION,” “STANDARD,” “UTILITY” and “ECONOMY.” These grades are stress rated except “ECONOMY,” with appropriate design values shown in Tables 6a, 6b and 6c, Para. 200. Tabulated design values for Utility grade apply to 4" widths only. For widths less than 4", Utility grade design values must be adjusted as indicated in the footnote. For measurement of knots. See Para. 201-b.

122-b. “CONSTRUCTION” - LIGHT FRAMING.

Characteristics permitted and limiting provisions shall be:

Checks - surface seasoning checks, not limited.
Through checks at ends are limited as splits.

Knots - sound, firm, encased and pith, must be tight and are permitted in the following sizes or their equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Anywhere on Wide Face</th>
<th>Unsound or Loose Knots and Holes (Any cause)</th>
<th>One hole or equivalent smaller holes per 3 lin. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>3/4&quot;</td>
<td>5/8&quot;</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>1-1/4&quot;</td>
<td>3/4&quot;</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>1-1/2&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Manufacture - Standard “E.” See Para. 722 (e).
Pitch and pitch streaks - not limited.
Pockets - pitch or bark - not limited.
Shake - If through at ends, limited as splits. Surface shakes up to 2’ long.
Skips - hit and miss skips in a maximum of 10% of the pieces. See Para. 720 (f).
Slope - 1 in 6.
Splits - equal in length to the width of the piece.
Stain - stained sapwood. Firm heart stain or firm red heart.

Wane - 1/4 the thickness and 1/4 the width full length, or equivalent on each face, provided that wane not exceed 1/2 the thickness or 1/3 the width for up to 1/4 the length. See Para. 750.

Warp - 1/2 of medium. See Para. 752.

122-c. “STANDARD” - LIGHT FRAMING.

Characteristics permitted and limiting provisions shall be:

Checks - seasoning checks not limited. Through checks at ends are limited as splits.

Knots - not restricted as to quality and are permitted in the following sizes or their equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Anywhere on Wide Face</th>
<th>Holes (Any cause)</th>
<th>One hole or equivalent smaller holes per 2 lin. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>1&quot;</td>
<td>3/4&quot;</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Manufacture - Standard “F.” See Para. 722(f).

Pitch and pitch streaks - not limited.

Pockets - pitch or bark - not limited.

Shake - If through at ends, limited as splits. Away from ends through shakes up to 2' long, well separated. If not through, single shakes shall not exceed 3' long or 1/4 the length, whichever is greater.

Skips - hit and miss, with a maximum of 5% of the pieces containing hit or miss or heavy skip 2' or less in length. See Para. 720 (e), (f) and (g).

Slope of grain - 1 in 4.

Splits - equal in length to 1-1/2 times the width of the piece.

Stain - stained sapwood. Firm heart stain or firm red heart. Not limited.
FRAMING – ALL SPECIES
(NATIONAL GRADES)

Unsound wood - Small spots or streaks of firm honeycomb or peck are limited to 1/6 the width. In 2” lumber, any other unsound wood is limited to a spot 1/12 the width and 2” in length or equivalent smaller.

Wane - 1/3 the thickness and 1/3 the width full length, or equivalent on each face, provided that wane not exceed 2/3 the thickness or 1/2 the width for up to 1/4 the length. See Para. 750.

Warp - light. See Para. 752.

White speck - firm, 1/3 the face or equivalent.

122-d. “UTILITY” - LIGHT FRAMING.
Characteristics permitted and limiting provisions shall be:

Checks - seasoning checks not limited. Through checks at ends are limited as splits.

Knots - not restricted as to quality and are permitted in the following sizes or their equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Anywhere on Wide Face</th>
<th>Holes (Any cause)</th>
<th>One hole or equivalent smaller holes per 1 lin. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>3&quot;</td>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>2-1/2&quot;</td>
<td>1-1/2&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Manufacture - Standard “F.” See Para. 722(f).

Pitch and pitch streaks - not limited.

Pockets - pitch or bark - not limited.

Shake - surface shakes permitted. If through at edges or ends, limited as splits. Elsewhere through shakes 1/3 the length, scattered along the length.

Skips - hit or miss, with a maximum of 10% of the pieces containing heavy skips. See Para. 720(e) and (g).

Slope of grain - 1 in 4.
Splits - equal to 1/6 the length of the piece.
Stain - stained wood, not limited.
Unsound wood - Must not destroy the nailing edge.
   Spots or streaks limited to 1/3 the
   cross section at any point along the length. See
   Para. 710(e).
Wane - 1/2 the thickness and 1/2 the width full length,
   or equivalent on each face, provided that wane not
   exceed 7/8 the thickness or
   3/4 the width for up to 1/4 the length.
   See Para. 750.
Warp - medium. See Para. 752.
White speck and honeycomb - firm.

122-e. “ECONOMY” - LIGHT FRAMING. (WCLIB).
   2" to 4" Thick
   2" and Wider
Lumber of this grade is suitable for crating, bracing,
dunnage and temporary construction. Short lengths of
higher grade material may often be obtained from this
grade by crosscutting.

   All characteristics which do not interfere with use of
   the piece full length are permitted. In pieces over 8' long,
   characteristics which interfere with use of the piece full
   length are permitted if not located within 2' of either end;
   at least 75% of such a piece, shall be usable after it has
   been cut into two or three pieces. Pieces 8' and shorter are
   usable full length.

   It is permissible at the shipper’s option to
   ship “ECONOMY” Light Framing in mixed West Coast
   species.

   On any order calling for one of these species, any
   combination may be shipped unless the order specifically
   excludes the other species.
123. There are four grades of Structural Joists and Planks: “SELECT STRUCTURAL,” “NO. 1,” “NO. 2” and “NO. 3.” All of these grades are stress rated with appropriate base design values and width adjustments, shown in tables 4 and 5 (a, b, c), Para. 200.

For measurement of knots, see Para. 201-b.

123-aa. “DENSE SELECT STRUCTURAL” - JOISTS AND PLANKS (Douglas fir only). Conforms to all the provisions of Para. 123-a with the additional requirement of density as defined in Para. 204-c.

123-a. “SELECT STRUCTURAL” - JOISTS AND PLANKS.

Characteristics permitted and limiting provision shall be:

- Checks - surface seasoning checks, not limited.
  Through checks at ends are limited as splits.

- Knots - sound, firm, encased, and pith knots, if tight and well spaced, are permitted in sizes not to exceed the following, or equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge</th>
<th>Centerline</th>
<th>Unsound or Loose Knots and Holes*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wide Face</td>
<td>Wide Face</td>
<td>(Any Cause)</td>
</tr>
<tr>
<td>5&quot;</td>
<td>1&quot;</td>
<td>1-1/2&quot;</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-1/8&quot;</td>
<td>1-7/8&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1-1/2&quot;</td>
<td>2-1/4&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>1-7/8&quot;</td>
<td>2-5/8&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2-1/4&quot;</td>
<td>3&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>2-3/8&quot;</td>
<td>3-1/4&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>2-3/8&quot;</td>
<td>3-3/8&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>2-1/2&quot;</td>
<td>3-1/2&quot;</td>
<td>1-1/4&quot;</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 4 lin. ft.
Manufacture - Standard “E.” See Para. 722(e).
Pitch and pitch streaks - not limited.
Pockets - itch or bark - not limited.
Rate of growth -limited to medium grain in Douglas fir only. See Para. 204-a.
Shake - If through at ends, limited as splits. Surface shakes up to 2' long.
Skips - hit and miss skips in a maximum of 10% of the pieces. See Para. 720(f).
Slope of grain - 1 in 12.
Splits - equal in length to the width of the piece.
Stain - stained sapwood. Firm heart stain or firm red heart limited to 10% of the piece.
Wane - 1/4 the thickness and 1/4 the width full length, or equivalent on each face, provided that wane not exceed 1/2 the thickness or 1/3 the width for up to 1/4 the length.
See Para. 750.
Warp - 1/2 of medium. See Para. 752.

123-bb. “DENSE NO. 1” - STRUCTURAL JOISTS and PLANKS (Douglas fir only). Conforms to all the provisions of Para. 123-b with the additional requirement of density as defined in Para. 204-c.

123-b. “NO. 1” - STRUCTURAL JOISTS and PLANKS. For an explanation of No. 1 & Better design values see Para. 754.

Characteristics permitted and limiting provision shall be:
Checks - surface seasoning checks, not limited.
Through checks at ends are limited as splits.
Knots - sound, firm, encased, and pith knots, if tight and well spaced, are permitted in sizes not to exceed the following or equivalent displacement:
FRAMING - ALL SPECIES  
(NATIONAL GRADES)

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Wide Face</th>
<th>Centerline Wide Face</th>
<th>Unsound or Loose Knots and Holes* (Any Cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot;</td>
<td>1-1/4&quot;</td>
<td>1-7/8&quot;</td>
<td>1-1/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-1/2&quot;</td>
<td>2-1/4&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>2&quot;</td>
<td>2-3/4&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2-1/2&quot;</td>
<td>3-1/4&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>3&quot;</td>
<td>3-3/4&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>3-1/8&quot;</td>
<td>4&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>3-1/4&quot;</td>
<td>4-1/2&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>3-3/8&quot;</td>
<td>4-5/8&quot;</td>
<td>1-1/2&quot;</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 3 lin. ft.

Manufacture - Standard “E.” See Para. 722 (e).
Pitch and pitch streaks - not limited.
Pockets - pitch or bark - not limited.
Rate of growth - limited to medium grain in Douglas fir only. See Para. 204-a.
Shake - If through at ends, limited as splits. Surface shakes up to 2’ long.
Skips - hit and miss skips in a maximum of 10% of pieces. See Para. 720(f).
Slope of grain - 1 in 10.
Splits - equal in length to width of the piece.
Stain - stained sapwood. Firm heart stain or firm red heart.
Wane - 1/4 the thickness and 1/4 the width full length, or equivalent on each face, provided that wane not exceed 1/2 the thickness or 1/3 the width for up to 1/4 the length. See Para. 750.
Warp - 1/2 of medium. See Para. 752.

123-cc. “DENSE NO. 2” - STRUCTURAL JOIST and PLANKS (Douglas fir only). Conforms to all the provisions of Para. 123-c with the additional requirement of density as defined in Para. 204-c.
123-c. “NO. 2” - STRUCTURAL JOISTS and PLANKS.

Characteristics permitted and limiting provision shall be:

Checks - seasoning checks not limited. Through checks at ends are limited as splits.

Knots - well spaced knots of any quality are permitted in sizes not to exceed the following or equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Wide Face</th>
<th>Centerline Wide Face</th>
<th>Holes* (Any Cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5”</td>
<td>1-5/8”</td>
<td>2-3/8”</td>
<td>1-3/8”</td>
</tr>
<tr>
<td>6”</td>
<td>1-7/8”</td>
<td>2-7/8”</td>
<td>1-1/2”</td>
</tr>
<tr>
<td>8”</td>
<td>2-1/2”</td>
<td>3-1/2”</td>
<td>2”</td>
</tr>
<tr>
<td>10”</td>
<td>3-1/4”</td>
<td>4-1/4”</td>
<td>2-1/2”</td>
</tr>
<tr>
<td>12”</td>
<td>3-3/4”</td>
<td>4-3/4”</td>
<td>3”</td>
</tr>
<tr>
<td>14”</td>
<td>4-1/8”</td>
<td>5-1/4”</td>
<td>3-1/2”</td>
</tr>
<tr>
<td>16”</td>
<td>4-1/4”</td>
<td>5-3/4”</td>
<td>4”</td>
</tr>
<tr>
<td>18”</td>
<td>4-3/8”</td>
<td>5-7/8”</td>
<td>4-1/2”</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 2 lin. ft.

Manufacture - Standard “F.” See Para. 722(f).

Pitch and pitch streaks - not limited.

Pockets - pitch or bark - not limited.

Rate of growth - limited to medium grain in Douglas fir only. See Para. 204-a.

Shake - If through at ends, limited as splits. Away from ends through shakes up to 2’ long, well separated. If not through, single shakes shall not exceed 3’ long or 1/4 the length, whichever is greater.

Skips - hit and miss, with a maximum of 5% of the pieces containing hit or miss or heavy skip 2’ or less in length. See Para. 720(e), (f) and (g).

Slope of grain - 1 in 8.

Splits - equal in length to 1-1/2 times the width of the piece.
Stain - stained sapwood. Firm heart stain or firm red heart not limited.

Unsound wood (excluding white speck) - not permitted in thicknesses over 2". In 2" lumber, small spots or streaks of firm honeycomb or peck are limited to 1/6 the width. Any other unsound wood is limited to a spot 1/12 the width and 2" in length or equivalent smaller.

Wane - 1/3 the thickness and 1/3 the width full length, or equivalent on each face, provided that wane not exceed 2/3 the thickness or 1/2 the width for up to 1/4 the length. See Para. 750.

Warp - light. See Para. 752.

White speck - firm, 1/3 the face or equivalent.

123-d. “NO. 3” - STRUCTURAL JOISTS and PLANKS.
Characteristics permitted and limiting provisions shall be:

Checks - seasoning checks not limited. Through checks at ends are limited as splits.

Knots - well spaced knots of any quality are permitted in the following sizes or their equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Wide Face</th>
<th>Centerline Wide Face</th>
<th>Holes* (Any Cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot;</td>
<td>2-1/4&quot;</td>
<td>3&quot;</td>
<td>1-7/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>2-3/4&quot;</td>
<td>3-3/4&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3-1/2&quot;</td>
<td>4-1/2&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>4-1/2&quot;</td>
<td>5-1/2&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>5-1/2&quot;</td>
<td>6-1/2&quot;</td>
<td>3-1/2&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>6&quot;</td>
<td>7&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>6-3/8&quot;</td>
<td>8&quot;</td>
<td>4-1/2&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>6-1/2&quot;</td>
<td>8-1/4&quot;</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 1 lin. ft.
Manufacture - Standard “F.” See Para. 722(f).

Pitch and pitch streaks - not limited.

Pockets - pitch or bark - not limited.

Shake - surface shakes permitted. If through at edges or ends, limited as splits. Elsewhere through shakes 1/3 the length, scattered along the length.

Skips - hit or miss, with a maximum of 10% of pieces containing heavy skips. See Para. 720(e) and (g).

Slope of grain - 1 in 4.

Splits - equal to 1/6 the length of the piece.

Stain - stained wood, not limited.

Unsound wood - Must not destroy the nailing edge.
            (Spots or streaks limited to 1/3 the cross section at any point along the length.) See Para. 710(e).

Wane - 1/2 the thickness and 1/2 the width full length, equivalent on each face, provided that wane not exceed 7/8 the thickness or 3/4 the width for up to 1/4 the length. See Para. 750.

Warp - medium. See Para. 752.

White speck and honeycomb - firm.
STRUCTURAL LIGHT FRAMING
ALL WEST COAST SPECIES
2” to 4” Thick, 2” to 4” Wide

124. There are four grades of Structural Light Framing: SELECT STRUCTURAL,” NO. 1,” “NO. 2” and “NO. 3.” All of these grades are stress rated, with appropriate base design values and width adjustments shown in Tables 4 and 5 (a,b,c&d), Para. 200.

For measurement of knots, see Para. 201-b.

124-aa. “DENSE SELECT STRUCTURAL” - STRUCTURAL LIGHT FRAMING (Douglas fir only) Conforms to all the provisions of 124-a with the additional requirement of density as defined in Para. 204-c.

124-a. “SELECT STRUCTURAL” - STRUCTURAL LIGHT FRAMING.

Characteristics permitted and limiting provisions shall be:

Checks - surface seasoning checks, not limited. Through checks at ends are limited as splits.

Knots - sound, firm, encased, and pith knots, if tight and well spaced, are permitted in sizes not to exceed the following, or equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Wide Face</th>
<th>Centerline Wide Face</th>
<th>Unsound or Loose Knots and Holes* (any cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”</td>
<td>3/8”</td>
<td>3/8”</td>
<td>3/8”</td>
</tr>
<tr>
<td>3”</td>
<td>1/2”</td>
<td>1/2”</td>
<td>1/2”</td>
</tr>
<tr>
<td>4”</td>
<td>3/4”</td>
<td>7/8”</td>
<td>3/4”</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 4 lin. ft.

Manufacture - standard “E.” See Para. 722(e).

Pitch and pitch streaks - not limited.

Pockets - pitch or bark - not limited.

Rate of growth - limited to medium grain in Douglas fir only. See Para. 204-a.

Shake - If through at ends, limited as splits. Surface shakes up to 2’ long.
FRAMING - ALL SPECIES  
(NATIONAL GRADES)

Skips - hit and miss skips in a maximum of 10% of the pieces. See Para. 720f.

Slope of grain - 1 in 12.

Splits - equal in length to the width of the piece.

Stain - stained sapwood. Firm heart stain or firm red heart limited to 10% of the piece.

Wane - 1/4 the thickness and 1/4 the width full length, or equivalent on each face, provided that wane not exceed 1/2 the thickness or 1/3 the width for up to 1/4 the length. See Para. 750.

Warp - 1/2 of medium. See Para. 752.

124-bb. “DENSE NO. 1” - STRUCTURAL LIGHT FRAMING (Douglas fir only). Conforms to all the provisions of Para. 124-b with the additional requirement of density as defined in Para. 204c.

124-b. “NO. 1” - STRUCTURAL LIGHT FRAMING. For an explanation of No. 1 & Better design values see Para. 754.

Characteristics permitted and limiting provisions shall be:

Checks - surface seasoning checks, not limited. Through checks at ends are limited as splits.

Knots - sound, firm, encased, and pith knots, if tight and well spaced, are permitted in sizes not to exceed the following, or equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Wide Face</th>
<th>Centerline Wide Face</th>
<th>Unsound or Loose Knots and Holes* (any cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”</td>
<td>1/2”</td>
<td>1/2”</td>
<td>1/2”</td>
</tr>
<tr>
<td>3”</td>
<td>3/4”</td>
<td>3/4”</td>
<td>3/4”</td>
</tr>
<tr>
<td>4”</td>
<td>1”</td>
<td>1 1/2”</td>
<td>1”</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 3 lin. ft.
FRAMING - ALL SPECIES
(NATIONAL GRADES)

Manufacture - standard “E.” See Para. 722(e).
Pitch and pitch streaks - not limited.
Pockets - pitch or bark - not limited.
Rate of growth - limited to medium grain in Douglas fir only. See Para. 204-a.
Shake - if through at ends, limited as splits. Surface shakes up to 2' long.
Skips - hit and miss skips in a maximum of 10% of pieces. See Para. 720(f).
Slope of grain - 1 in 10.
Splits - equal in length to the width of the piece.
Stain - stained sapwood. Firm heart stain or firm red heart.
Wane - 1/4 the thickness and 1/4 the width full length, or equivalent on each face, provided that wane not exceed 1/2 the thickness or 1/3 the width for up to 1/4 the length. See paragraph 750.
Warp - 1/2 of medium. See Para. 752.

124-cc. “DENSE NO. 2” - STRUCTURAL LIGHT FRAMING (Douglas fir only). Conforms to all the provisions of Para. 124-c with the additional requirement of density as defined in Para. 204-c.

124-c. “NO. 2” - STRUCTURAL LIGHT FRAMING.
Characteristics permitted and limiting provisions shall be:

Checks - seasoning checks not limited. Through checks at ends are limited as splits.

Knots - well spaced knots of any quality are permitted in sizes not to exceed the following or equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge</th>
<th>Centerline</th>
<th>Holes* (any cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wide Face</td>
<td>Wide Face</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>5/8&quot;</td>
<td>5/8&quot;</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>7/8&quot;</td>
<td>7/8&quot;</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1-1/4&quot;</td>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 2 lin. ft.
FRAMING - ALL SPECIES  
(NATIONAL GRADES)

Manufacture - standard “F.” See Para. 722(f).
Pitch and pitch streaks - not limited.
Pockets - pitch or bark - not limited.
Rate of growth - limited to medium grain in Douglas fir only. See Para. 204-a.
Shake - if through at ends, limited as splits. Away from ends through shakes up to 2' long, well separated. If not through, single shakes shall not exceed 3' long or 1/4 the length, whichever is greater.
Skips - hit and miss, with a maximum of 5% of the pieces containing hit or miss or heavy skip 2' or less in length. See Para. 720(e), (f) and (g).
Slope of grain - 1 in 8.
Splits - equal in length to 1-1/2 times the width of the piece.
Stain - stained sapwood. Firm heart stain or firm red heart. Not limited.
Unsound wood (excluding white speck) - Not permitted in thicknesses over 2". In 2" lumber, small spots or streaks of firm honeycomb or peck are limited to 1/6 the width. Any other unsound wood is limited to a spot 1/12 the width and 2" in length or equivalent smaller.
Wane - 1/3 the thickness and 1/3 the width full length, or equivalent on each face, provided that wane not exceed 2/3 the thickness or 1/2 the width for up to 1/4 the length. See Para. 750.
Warp - light. See Para. 752.
White speck - firm, 1/3 the face or equivalent.

124-d. “NO. 3” - STRUCTURAL LIGHT FRAMING.
Characteristics permitted and limiting provisions shall be:
Checks - seasoning checks not limited. Through checks at ends are limited as splits.
Knots - well spaced knots of any quality are permitted in the following sizes or their equivalent displacement:
Framing - All Species
(National Grades)

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Wide Face</th>
<th>Centerline Wide Face</th>
<th>Holes* (any cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1-1/4&quot;</td>
<td>1-1/4&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1-3/4&quot;</td>
<td>2-1/2&quot;</td>
<td>1-3/4&quot;</td>
</tr>
</tbody>
</table>

*One hole or equivalent smaller holes per 1 lin. ft.

Manufacture - standard “F.” See Para. 722(f).
Pitch and pitch streaks - not limited.
Pockets - pitch or bark - not limited.
Shake - surface shakes permitted. If through at edges or ends, limited as splits. Elsewhere through shakes 1/3 the length, scattered along the length.
Skips - hit or miss, with a maximum of 10% of the pieces containing heavy skips. See Para. 720(e) and (g).
Slope of grain - 1 in 4.
Splits - equal to 1/6 the length of the piece.
Stain - stained wood - not limited.
Unsound wood - Must not destroy the nailing edge.
   Spots or streaks limited to 1/3 the cross section at any point along the length. See Para. 710(e).
Wane - 1/2 the thickness and 1/2 the width full length, or equivalent on each face, provided that wane not exceed 7/8 the thickness or 3/4 the width for up to 1/4 the length. See Para. 750.
Warp - medium. See Para. 752.
White speck and honeycomb - firm.
125. APPEARANCE There is only one category of Appearance. “Appearance” provides the same level of structural performance as the applicable NGR grade, but with added restrictions on manufacture, wane, skip, and warp. Any NGR grade may be graded or ordered with “Appearance” limitations. “Appearance” shall be designated by either including the term “Appearance” or the abbreviation “App” on the grade stamp or by specifically identifying “Appearance” in the purchase and shipping documents.

125a. APPEARANCE Conforms to all provisions of the applicable NGR grade. In addition, the following limitations shall apply:

- Skip - hit and miss skips in a maximum of 10% of pieces. See Para. 720(f).
- Wane - 1/4 the thickness and 1/6 the width for up to 1/4 the length. Omit Para. 750.
- Warp - 1/2 of medium. See Para. 752.
EXTERIOR DECKING
ALL WEST COAST SPECIES
ROUGH OR SURFACED
K.D., A.D., or Unseasoned
5/4" to 2" Thickness, 4" and Wider

Recommended for flatwise load applications where spans are limited to 24" on center for nominal 6" and wider, and 16" on center for all other widths.

Approved by the American Lumber Standard Committee Board of Review. Species graded under this rule are span rated in accordance with the requirements of the American Lumber Standard Committee Policy for Evaluation of Recommended Spans for Span Rated Decking Products.

126. Exterior Decking is recommended for flatwise use, where it’s decorative appearance makes it highly suitable for outdoor applications such as patio and poolside decks, benches, boardwalks, planter boxes, and many garden uses.

   Exterior Decking is run to standard sizes with the option of radius edges per buyer’s specification.

   There are two grades of Exterior Decking: “SELECT DEX” and “COMMERCIAL DEX.”

126-a. “SELECT DEX” Characteristics permitted and limiting provisions shall be:

   Medium stained sapwood, heart stain firm.
   Short splits.
   Medium seasoning checks.
   Medium bark pockets, small pitch pockets.
   Light shake - several along length, none through; if through at ends, limited as splits.
   Medium raised or torn grain.
   Pin holes - limited.
   Holes - pin to small size, equivalent to chipped knots.
   Knots - Sound and tight.
EXTERIOR DECKING
ALL WEST COAST SPECIES

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Knot Size</th>
<th>Span Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>1-1/2&quot;</td>
<td>16&quot; O.C.</td>
</tr>
<tr>
<td>5&quot;</td>
<td>2&quot;</td>
<td>16&quot; O.C.</td>
</tr>
<tr>
<td>6&quot;</td>
<td>2-1/2&quot;</td>
<td>24&quot; O.C.</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3&quot;</td>
<td>24&quot; O.C.</td>
</tr>
<tr>
<td>10&quot;</td>
<td>3-1/2&quot;</td>
<td>24&quot; O.C.</td>
</tr>
<tr>
<td>12&quot;</td>
<td>4&quot;</td>
<td>24&quot; O.C.</td>
</tr>
</tbody>
</table>

Spike knots or narrow face knots equivalent displacement.
Chipped knots - not to exceed 1/3 thickness, 2 per 12'.
Pitch streaks - medium or equivalent.
Skip - very light, 1 per 12'; light on reverse face and edges.
Warp - light.
Slope of grain - 1 in 8.

Unless otherwise specified, reverse face may contain characteristics one grade lower (Exterior Commercial Decking). In addition, pieces may contain wane 1/2 the thickness by 1/3 the width or equivalent on each face; in cedar species, peck permitted in small spots or streaks limited to 1/6 width.

126-b. “COMMERCIAL DEX”
Characteristics permitted and limiting provisions shall be:
Stained wood.
Medium splits.
Season checks.
Large bark pockets, medium pitch pockets.
Manufacture - standard “F.”
Medium shake - 1/4 length, none through; if through at ends limited as splits.
Torn or raised grain.
Pin holes.
EXTERIOR DECKING
ALL WEST COAST SPECIES

Knots:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Sound &amp; Tight Knots</th>
<th>Unsound, Loose Knots, Holes*</th>
<th>Span Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>1-7/8&quot;</td>
<td>1&quot;</td>
<td>16&quot; O.C.</td>
</tr>
<tr>
<td>5&quot;</td>
<td>2-1/2&quot;</td>
<td>1&quot;</td>
<td>16&quot; O.C.</td>
</tr>
<tr>
<td>6&quot;</td>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
<td>24&quot; O.C.</td>
</tr>
<tr>
<td>8&quot;</td>
<td>4&quot;</td>
<td>2&quot;</td>
<td>24&quot; O.C.</td>
</tr>
<tr>
<td>10&quot;</td>
<td>5&quot;</td>
<td>2&quot;</td>
<td>24&quot; O.C.</td>
</tr>
<tr>
<td>12&quot;</td>
<td>6&quot;</td>
<td>2&quot;</td>
<td>24&quot; O.C.</td>
</tr>
</tbody>
</table>

*Holes maximum one hole per 12’ length.

Spike knots or narrow face knots equivalent displacement.

Slope of grain - 1 in 8.

Skip - light on face, 2 per 12’; hit and miss 1/32 on reverse face, medium on edges.

Warp - medium.

White speck - firm 1/3 face area.

Unless otherwise specified, reverse face may contain characteristics 25% larger than face side. In addition: white speck, firm; unsound wood in small spots and streaks limited to 1/6 width; wane 1/2 the thickness by 1/3 the width, or equivalent on each face; in cedar species, peck permitted in spots or streaks limited to 1/3 width.
ALTERNATE DECKING GRADES
ALL SPECIES
ROUGH OR SURFACED
K.D., A.D., or Unseasoned

Recommended for flatwise load applications where spans are either 16" or 24" on center.

126-r. Some manufacturers of decking products from species listed in this grade rule prefer to grade the material under the provisions of the Radius Edge Decking Special Product Rule of the Southern Pine Inspection Bureau which are published here. There are two grades of Radius Edge Decking, “PREMIUM DECKING” and STANDARD DECKING”.

Species graded under this rule are span rated for either 16" or 24" in accordance with the requirements of the American Lumber Standard Policy for Span Rated Decking Products. Species only approved for a 16" span shall include the phrase “16" on center” in the grade stamp.

The standard radius for Radius Edge Decking products is 1/4". Decking manufactured with a different radius shall list the radius in the grade stamp.

Face knots are measured as the average of the maximum and minimum diameters. Knots occurring on the reverse face are measured by displacement. In no case shall knots on either face displace more than 45% of the cross section in Premium and 55% of the cross section in Standard.

For length mix specifications see Para. 260-r.

126-ra. “PREMIUM DECKING”
Characteristics permitted and limiting provisions shall be:

Checks - medium surface checks; through checks not over 1/32" wide are allowed if not longer than width of piece.

Compression Wood - prohibited if in readily identifiable and damaging form.

Firm Red Heart - not over 25% of face.

Holes - one medium allowed for each 4' of length.
Knots - sound, firm, encased and pith knots, if tight and well spaced, in sizes as listed; decayed knots on same basis if smooth across the surface or if evidencing only minor surface pits or cavities; decayed knots containing serious pits or cavities limited to one-half the sound knot size.

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Knot Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-1/2&quot;</td>
</tr>
</tbody>
</table>

*Note: the sum of diameters of all face knots in any 4' of length must not exceed twice the diameter of the maximum size knot allowed.*

Manufacture - standard “E” manufacture.
Pitch - medium.
Pitch pockets - medium.
Pitch streaks - medium.
Pith - not limited.
Shakes - slight (not over 1/32" wide), if through at end limited as splits.
Skips - very light face and edge skip (not over 1/64" deep) if not longer than 6" for full width or equivalent area if less than full width.
Slope to grain - 1" in 8".
Splits - short (not longer than width of piece).
Stain - medium.
Wane - not to exceed 1/8" deep or 1/2" wide.
Warp - medium.

(Reverse side not lower than Standard except wane - not over 1/2" deep and 1" wide and pitch pockets - large.)

**126-rb. “STANDARD DECKING”**
Characteristics permitted and limiting provisions shall be:

Checks - checks except through checks limited as splits.
Compression Wood - prohibited if in readily identifiable and damaging form.

Firm Red Heart - not limited.

Holes - up to 1/4" through holes well scattered.

Knots - sound, firm, encased and pith, if tight and well spaced are limited to the size as listed; decayed knots on same basis if smooth across surface or if evidencing only minor surface pits or cavities; decayed knots containing serious surface pits or cavities are limited to Premium size knots; hollow knots limited by Premium knot size and through opening in them limited to 1/4".

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Knot Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>2-1/2&quot;</td>
</tr>
</tbody>
</table>

Manufacture - standard “E” manufacture.

Pitch - medium.

Pitch pockets - medium.

Pitch streaks - medium.

Pith - not limited.

Shakes - medium (not over 1/8" wide), if through at ends limited as splits.

Skips - light skip allowed not to exceed 10% of face, hit or miss on edges.

Slope of grain - 1" in 8".

Splits - medium splits.

Stain - medium stain.

Wane - not to exceed 1/8" deep or 1/2" wide.

Warp - heavy.

(Reverse side shall be free of defects which might prevent its use as decking. Streaks of heart-center decay not over 1/3 the width or thickness or the equivalent in unsound red heart allowed. Wane not over 1/2" deep and 1" wide.)
127. “DEX” Wall and Roof Plank is widely used for attractive walls and roofs. Often the underside is left exposed for paneled ceilings, the upper side serving as a base for roofing material. Appropriate working stresses for these uses are assigned to the grades. See Table 7, Para. 200.

When orders for “DEX” Wall and Roof Plank specify “square end trimmed”, pieces are trimmed square with a tolerance of 1/64” permitted, for each nominal 2” of width or thickness. This does not preclude the practice of slightly back-beveling the ends from the face side to reverse side to insure a closer fit.

“DEX” Wall and Roof Plank is usually surfaced to single tongue and groove pattern in 2” thicknesses and double tongue and groove in 3” and 4” thicknesses, with edge “V” one side. The side with the “V” or pattern shall be considered the face side.

There are two grades of “DEX” Wall and Roof Plank: “SELECT DEX” and “COMMERCIAL DEX.” In addition to the following specific provisions applicable to “DEX” Wall and Roof Plank, the appropriate provisions in all other paragraphs of the rules apply.

127-b. “SELECT DEX” - WALL and ROOF PLANK. Lumber of this grade is recommended for high class construction where good strength and fine appearance are desired. Knots and other natural characteristics which add to the decorative character of the piece are permitted. Characteristics and limiting provisions on exposed faces, except as noted, are:

- Medium stained sapwood. Heart stain firm.
- Occasional short splits.
- Medium seasoning checks, scattered.
- Holes, pin to small in size, none through; equivalent to chipped knots.
WALL AND ROOF PLANK
ALL WEST COAST SPECIES

Medium torn or raised grain.
Medium grain in Douglas fir only.
Slope of grain not to exceed 1 in 10.
Pitch, light or equivalent very small streak.
Tongue 1/16” narrow in occasional pieces.
Medium bark pockets.
Very small, dry pitch pockets.
Light crook or very light twist, in occasional pieces.
Knots, sound and tight, on exposed face except as noted below.
Knots, well spaced, are permitted in the following sizes on both wide faces. For measurement, see Para 201-a.

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Net Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>3&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>4&quot;</td>
<td>1-7/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5&quot;</td>
<td>2-3/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5-1/4&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6-3/4&quot;</td>
<td>3-1/4&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>8-3/4&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>10-3/4&quot;</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>

In occasional pieces, firm and tight knots not exceeding 1-1/2" in diameter are permitted if not through the piece and do not exceed two in 12' of length, or equivalent smaller.

Spike and narrow face knots are permitted if judged to have no more effect on strength than other knots.

Knots may contain chipped or unsound spots not larger than approximately 3/4" in diameter if not through the piece and do not exceed two in 12' of length or equivalent smaller.
Back and Unexposed Edges

On back and unexposed edges, hit and miss skips, wane approximately 1/3 of the face width and other characteristics not interfering with the intended use are permitted except as noted.

For cedar species the natural characteristic of pitted areas or peck is permitted on back and unexposed edges when the peck is narrow and well scattered and does not affect the strength more than other characteristics permitted in the grade.

127-c. “COMMERCIAL DEX”- WALL AND ROOF PLANK. Lumber of this grade is recommended and customarily used for the same purposes served by the higher grade when appearance requirements are not critical.

Characteristics and limiting provisions are:

- Stained wood.
- Splits approximately 1/6 the length.
- Seasoning checks.
- Small holes.
- Torn grain.
- Medium grain in Douglas fir only.
- Slope of grain not to exceed 1 in 8.
- Pitch streaks.
- Hit and miss skips.
- Tongue 1/16" narrow.
- Wane approximately 1/6 the face width.
- Pitch or bark pockets.
- Firm white specks, narrow streak.
- Unsound wood in small spots or streaks up to 1" wide may be accepted on any face. In cedar species only, spots or streaks may be accepted up to 1/3 the width on any face.
- Shake - not serious.
- Medium crook or very light twist in occasional pieces.
Knots, well spaced, are permitted in the following size on both wide faces:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Net Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>3&quot;</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>4&quot;</td>
<td>2-3/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5&quot;</td>
<td>2-7/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5-1/4&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6-3/4&quot;</td>
<td>3-3/4&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>8-3/4&quot;</td>
<td>4-7/8&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>10-3/4&quot;</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

Spike and narrow face knots are permitted if judged to have no more effect on strength than other knots.

Chipped and/or broken out knots, not larger than approximately 1-1/2" in diameter, are permitted if not through the piece.

On Back and Unexposed Edges

Wane approximately 1/3 of face and other characteristics not interfering with the intended use are permitted on unexposed back and edges except as noted.

Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.
128. The dimensional stability and decay resistance qualities of this material make it ideally suited for use as Foundation Lumber.

In addition to the following specific provisions applicable to Foundation Lumber, the appropriate provisions in all other paragraphs in the rules apply.

For measurement of knots, see Para. 201-b.

There is only one grade of Foundation Lumber: “FOUNDATION.” It is selected from heartwood and must be free of heart center (FOHC) and free of sapwood.

128-a. “FOUNDATION.”
Characteristics and limiting provisions are:

- Splits - medium.
- Checks - seasoning. If through at ends, limited as splits.
- Torn grain.
- Skips - hit and miss. In 5% of pieces, hit or miss or a heavy skip.
- Bark pockets.
- Shake - through heart shakes up to 2' long, well separated. If not through, single shakes 3' long or 1/4 the length, whichever is greater.
- Warp - light.
- Peck (unsound wood) - narrow streak 1/6 the width.
- Knots, sound, unsound or not firmly fixed but well spaced, are permitted in the following sizes or their equivalent displacement:
Narrow face and spike knots are permitted if judged to have no more effect on strength than other knots.

All or nearly all of the permissible characteristics of the grade are never present in maximum size or number in any one piece. Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Knot Size</th>
<th>Holes from Any Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>2&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>2-1/2&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>3-1/2&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>4&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>Over 12&quot;</td>
<td>4-1/2&quot;</td>
<td>3-1/2&quot;</td>
</tr>
</tbody>
</table>
BEAMS AND STRINGERS
ALL WEST COAST SPECIES
ROUGH OR SURFACED
5" and Thicker, Rectangular
width more than 2" greater than thickness

130. There are five grades of Beams and Stringers: “SELECT STRUCTURAL,” “NO. 1 STRUCTURAL,” “STANDARD,” “NO. 2 STRUCTURAL” and “UTILITY.” Three of these grades, “SELECT STRUCTURAL,” “NO. 1 STRUCTURAL” and “NO. 2 STRUCTURAL” are stress grades with working stress values assigned. In Douglas fir only, both “SELECT STRUCTURAL” and NO. 1 STRUCTURAL” may be obtained with an additional specification for density. For design values, see Table 10, Para. 200, and Para. 200-g.

Pieces 5"x5" and larger, with the width not more than 2" greater than the thickness, may be graded under this paragraph provided all faces are graded as narrow faces. Pieces so graded will have a fiber stress similar to that of the following grades. If grade stamped, they will be stamped with stamps showing only the appropriate fiber stress in bending “f.”

In addition to the following specific provisions applicable to Beams and Stringers, the appropriate provisions in all other paragraphs in the rules apply. For measurement of knots see Para. 201-c.

130-aa. “DENSE SELECT STRUCTURAL” - BEAMS and STRINGERS (Douglas fir only). Conforms to all the grade provisions of Para. 130-a with the additional requirement of density as defined in Para. 204-c.

130-a. “SELECT STRUCTURAL” - BEAMS and STRINGERS. Timbers of this grade have very high strength properties and are of finest appearance. They are recommended for use in bridges, docks, warehouses and heavy construction of all kinds where superior strength is required. They are also recommended for exposed framing where fine appearance is demanded. Because of their size they are highly fire resistive. These timbers are graded primarily for members stressed in bending but may also be used as tension and compression members. Appropriate working stresses for all these uses are assigned to the grade.
Characteristics and limiting provisions are:

Stained sapwood.
Firm heart stain - 10% of width or equivalent.
Splits approximately 1/2 the width or equivalent of end checks.
Seasoning checks in areas at ends, single or opposite each other, are limited to a sum total of 1/4 the thickness.
Limited pin holes.
Heavy torn grain.
Pitch Streaks.
Medium grain (Douglas fir only).
Slope of grain in middle 1/3 of length not to exceed 1 in 15, balance of piece may be 1 in 12.
Occasional skips, 1/16"x2' or equivalent.
Medium pitch pockets.
Wane 1/8 of any face or equivalent slightly more for a short distance.
Shake approximately 1/6 the thickness on end.
Knots, sound, tight and well spaced, may be present in the following approximate sizes:

<table>
<thead>
<tr>
<th>Nominal Face Width</th>
<th>On Narrow Face and Edge of Wide Face in Middle 1/3 of Length</th>
<th>At Ends and Along Centerline of Wide Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot;</td>
<td>1-1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>1-7/8&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2&quot;</td>
<td>2-5/8&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2-1/4&quot;</td>
<td>3-1/8&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>2-3/8&quot;</td>
<td>3-3/8&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>3-5/8&quot;</td>
<td></td>
</tr>
<tr>
<td>18&quot;</td>
<td>3-5/8&quot;</td>
<td></td>
</tr>
</tbody>
</table>
Increase in knot sizes:

The size of knots permitted on the narrow face and at edge of wide face are the same and are determined by the width of the narrow face. These may be increased proportionately from the size permitted in the middle 1/3 of the length to twice that size at the ends of the piece, except that the size of no knot shall exceed the size permitted at the center of the wide face.

On the wide faces, the sizes of knots are proportionate from the sizes at edges of the face to the permissible size along the centerline of the wide face.

130-bb. “DENSE NO. 1 STRUCTURAL” - BEAMS and STRINGERS (Douglas fir only). Conforms to all the grade provisions of Para. 130-b with the additional requirement of density as defined in Para. 204-c.

130-b. “No. 1 STRUCTURAL” - BEAMS and STRINGERS. Timbers of this grade are in great demand because of their excellent strength and appearance.

In these respects they rank only slightly below the “SELECT STRUCTURAL” grade and are recommended for similar uses wherever appearance is a less exacting factor but high strength is a requirement. Like the “SELECT STRUCTURAL” grade, these timbers are graded primarily for members stressed in bending, but may also be used as tension and compression members. Appropriate working stresses for all these uses are assigned to the grade.

Characteristics and limiting provisions are:

- Stained sapwood.
- Firm stained heartwood.
- Splits approximately equal to the width or equivalent end checks.
- Seasoning checks in areas at ends, single or opposite each other, are limited to a sum total of 1/4 the thickness.
- Pin holes limited.
Heavy torn grain.
Medium grain (Douglas fir only).
Slope of grain in middle 1/3 of length not to exceed 1 in 10, balance of piece may be 1 in 8.
Pitch streaks.
Occasional skips 1/8" deep and 2' long are permitted.
Pitch pockets.
Wane 1/4 any face or equivalent slightly more for short distance.
Shake approximately 1/6 the thickness on end.
Knots, sound, tight and well spaced, may be present in the following approximate sizes:

<table>
<thead>
<tr>
<th>Nominal Face Width</th>
<th>On Narrow Face and Edge of Wide Face in Middle 1/3 of Length</th>
<th>At Ends and Along Centerline of Wide Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot;</td>
<td>1-7/8&quot;</td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>2-1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>2-5/8&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2-7/8&quot;</td>
<td>3-3/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>3-1/4&quot;</td>
<td>4-1/2&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>3-1/2&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td></td>
<td>5-1/4&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td></td>
<td>5-5/8&quot;</td>
</tr>
</tbody>
</table>

In cedar species, holes from any cause 1/2 the size of allowable knots are permitted.

Increase in knot sizes:

The sizes of knots permitted on the narrow face and at edge of wide face are the same and are determined by the width of the narrow face.
These may be increased proportionately from the size permitted in the middle 1/3 of the length to twice that size at the ends of the piece, except that the size of no knot shall exceed the size permitted at the center of the wide face.

On wide faces, the sizes of knots are proportionate from the sizes at edges of the face to the permissible size along the centerline of the wide face.

130-c. “STANDARD” - BEAMS and STRINGERS. Graded under Para. 131-c.

130-cc. “NO. 2 STRUCTURAL” - BEAMS and STRINGERS. Timbers of this grade are for use in general construction where higher strength properties are not needed and where serviceability is important. Appropriate working stresses are assigned.

Characteristics and limiting provisions are:

- Stained wood.
- Splits, medium or equivalent end checks.
- Seasoning checks.
- Torn grain.
- Pitch streaks.
- Slope of grain 1 in 6 full length.
- Skips, 1/8" deep and 2' in length or 1/16" scant full length.
- Pitch or bark pockets.
- Wane 1/3 of any face or equivalent, slightly more for a short distance.
- Firm white specks, 1/3 width or equivalent.
- Shake, 1/2 length, 1/2 thickness. If through at ends, limited as splits.
- Small spots of unsound wood, well scattered, 1/6 the face width.
Knots, sound, not firmly fixed or holes, well spaced, may be present in the following approximate sizes:

<table>
<thead>
<tr>
<th>Nominal Face Width</th>
<th>On Narrow Face and Edge of Wide Face in Middle 1/3 of Length</th>
<th>At Ends and Along Centerline of Wide Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot;</td>
<td>2-5/8&quot;</td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>3-1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>4-1/2&quot;</td>
<td>4-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>5-5/8&quot;</td>
<td>5-5/8&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>6-7/8&quot;</td>
<td>6-7/8&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>7-1/2&quot;</td>
<td>7-1/2&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td></td>
<td>8-1/8&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td></td>
<td>8-5/8&quot;</td>
</tr>
</tbody>
</table>

Unsound knots are limited to 1/2 the size of other knots.

Increase in knot sizes:

The size of knots permitted on the narrow face and edge of wide face are the same and are determined by the width of the narrow face. These may be increased proportionately from the size permitted in the middle 1/3 of the length to twice that size at the ends of the piece, except that the size of no knot shall exceed the size permitted at the center of the wide face.

On wide faces, the size of knots are proportionate from the sizes at the edges of the face to the permissible size along the centerline of the wide face.

130-d. “UTILITY” - BEAMS and STRINGERS. Graded under Para. 131-d.
ALT 130. Some manufacturers of timber products from species listed in this grade rule prefer to grade the material under the provisions of the Beams and Stringers rule of the Western Wood Products Association which is published here. There are three grades: SELECT STRUCTURAL, NO. 1, and NO. 2. All are graded full length. Knots appearing on narrow faces are limited to the same displacement as knots specified at edges of wide faces. The Select Structural, No.1 and No. 2 grades are assigned design values as shown in Table 10.

Pieces 5" x 5" and larger, with the width not more than 2" greater than the thickness, may be graded under this paragraph provided all faces are graded as narrow faces. Pieces so graded will have a fiber stress similar to that of the following grades. If grade stamped, they will be stamped with stamps showing only the appropriate fiber stress in bending “f.”

In addition to the following specific provisions applicable to Beams and Stringers, the appropriate provisions in all other paragraphs in the rules apply. For measurement of knots, see Paragraph 201-b.

ALT 130-aa “DENSE SELECT STRUCTURAL” – BEAMS and STRINGERS (Douglas fir only)

Conforms to all the grade provisions in Paragraph ALT 130-a with the additional requirement of density as defined in Paragraph 204-c.

ALT 130-a “SELECT STRUCTURAL” – BEAMS and STRINGERS

Timber of this grade have very high strength properties and are of finest appearance. They are recommended for use in bridges, docks, warehouses and heavy construction of all kinds where superior strength is required. They are also recommended for exposed framing where fine appearance is demanded. Because of their size they are highly fire resistive. These timbers are graded primarily for members stressed in bending but may also be used as tension and compression members. Appropriate working stresses for all these uses are assigned to the grade.
ALTERNATIVE BEAMS AND STRINGERS GRADES

Characteristics and limiting provisions are:

Checks — Seasoning checks, single or opposite each other with a sum total equal to 1/4 the thickness.

Grain — Medium. See Paragraph 204-a (Douglas fir only).

Knots — Sound, tight and well-spaced, are permitted in sizes not to exceed the following or equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Wide Face</th>
<th>Centerline Wide Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>1-7/8&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2&quot;</td>
<td>2-5/8&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2-1/8&quot;</td>
<td>3-1/8&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>2-3/8&quot;</td>
<td>3-3/8&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>2-1/2&quot;</td>
<td>3-5/8&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>2-3/4&quot;</td>
<td>3-5/8&quot;</td>
</tr>
<tr>
<td>20&quot;</td>
<td>2-7/8&quot;</td>
<td>3-7/8&quot;</td>
</tr>
<tr>
<td>22&quot;</td>
<td>3&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>3-1/8&quot;</td>
<td>4-1/4&quot;</td>
</tr>
</tbody>
</table>

The size of knots on wide faces may be increased proportionately from the size permitted at the edge to the size permitted at the centerline.

Pin Holes — Limited.

Pitch Streaks.

Pockets — Medium pitch pockets.

Shake — 1/6 the thickness on end.

Skips — Occasional Skips 1/16" deep, 2' in length.

Slope of Grain — 1 in 14.

Splits — Splits equal in length to 1/2 the width of the piece or equivalent of end checks.

Stain — Stained sapwood. Firm heart stain, 10% of width or equivalent.

Torn Grain — Heavy.

Wane — 1/8 of any face, or equivalent slightly more for a short distance.
ALTERNATIVE BEAMS AND STRINGERS GRADES

ALT 130-bb  “DENSE NO. 1 STRUCTURAL” – BEAMS and STRINGERS (Douglas fir only)

Conforms to all the grade provisions in Paragraph ALT 130-b with the additional requirement of density as defined in Paragraph 204-c.

ALT 130-b. “No. 1 STRUCTURAL” – BEAMS and STRINGERS.

Timbers of this grade are in great demand because of their excellent strength and appearance.

In these respects they rank only slightly below the “SELECT STRUCTURAL” grade and are recommended for similar uses wherever appearance is less exacting factor but high strength is a requirement. Like the “SELECT STRUCTURAL” grade, these timbers are graded primarily for members stressed in bending, but may also be used as tension and compression members. Appropriate working stresses for all these uses are assigned the grade.

Characteristics and limiting provisions are:

Checks — Seasoning checks, single or opposite each other with a sum total equal to 1/4 the thickness.

Grain — Medium. See Paragraph 204-a (Douglas fir only).

Holes — In Cedar species, holes from any cause 1/2 the size of allowable knots are permitted.

Knots — Sound, tight and well-spaced, are permitted in sizes not to exceed the following or equivalent displacement:
ALTERNATIVE BEAMS AND STRINGERS GRADES

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>At Edge Wide Face</th>
<th>Centerline Wide Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>2-5/8&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2-7/8&quot;</td>
<td>3-3/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>3-1/4&quot;</td>
<td>4-1/2&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>3-1/2&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>3-3/4&quot;</td>
<td>5-1/4&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>3-7/8&quot;</td>
<td>5-5/8&quot;</td>
</tr>
<tr>
<td>20&quot;</td>
<td>4-1/8&quot;</td>
<td>5-7/8&quot;</td>
</tr>
<tr>
<td>22&quot;</td>
<td>4-3/8&quot;</td>
<td>6-1/4&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>4-1/2&quot;</td>
<td>6-1/2&quot;</td>
</tr>
</tbody>
</table>

The size of knots on wide faces may be increased proportionately from the size permitted at the edge to the size permitted at the centerline.


Pockets — Pitch pockets.

Shake — 1/6 the thickness on end.

Skip — Occasional skips 1/8” deep, 2’ in length.

Slope of Grain — 1 in 10.

Splits — Equal in length to the width of the piece or equivalent of end checks.

Stain — Stained sapwood. Firm stained heartwood.

Torn Grain — Heavy.

Wane — 1/4 of any face, or equivalent slightly more for a short distance.
ALT 130cc. “No. 2 STRUCTRAL – BEAMS and STRINGERS

Timbers of this grade are for use in general construction where higher strength properties are not needed and where serviceability is important. Appropriate working stresses are assigned.

Characteristics and limiting provisions are:

Checks — Seasoning checks.
Grain — Medium. See Paragraph 204-a (Douglas fir only).
Knots — Sound, not firmly fixed or holes, well-spaced, are permitted in sizes not to exceed the following or equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Anywhere on Wide Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>4-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>5-5/8&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>6-7/8&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>7-1/2&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>8-1/8&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>8-5/8&quot;</td>
</tr>
<tr>
<td>20&quot;</td>
<td>9-1/8&quot;</td>
</tr>
<tr>
<td>22&quot;</td>
<td>9-1/2&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

Unsound knots are limited to ½ the size of other knots.

Pitch Streaks.

Pockets — Pitch or bark pockets.

Shake — 1/2 length, 1/2 thickness. If through at ends, limited as splits. Skips — 1/8 “ deep, 2’ in length, or 1/16” skip full length.

Slope of Grain — 1 in 6.

Splits — Medium or equivalent end checks.

Stain — Stained wood.
ALTERNATIVE BEAMS AND STRINGERS GRADES

Torn Grain.
Unsound Wood — Small spots of unsound wood, well scattered, 1/6 the face width.
Wane — 1/3 of any face, or equivalent slightly more for a short distance.
White Specks — Firm, 1/3 width, or equivalent.
There are five grades of Posts and Timbers: “SELECT STRUCTURAL,” “NO. 1 STRUCTURAL,” “STANDARD,” “NO. 2 STRUCTURAL,” and “UTILITY.” Three of these grades, “SELECT STRUCTURAL,” “NO. 1 STRUCTURAL,” and “NO. 2 STRUCTURAL,” are stress graded with working stress values assigned. In Douglas fir, both “SELECT STRUCTURAL” and “NO. 1 STRUCTURAL” may be obtained with an additional specification for density. For design values, see Table 11, Para. 200.

In addition to the following specific provisions applicable to Posts and Timbers, the appropriate provisions in all other paragraphs of the rules apply. For measurement of knots, see Para. 201-d.

131-aa. “DENSE SELECT STRUCTURAL” - POSTS and TIMBERS (Douglas fir only). Conforms to all the grade provisions of Para. 131-a with the additional requirement of density as defined in Para. 204-c.

131-a. “SELECT STRUCTURAL” - POSTS and TIMBERS. Timbers of this grade have very high strength properties and are of finest appearance. They are recommended for columns, posts and struts in heavy construction such as warehouses, docks, and other large structures where superior strength is required. They are also recommended for exposed framing where fine appearance is demanded. Because of their size they are highly fire resistive. These timbers are graded primarily for compression parallel to the grain but may also be used for members stressed in tension or bending. Appropriate working stresses for these uses are assigned to the grade.

Characteristics and limiting provisions are:

- Stained sapwood.
- Firm heart stain - 10% of width or equivalent.
- Splits equal to 3/4 the thickness or equivalent end checks.
- Seasoning checks in areas at ends, single or opposite each other, are limited to a sum total of 1/2 the thickness.
Limited pin holes.
Heavy torn grain.
Medium grain (Douglas fir only).
Slope of grain full length not to exceed 1 in 12.
Pitch streaks.
Medium pitch pocket.
Occasional skips 1/16" deep and 2' long or equivalent.
Wane approximately 1/8 of any face or equivalent slightly more for short distance.
Shake approximately 1/3 the thickness on end.
Knots are sound, tight and well spaced. They may be present anywhere in the piece in the following approximate sizes:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Approx. Knot Size</th>
<th>Nominal Width</th>
<th>Approx. Knot Size</th>
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</thead>
<tbody>
<tr>
<td>5&quot;</td>
<td>1&quot;</td>
<td>12&quot;</td>
<td>2-3/8&quot;</td>
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<tr>
<td>6&quot;</td>
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<td>14&quot;</td>
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<tr>
<td>10&quot;</td>
<td>2&quot;</td>
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<td>3&quot;</td>
</tr>
</tbody>
</table>

In rectangular sizes the wider face determines the size of knots. Proportionately larger knots are permitted in sizes 20" and wider or thicker.

Assigned stress values do not apply to pieces 20" and larger or 50' and longer.

131-bb. “DENSE NO. 1 STRUCTURAL” - POSTS and TIMBERS (Douglas fir only). Conforms to all the grade provisions of Para. 131-b with the additional requirement of density as defined in Para. 204-c.

131-b. “NO. 1 STRUCTURAL” - POSTS and TIMBERS. Timbers of this grade are in great demand because of their excellent strength and appearance. In these respects they rank only slightly below the “SELECT STRUCTURAL” grade and are recommended for similar uses wherever appearance is a less exacting factor but high strength is a requirement. Like the “SELECT STRUCTURAL” grade, these timbers are graded primarily for compression parallel
to the grain but may also be used for members stressed in tension or bending. Appropriate working stresses for these uses are assigned to the grade.

Characteristics and limiting provisions are:

- Stained sapwood.
- Firm stained heartwood.
- Short splits or equivalent end checks.
- Seasoning checks in areas at ends, single or opposite each other, are limited to a sum of 1/2 the thickness.
- Pin holes - limited.
- Heavy torn grain.
- Medium grain (Douglas fir only).
- Slope of grain full length not to exceed 1 in 10.
- Occasional skips 1/8" deep and 2' long or equivalent are permitted.
- Pitch streaks.
- Pitch pockets.
- Wane approximately 1/4 of any face or equivalent slightly more for short distance.
- Shake approximately 1/3 the thickness on end.
- Knots are sound, tight and well spaced. They may be present anywhere in the piece in the following approximate sizes:

<table>
<thead>
<tr>
<th>Nominal Width</th>
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<tbody>
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<td>10&quot;</td>
<td>3-1/8&quot;</td>
<td>18&quot;</td>
<td>4-1/2&quot;</td>
</tr>
</tbody>
</table>

*In rectangular sizes 8" x 10" nominal and smaller, the wide face determines the size of knots. Larger sizes, knot size is determined for each face width.*
In cedar species, holes from any cause 1/2 the size of allowable sound and tight knots are permitted.

Proportionately larger knots are permitted in sizes 20" and wider or thicker.

Assigned stress values do not apply to pieces 20" and larger or 50' and longer.

131-c. "STANDARD" - POSTS and TIMBERS (NO. 1 MINING). Timbers of this grade are recommended for general construction. Where they occur, the natural characteristics of lumber are so limited that each piece of this grade may be used in the form in which it is shipped.

Pieces of this grade may have:
- Stained wood.
- Medium splits or equivalent end checks.
- Seasoning checks.
- Torn grain.
- Pitch streaks.
- Skips 1/8" deep and 2' in length or 1/16" scant full length.
- Pitch or bark pockets.
- Wane 1/3 of any face or equivalent slightly more for short distance.
- Firm white specks, 1/3 width or equivalent.
- Shake, 1/2 length, 1/2 thickness. If through at ends, limited as splits.
- Small spots of unsound wood, well scattered, 1/4 the face width.
- Knots, unsound, not firmly fixed, or holes not larger than approximately 1/2 the width of the face.

All or nearly all of the permissible characteristics of the grade are never present in maximum size or number in any one piece. Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.
55

131-cc. “NO. 2 STRUCTURAL” - POSTS and TIMBERS. Timbers of this grade are for use in general construction where higher strength properties are not needed and where serviceability is important. Appropriate working stresses are assigned.

Characteristics and limiting provisions are:

- Stained wood.
- Splits, medium or equivalent end checks.
- Seasoning checks.
- Torn grain.
- Pitch streaks.
- Slope of grain 1 in 6 full length.
- Skips, 1/8" deep and 2' in length or 1/16" scant full length.
- Pitch or bark pockets.
- Wane 1/3 of any face or equivalent, slightly more for a short distance.
- Firm white specks, 1/3 width or equivalent.
- Shake, 1/2 length, 1/2 thickness. If through at ends, limited as splits.
- Small spots of unsound wood, well scattered, 1/6 the face width.
- Knots sound, not firmly fixed or holes, well spaced.

They may be present anywhere in the piece in the following approximate sizes:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Approx. Knot Size</th>
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<th>Approx. Knot Size</th>
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</thead>
<tbody>
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<td>7&quot;</td>
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<tr>
<td>10&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>7-1/2&quot;</td>
</tr>
</tbody>
</table>

Unsound knots are limited to 1/2 the size of other knots. In rectangular sizes the wider face determines the size of knots.
131-d. “UTILITY” - POSTS and TIMBERS (NO. 2 MINING)  Timbers of this grade are recommended for rough general construction. Where they occur, the natural characteristics of lumber are so limited that each piece of this grade may be used in the form in which it is shipped.

Pieces of this grade may have:

- Stained wood.
- Splits approximately 1/4 the length.
- Seasoning checks.
- Torn grain.
- Pitch streaks.
- Approximately 1/8" scant in both width and thickness if surfaced, or approximately 1/2" if rough.
- Pitch or bark pockets.
- Wane approximately 1/3 of any face.
- White specks and firm honeycomb.
- Shake full length if not continuous.
- Unsound wood, scattered.
- Knots, large, unsound or not firmly fixed, or holes from any cause, not larger than approximately 3/4 the width of the face.

All or nearly all of the permissible characteristics of the grade are never present in maximum size or number in any one piece. Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.
ALTERNATIVE POSTS AND TIMBERS GRDES
ALL SPECIES
5” x 5” and Larger
Width not more than 2” greater than thickness

ALT 131. Some manufacturers of timber products from species listed in this grade rule prefer to grade the material under the provisions of Posts and Timbers rule of the Western Woods Products Association which is published here. There are three grades: “SELECT STRUCTURAL”, “NO. 1 STRUCTURAL”, and “NO. 2 STRUCTURAL”. In Douglas fir, both “SELECT STRUCTURAL” and “NO. 1 STRUCTURAL” may be obtained with an additional specification for density. For design values, See Table 11, Paragraph 200.

All are graded full length except as provided in the grade descriptions, knots appearing on narrow faces are limited to the same displacement as knots specified for the wide face.

In addition to the following specific provisions applicable to Posts and Timbers, the appropriate provisions in all other paragraphs in the rules apply. For measurement of knots, see Paragraph 201-b.

ALT 131-aa. “DENSE SELECT STRUCTURAL” – POSTS and TIMBERS (Douglas fir only).

Conforms to all the grade provisions in Paragraph ALT 131-a with the additional requirement of density as defined in Paragraph 204-c.

ALT 131-a. “SELECT STRUCTURAL” – POSTS and TIMBERS.

Timbers of this grade have very high strength properties and are of finest appearance. They are recommended for columns, posts, and struts in heavy construction such as warehouses, docks, and other large structures where superior strength is required. They are also recommended for exposed framing where fine appearance is demanded. Because of their size they are highly fire resistive. These timbers are graded primarily for compression parallel to the grain but may also be used for members stressed in tension or bending. Appropriate working stresses for these uses are assigned to the grade.
ALTERNATIVE POSTS AND TIMBERS GRADES

Characteristics and limiting provisions are:

Checks — Seasoning checks, single or opposite each other with a sum total equal to 1/2 the thickness of the piece.

Grain — Medium. See Paragraph 204-a (Douglas fir only).

Knots — Sound, tight and well-spaced. Knot size limitations are permitted in the following sizes or their equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Anywhere on Wide Face</th>
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</thead>
<tbody>
<tr>
<td>5&quot;</td>
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<td>18&quot;</td>
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</tbody>
</table>

Pin Holes — Limited. Pitch Streaks.
Pockets — Medium pitch pockets.
Shake — 1/3 the thickness on end.
Skip — Occasional skips 1/16” deep, 2’ in length.
Slope of Grain — 1 in 12.
Splits — Splits equal in length to 3/4 the thickness of the piece or equivalent of end checks.
Stains — Stained sapwood. Firm heart stain, 10% of width or equivalent.
Torn Grain — Heavy.
Wane — 1/8 of any face, or equivalent slightly more for a short distance.
ALTERNATIVE POSTS AND TIMBERS GRADES

ALT 131-bb. “DENSE NO. 1 STRUCTURAL” – POSTS and TIMBERS (Douglas fir only)

Conforms to all the grade provisions in Paragraph ALT 131-b with the additional requirement of density as defined in Paragraph 204-c.

ALT 131-b. “NO. 1 STRUCTURAL” – POSTS and TIMBERS

Timbers of this grade are in great demand because of their excellent strength and appearance. In these respects they rank only slightly below the “SELECT STRUCTURAL” grade and are recommended for similar uses wherever appearance is a less exacting factor but high strength is a requirement. Like the “SELECT STRUCTURAL” grade, these timbers are graded primarily for compression parallel to the grain but may also be used for members stressed in tension or bending. Appropriate working stresses for these uses are assigned to the grade.

Characteristics and limiting provisions are:

Checks — Seasoning checks, single or opposite each other with a sum total equal to 1/2 the thickness.

Grain — Medium. See Paragraph 204-a (Douglas fir only).

Holes — In Cedar species, holes from any cause 1/2 the allowable knot size are permitted.

Knots — Sound, tight and well-spaced. Knot size limitations are permitted in the following sizes or their equivalent displacement:
ALTERNATIVE POSTS AND TIMBERS GRADES

<table>
<thead>
<tr>
<th>Nominal Width</th>
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<tbody>
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<tr>
<td>18&quot;</td>
<td>4-1/2&quot;</td>
</tr>
</tbody>
</table>

Pin Holes — Limited.
Pitch Streaks.
Pockets — Pitch pockets.
Shake — 1/3 the thickness on end.
Skip — Occasional skips 1/8" deep, 2’ in length.
Slope of Grain — 1 in 10.
Split — Splits equal in length to width of the piece or equivalent of end checks.
Stain — Stained sapwood. Firm stained heartwood.
Torn Grain — Heavy.
Wane — 1/4 of any face or equivalent slightly more for a short distance.
ALT 131-cc. “NO. 2 STRUCTURAL” – POSTS and TIMBERS

Timbers of this grade are for use in general construction where higher strength properties are not needed and where serviceability is important. Appropriate working stresses are assigned.

Characteristics and limiting provisions are:

Checks — Seasoning checks.

Grain — Medium. See Paragraph 204-a (Douglas fir only).

Knots — Sound, not firmly fixed, or holes, well-spaced. Knot size limitations are permitted in the following sizes or their equivalent displacement:

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Anywhere on Wide Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot;</td>
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<td>7&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>7-1/2&quot;</td>
</tr>
</tbody>
</table>

Unsound knots are limited to 1/2 the size of other knots.

Pitch Streaks.

Pockets — Pitch or bark pockets.

Shake — 1/2 length, 1/2 thickness. If through at ends, limited as splits. Skips — 1/8" deep, 2’ in length, or 1/16” skip full length.

Slope of Grain — 1 in 6.

Splits — Medium or equivalent end checks.

Stain — Stained wood.
ALTERNATIVE POSTS AND TIMBERS GRADES

Torn Grain.
Unsound Wood — Small spots of unsound wood, well scattered, 1/6 the face width.
Wane — 1/3 of any face, or equivalent slightly more for a short distance.
White Speck — Firm white specks, 1/3 width or equivalent.
149. Western red cedar Industrial Clears, if ordered surfaced and unless otherwise specified, are finished to the sizes shown in the tables of Para. 250.

Grade descriptions are based on a piece 8" wide and 12' long.

Pieces 5" and narrower are graded from best face and both edges; pieces 6" and wider from best face and one edge.

There are three grades of Western red cedar Industrial Clears: “B and BETTER”, “C” and “D.”

149-b. “B and BETTER” CEDAR INDUSTRIAL CLEARS. A supreme grade recommended and widely used for interior and exterior trim, cabinet work, doors and similar uses, where the finest finish is important.

Pieces of this grade shall average not less than 6 annual rings per inch at either one end or the other.

Characteristics which may appear on pieces in this grade and their limiting provisions are:

- Checks - 4, small - no limit to number in rough stock.
- Slope of grain - not to exceed 1 in 8.
- Splits - short, in 5% of the pieces.
- Torn or raised grain - very light.
- Warp - very light in occasional pieces.
- Knots - on reverse face, 3 sound tight small.
- Skips - on reverse face, occasional light.

149-c. “C” CEDAR INDUSTRIAL CLEARS. This grade is recommended and widely used for interior and exterior trim, cabinet work, doors and similar uses where a high quality finish is important.

Characteristics which may appear on pieces in this grade and their limiting provisions are:
INDUSTRIAL CLEARS
WESTERN RED CEDAR

Checks - 4, small - no limit to number in rough stock.
Skips - occasional very light on face; light on edges and reverse side.
Slope of grain - 1 in 6.
Splits - short, in 5% of the pieces.
Sap stain - medium.
Torn or raised grain - light.
Warp - light in occasional pieces.
Knots - 3 sound tight 1", or 5 equivalent smaller or 4 not firmly fixed or unsound 1/2 the size of sound and tight knots.

10% of the pieces in a shipment may have a 3" cutout 3' or more from either end in pieces 12' and longer.

149-d. “D” CEDAR INDUSTRIAL CLEARS. A grade recommended and widely used where general utility purposes are of more importance than appearance. Characteristics on reverse face may be approximately 25% larger or more numerous.

Characteristics which may appear on pieces in this grade and their limiting provisions are:

Checks.
Knots - 4, approximately 1" or 8 equivalent smaller.
Pin holes - limited.
Skips - hit and miss; approximately 1/8" scant on edge.
Splits - short.
Sap stain.
Torn or raised grain.
Wane - 1/8 the width, 1/4 the length or equivalent, 1/4 the thickness, 50% more on reverse face.
White specks - firm, 1/4 the width or equivalent.
Warp - medium.

20% of pieces in a shipment may have a 3" cutout 3' or more from either end in pieces 12' and longer.
150. Industrial Clears, if ordered surfaced and unless otherwise specified, are finished to the sizes shown in the tables of Para. 250-d.

Grade descriptions are based on a piece 8" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

The grade is determined from the better face with the upper half of the edges considered as part of the face, and lower half of the edges as part of the reverse face, the reverse face being approximately one grade lower.

There are three grades of Industrial Clears: “B and BETTER”, “C” and “D.”

150-b. “B and BETTER” CEDAR INDUSTRIAL CLEARS. A supreme quality grade recommended and widely used for interior and exterior trim, cabinet work, doors and similar uses, where the finest finish is important.

Pieces in this grade shall average not less than 6 annual rings per inch at either one end or the other of the piece.

Characteristics which may appear on pieces in this grade and their limiting provisions are:

- Checks - four small - no limit to number in rough stock.
- Slope of grain - not to exceed 1 in 8.
- Splits - short, in 5% of the pieces.
- Torn or raised grain - very light.
- Warp - very light in occasional pieces.
- Knots, on reverse face - three sound tight 1" in 2-1/4" thicknesses to three 2" in 12" thicknesses.

150-c. “C” CEDAR INDUSTRIAL CLEARS. This grade is recommended and widely used for interior and exterior trim, cabinet work, garage doors and similar uses where a high quality finish is important.
INDUSTRIAL CLEARS
WESTERN RED CEDAR

Characteristics which may appear on pieces in this grade and their limiting provisions are:

Checks - four small - no limit to number in rough stock.
Skips - occasional very light on face; light on edges and back.
Slope of grain - 1 in 6.
Splits - short, in 5% of the pieces.
Sap stain - medium.
Torn or raised grain - light.
Warp - light in occasional pieces.
Knots - four sound tight 1" or five equivalent smaller in 2-1/4" thickness to four 2" or five equivalent smaller in 12" thicknesses or four not firmly fixed or unsound 1/2 the size of sound and tight knots.

10% of pieces in a shipment may have a 3" cutout 3' or more from either end in pieces 12' and longer.

150-d. “D” CEDAR INDUSTRIAL CLEARS. A grade recommended and widely used where general utility purposes are of more importance than appearance. Reverse face must be of reasonably clear type, allowing characteristics approximately 25% larger or more numerous.

Characteristics which may appear on pieces in this grade and their limiting provisions are:

Checks.
Pin holes - limited.
Skips - hit and miss; approximately 1/8" scant on edge.
Splits - short.
Sap stain.
Torn or raised grain.
Wane - 1/8 the width, 1/4 the length or equivalent, 1/4 the thickness; 50% more on reverse side.
Warp - medium.
White specks - 1/4 the width or equivalent.
Knots - five 1" or seven equivalent smaller in 2-1/4" thicknesses, to five 2" or seven equivalent smaller in 12" thicknesses.
20% of pieces in a shipment may have a 3" cutout 3' or more from either end in pieces 12' and longer.

**INDUSTRIAL CLEARS**  
**ALL WEST COAST SPECIES**  
(Except Cedar)  
VG, FG, AND/OR MG  
Rough or Surfaced  
KD, AD or Unseasoned  
2" and Thinner, 3" and Wider

**151.** Industrial Clears, if ordered surfaced, and unless otherwise specified, are finished to the sizes shown in the tables, Para. 250. Bright sapwood is admitted without limit in all grades except “B&BTR” INDUSTRIAL. The restrictions on bright sapwood prescribed in the “B & BTR” INDUSTRIAL grade do not apply if the lumber is kiln dried or air dried or treated with anti-stain solution.

Grade descriptions are based on a piece 8" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

Pieces 5" and narrower are graded from the best face and both edges; pieces 6" and wider are graded from the best face and one edge.

There are three grades of Industrial Clears: “B & BTR”, “C” and”D.”

In addition to the following specific provisions applicable to Industrial Clears, the appropriate provisions in all other paragraphs of the rules apply.

**151-b. **“B & BTR” INDUSTRIAL. Pieces of this grade are of sound wood and are recommended for and widely used as trim, cabinet work, garage doors and other similar uses where finest appearance is important.

Pieces of this grade have an average of 6 or more rings of annual growth per inch on either one end or the other. Pieces are entirely clear or have only a few minor and unimportant characteristics, such as:

- Bright sapwood - 1/3 width or equivalent in flat grain and 1/3 width or equivalent on both faces in vertical grain.
- Short splits in not more than 5% of the pieces.
- Four small seasoning checks.
INDUSTRIAL CLEARS
ALL WEST COAST SPECIES
(EXCEPT CEDAR)

Very light torn or raised grain.
Slope of grain not to exceed 1 in 8.
Three very small pitch or bark pockets or their equivalent.
Very light warp in occasional pieces.
Occasional light skips on reverse face.

151-c. “C” INDUSTRIAL. Pieces of this grade are of sound wood and are recommended for and widely used as trim, cabinet work, garage doors and other similar uses where excellent appearance is important.

Pieces may have one or more characteristics which are of such size or number that the piece is not of “B & BTR” grade.

Pieces may have:
- Sap stain, medium - 25% of piece or greater area of lighter stain.
- Heart stain, firm.
- Short splits in not more than 5% of the pieces.
- Small seasoning checks, well scattered.
- Light torn or raised grain.
- Occasional very light skips on face, light skips on edges and reverse side.
- Light warp in occasional pieces.

With the above, one of the following or its equivalent:
- Two small sound, tight knots or equivalent smaller.
- Four small pitch or bark pockets.
- Small pitch streak on resinous species.

The reverse side of an occasional piece may contain a shallow manufacturing mar.
151-d. **“D” INDUSTRIAL.** Pieces of this grade are recommended for use where excellent serviceability is required but appearance is not of primary importance.

Pieces may have one or more characteristics which are of such size or number that the piece is not of “C” grade. Pieces may contain characteristics which have no important effect on the utility of the piece such as:

- Stained wood.
- Occasional short splits.
- Medium seasoning checks, scattered.
- Limited pin holes.
- Medium torn or raised grain in scattered spots.
- Medium pitch streak.
- Hit and miss skips.
- Rough edges not more than 1/8" scant.
- Medium chip marks.
- Medium warp.
- Four knots approximately 1" or their equivalent smaller.
- Four medium pitch or bark pockets or their equivalent.
- Firm white specks, 1/4 of width or equivalent.
- Wane - 1/4 the thickness and 1/8 the width for 1/4 the length.
- A 3" cutout, 3' or more from either end of pieces 12' and longer, is permissible in 10% of the shipment.

Characteristics on reverse side may be slightly in excess of above.

All or nearly all of the permissible characteristics of the grade are never present in maximum size or number in any one piece. Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.
INDUSTRIAL CLEARS
ALL WEST COAST SPECIES
(EXCEPT CEDAR)
VG, FG, AND/OR MG 
Rough or Surfaced 
KD, AD or Unseasoned 
2-1/4" and Thicker, 3" and Wider

152. Industrial Clears, if ordered surfaced, and unless otherwise specified, are finished to the sizes shown in the tables, Para. 250. Bright sapwood is permitted without limit in all grades except “B & BTR” INDUSTRIAL. The restrictions on bright sapwood prescribed in the “B & BTR” INDUSTRIAL grade do not apply if the lumber is kiln dried or air dried or treated with anti-stain solution.

Grade descriptions are based on a piece 8" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. In determining the grade of pieces of these thicknesses, the upper half of the edges is considered a part of the face; the lower half of the edges is considered a part of the reverse face. Characteristics on the reverse face may be slightly in excess of those allowed on the better face, but in no case are they more than one grade lower except as otherwise specified.

There are three grades of Industrial Clears: “B & BTR”, “C” and “D.”

In addition to the following specific provisions applicable to Industrial Clears, the appropriate provisions in all other paragraphs in the rules apply.

152-b. “B & BTR” INDUSTRIAL. Pieces of this grade are of sound wood and have an average of 6 or more rings of annual growth on either one end or the other. Pieces are entirely clear or have only a few minor and unimportant characteristics such as:

Bright sapwood - 1/3 width or equivalent in flat grain and 1/3 width or equivalent on both faces in vertical grain.

Short splits in not more than 5% of the pieces.

Four small seasoning checks.
Very light torn or raised grain.
Slope of grain not to exceed 1 in 8.
Three 4" pitch or bark pockets in 2-1/4" thickness to three 6" pockets in 4" and thicker stock.
Very light warp in occasional pieces.
Occasional light skips on reverse face.

152-c. “C” INDUSTRIAL. Pieces of this grade are of sound wood. Pieces may have one or more characteristics which are of such size or number that the piece is not of “B&BTR” grade.

Pieces may have:
- Sap stain, medium - 25% of face or greater area of lighter stain.
- Heart stain - firm.
- Short splits in not more than 5% of the pieces.
- Small seasoning checks, well scattered.
- Light torn or raised grain.
- Occasional very light skips on face, light skips on reverse side.
- Light warp in occasional pieces.

With the above, one of the following or its equivalent:
- Three sound, tight 1" knots in 2-1/4" thickness to three 2" in 12" thickness.
- Four 6" pitch or bark pockets or equivalent smaller.
  - In 4" and thicker stock, an occasional pocket may be 25% larger.
- Medium pitch streak.

The reverse side of an occasional piece may contain a shallow manufacturing mar.
152-d. "D" INDUSTRIAL. Pieces may have one or more characteristics which are of such size or number that the piece is not of “C” grade. Pieces may contain characteristics which have no important effect on the utility of the piece such as:

- Stained wood.
- Occasional short splits.
- Medium seasoning checks, scattered.
- Limited pin holes.
- Medium torn or raised grain.
- Medium pitch streak.
- Hit and miss skips.
- Medium warp.
- Four 1" knots in 2-1/4" thickness to four 2" in 12" thickness.
- Four 8" pitch or bark pockets or equivalent smaller.
  - An occasional pocket may be 25% larger.
- Firm white specks, 1/4 of width or equivalent.
- Wane - 1/4 the thickness, 1/8 the width for 1/4 the length.
- A 3" cutout 3’ or more from either end of pieces 12’ and longer is permissible in 10% of the shipment.

All or nearly all of the permissible characteristics of the grade are never present in maximum size or number in any one piece. Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.
There are three grades of Structural Tension Laminations. These grades are designated 302-24, 302-22, and 302-20.

The following general restrictions and limiting provisions apply to all grades and sizes of lumber used as individual laminations for structural glued laminated lumber.

Cross-section - a 1' length of a lamination shall be considered as a cross section.

Density - for Douglas fir, each piece shall meet the provisions for Dense. See Para. 204 (c) full length.

Specific gravity - pieces shall have near or above average specific gravity for the species. The minimum specific gravity adjusted to oven dry weight and volume at 12% moisture content basis shall be .45 for Douglas fir and .39 for Hem-Fir. For other species, see paragraph 200.

Moisture content - moisture content is subject to special agreement.

Knots - knots may be sound, unsound or not firmly fixed.

Knot measurement - a knot is measured by the area of the cross section it occupies.

Knot spacing - a knot of the permitted size may be anywhere on the faces.

Knot holes - knot holes are interchangeable with knots in size and spacing. Other holes permitted if no more damaging in effect than the allowable knot hole.

Splits and shakes - splits and shakes are permitted if extending from wide faces into the thickness at an angle of 45 degrees or more from the wide face.

Warp - crook or twist, light.
Torn grain - medium torn grain. Spots of heavy torn grain around knot areas or equivalent.

Heart stain - firm.

Compression wood - isolated streaks up to 5% of the cross section permitted when limits are clearly definable. Compression wood cumulative with other characteristics limited by displacement.

Checks - seasoning.

Pitch pockets - medium, scattered.

Pitch streaks - not exceeding 1/6 width.

Manufacture - shall be well manufactured.

Surfacing - edges may be hit or miss when ordered surfaced.

Wane - per purchaser’s specification. Limited on all edges to 1/6 of wide face.

In addition to the following specific provisions applicable to lumber for laminating purposes, the appropriate provisions of all other paragraphs in the rules apply.

153-a. 302-24 STRUCTURAL TENSION LAMINATION.

Characteristics and limiting provisions are:

Knots shall not occupy more than 1/5 of the cross section.

Maximum size single strength reducing characteristics when not in the same horizontal projection must be at least two feet apart measured center to center.

Any cross section shall have at least 2/3 clear wood free of strength reducing characteristics with a slope of grain no steeper than 1 in 16.

Knots plus associated localized cross grain, or localized cross grain not associated with a knot, or a combination of the two may occupy up to 1/3 of the cross section.

General slope of grain shall not exceed 1 in 16.

Wide ringed or light weight pith associated wood at the ends of the piece shall not exceed 1/8 of the cross section.
STRUCTURAL TENSION LAMINATIONS
ALL SPECIES

153-b. 302-22 STRUCTURAL TENSION LAMINATION.
Characteristics and limiting provisions are:

Knots shall not occupy more than 1/4 of the cross section.

Any cross section shall have at least 60% clear wood free of strength reducing characteristics with a slope of grain no steeper than 1 in 16.

Knots plus associated localized cross grain, or localized cross grain not associated with a knot, or a combination of the two may occupy up to 40% of the cross section.

General slope of grain shall not exceed 1 in 16.

Wide ringed or light weight pith associated wood at the ends of the piece shall not exceed 1/8 of the cross section.

153-c. 302-20 STRUCTURAL TENSION LAMINATION.
Characteristics and limiting provisions are:

Knots shall not occupy more than 1/4 of the cross section.

Any cross section shall have at least 50% clear wood free of strength reducing characteristics with a slope of grain no steeper than 1 in 12.

Knots plus associated localized cross grain, or localized cross grain not associated with a knot, or a combination of the two may occupy up to 1/2 of the cross section.

General slope of grain shall not exceed 1 in 12.

Wide ringed or light weight pith associated wood at the ends of the piece shall not exceed 1/8 of the cross section.

The following general restrictions and limiting provisions apply to all grades and sizes of lumber used as individual laminations for structural glued laminated lumber.

Moisture Content - Moisture content is subject to special agreement.

Knots - Knots may be sound, unsound or not firmly fixed.

Knot Measurement - A knot is measured by the area of the cross section it occupies.

Knot Spacing - A knot of the permitted size may be anywhere on the faces. Knots must be spaced in accordance with Para. 201.

Knot Holes - Knot holes are interchangeable with knots in size and spacing. Other holes permitted if no more damaging in effect than the allowable knot hole.

Splits and Shake - Splits and shake are permitted if extending from wide faces into the thickness at an angle of 45 degrees or more from the wide face.

Warp - Crook or twist, light.

Torn Grain - Medium torn grain. Spots of heavy torn grain around knot areas or equivalent.

Heart Stain - Firm.

Checks - Seasoning.

Pitch Pockets - Medium, scattered.

Pitch Streaks - Not exceeding 1/6 width.

Manufacture - Shall be well manufactured.

Surfacing - Edges may be hit or miss when ordered surfaced.
In addition to the following specific provisions applicable to lumber for laminating purposes, the appropriate provisions of all other paragraphs in the rules apply.

154-aa. “L1” LAMINATING STRUCTURAL LAMINATIONS.

Characteristics and limiting provisions are:

   Light stained sapwood.
   Dense grain in Douglas Fir. Medium grain for all other species.
   Basic slope of grain not to exceed 1 in 14 full length of piece.

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Knots, Sound Unsound, Loose Approximately</th>
<th>Nominal Width</th>
<th>Knots, Sound Unsound, Loose Approximately</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>7/8&quot;</td>
<td>10&quot;</td>
<td>2-3/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-3/8&quot;</td>
<td>12&quot;</td>
<td>2-7/8&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1-7/8&quot;</td>
<td>14&quot;</td>
<td>3-3/8&quot;</td>
</tr>
</tbody>
</table>

Spike and narrow face knots are permitted if judged to have no more effect on strength than other knots.

154-a. “L1-c” LAMINATING STRUCTURAL LAMINATIONS.

Characteristics and limiting provisions are:

   Light stained sapwood.
   Close grain.
   Basic slope of grain not to exceed 1 in 12 full length of piece.
   Knots conform to provisions of Para. 154-aa.

154-bb. “L2-d” DENSE LAMINATING STRUCTURAL LAMINATIONS.

Limited to Douglas Fir only. Conforms to all the provisions of Para. 154-b except that Dense material is required.
154-b. “L2” LAMINATING STRUCTURAL LAMINATIONS.

Characteristics and limiting provisions are:

Medium stained sapwood.

Medium grain.

Basic slope of grain not to exceed 1 in 12 full length of piece.

Wane per purchaser’s specifications.

Firm white specks. A combination of white speck and a knot in the same cross section shall occupy not more than 1/3 the width or equivalent.

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Knots, Sound Unsound, Loose Approximately</th>
<th>Nominal Width</th>
<th>Knots, Sound Unsound, Loose Approximately</th>
</tr>
</thead>
<tbody>
<tr>
<td>4”</td>
<td>1-1/8”</td>
<td>10”</td>
<td>3-1/8”</td>
</tr>
<tr>
<td>6”</td>
<td>1-7/8”</td>
<td>12”</td>
<td>3-3/4”</td>
</tr>
<tr>
<td>8”</td>
<td>2-3/8”</td>
<td>14”</td>
<td>4-3/8”</td>
</tr>
</tbody>
</table>

Spike and narrow face knots are permitted if judged to have no more effect on strength than other knots.

154-c. “L3” LAMINATING STRUCTURAL LAMINATIONS.

Characteristics and limiting provisions are:

Medium stained sapwood.

Medium grain.

Basic slope of grain not to exceed 1 in 8 full length of piece.

Wane per purchaser’s specifications.

Firm white specks. A combination of white speck and a knot in the same cross section shall occupy not more than 1/2 the width or equivalent.
### STRUCTURAL LAMINATIONS
**ALL SPECIES**

<table>
<thead>
<tr>
<th>Nominal Width</th>
<th>Knots, Sound Unsound, Loose Approximately</th>
<th>Nominal Width</th>
<th>Knots, Sound Unsound, Loose Approximately</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>1-3/4&quot;</td>
<td>10&quot;</td>
<td>4-5/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>2-3/4&quot;</td>
<td>12&quot;</td>
<td>5-5/8&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3-5/8&quot;</td>
<td>14&quot;</td>
<td>6-5/8&quot;</td>
</tr>
</tbody>
</table>

Spike and narrow face knots are permitted if judged to have no more effect on strength than other knots.
E-RATED STRUCTURAL LAMINATIONS
ALL SPECIES
2" Net, or Thinner, When Surfaced
3" and Wider

154-d. Conforms to all provisions for Paragraph 154 except for knot spacing. Knots, knot holes, burls, and distorted grain occurring at the edges of the wide faces shall be measured and limited in conformance with the Visual Grading Requirements of Paragraph 206-b, Mechanically Stress Rated Lumber. When specific gravity of the grade (based on oven-dry weight and volume at 12% moisture content) exceeds the value for the species average and is initially qualified by the Bureau and subsequently controlled by the mill as part of the daily quality control program, the higher specific gravity may be assigned to the grade. This grade qualified specific gravity may also be used to assign allowable design values for Fv and Fc in accordance with the provisions of paragraph 206. The ends of lumber not tested by the stress grading equipment shall be limited as follows:

Edge Knots - as limited above.

Non-Edge Knots - equal to the largest non-edge knots in the tested portion of the piece or the next larger edge knot, whichever is greater.

Cross-Section Knots - displacement of all knots in the same cross section must not exceed the size of the permitted non-edge knot.

Slope of Grain - the general slope of grain in the untested end portion shall not exceed:

<table>
<thead>
<tr>
<th>Slope</th>
<th>Edge Knot Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in 12</td>
<td>1/6 and smaller</td>
</tr>
<tr>
<td>1 in 10</td>
<td>&gt;1/6 to 1/4</td>
</tr>
<tr>
<td>1 in 8</td>
<td>&gt;1/4</td>
</tr>
</tbody>
</table>

All E-rated Structural Laminations shall be identified with a West Coast grade stamp containing mill identification, species, seasoning, and the E grade designation followed by the word LAM. The E designation shall be the average long span E of the grade as determined by qualification test and maintained by quality control.
E-RATED STRUCTURAL LAMINATIONS
ALL SPECIES

The grade stamp may also contain the applicable Machine Stress Rated grade in accordance with provisions of Paragraph 206.

MILL 10
2.3E LAM
2400 f 2.0E MSR
® H. FIR MC 15

MILL 10
2.3E LAM
® D.F. MC 15
FACTORY LUMBER
ALL WEST COAST SPECIES
(EXCEPT CEDAR)

155. Grades as described under FACTORY are valued for cutting qualities only and based on the percentage of cuttings.

Factory lumber is measured for the percentage of cuttings that can be obtained with the grade work carried to each cutting piece.

In Factory lumber 1-3/8" and thicker, which shows on both sides, the grade is determined from the poorer face and by the quantity of suitable cuttings obtained from each piece.

In addition to the following specific provisions applicable to Factory lumber, the appropriate provisions in all other paragraphs in the rules apply.

ONE-INCH SHOP

155-a. SIZES 1" SHOP

<table>
<thead>
<tr>
<th>Nominal Thickness Inches</th>
<th>Finished Thickness S2S Inches</th>
<th>Normal Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>cut full size</td>
<td>4&quot; and Wider</td>
</tr>
</tbody>
</table>

Lengths 4' and longer, not to exceed 25% 8' and shorter. Multiples of one foot.

155-b. SIZE AND GRADE OF CUTTINGS

(a) Cuttings 9-1/4" wide or wider and 18" or longer are clear on both sides - bright sap admitted.

(b) Cuttings 4" and wider or 5" and wider, 3' or longer have a face equal to B & BTR INDUSTRIAL CLEARS (except that any amount of bright sap is admitted). Panel stock cuttings are graded under (a) above and are full to width ordered.

155-c. SELECT SHOP. Each piece contains 70% or more of 9-1/4" wide or wider cuttings, 18" long or longer or 5" wide or wider, 3' long or longer of (a) or (b) cuttings or both.

155-d. NO. 1 SHOP. Each piece contains 50% to 70% of 9-1/4" wide or wider cuttings, 18" long or longer or 4" wide or wider, 3' long or longer of (a) or (b) cuttings or both.
FACTOR LUMBER
ALL WEST COAST SPECIES
(EXCEPT CEDAR)

155-c. NO. 2 SHOP. Each piece contains 33-1/3% to 50% of 9-1/4" wide or wider cuttings, 18" long or longer or 4" wide or wider, 3' long or longer of (a) or (b) cuttings or both.

155-f. NO. 3 SHOP. No. 3 shop is of factory lumber type admitting all pieces below the grade of No. 2 Shop that contains approximately 10% or more of mixed (a) and/or (b) cuttings and 30% or more of mixed sash cuttings or 50% of sash cuttings.

DOOR STOCK

156. SIZES 1-3/8" and THICKER.

<table>
<thead>
<tr>
<th>Nominal Thickness Inches</th>
<th>Finished Thickness S2S Inches</th>
<th>Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3/8&quot;</td>
<td>cut full size</td>
<td>1-5/32&quot;</td>
</tr>
<tr>
<td>1-5/8&quot;</td>
<td>cut full size</td>
<td>1-13/32&quot;</td>
</tr>
<tr>
<td>2&quot;</td>
<td>cut full size</td>
<td>1-25/32&quot;</td>
</tr>
<tr>
<td>2-1/2&quot;</td>
<td>cut full size</td>
<td>2-9/32&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>cut full size</td>
<td>2-3/4&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>cut full size</td>
<td>3-3/4&quot;</td>
</tr>
</tbody>
</table>

156-a. Rough 5" widths are not more than 1/8" scant in width when dry.

156-b. DOOR CUTTINGS. Stiles, for purposes of computing percentages of cuttings, are figured as 5" or 6" wide by 6'8" to 7'7" by odd inches in length, for 1-3/8" and 1-5/8" Shop; and 6'9" to 8'1" for 2" and thicker Shop.

Rails, 5", 6", 9", 10" or 12" in width, are figured in lengths from 23" to 37" in odd inches for 1-3/8" and 1-5/8" Shop and 25" to 47" for 2" and thicker Shop.

Muntins are 5" or 6" wide and from 3'6" to 4" in length.

In the following table, the board feet shown for each group of lengths is approximate and only for use by inspector when computing percentage of cuttings in a piece and is sufficiently accurate for all practical purposes:
FACTORY LUMBER  
ALL WEST COAST SPECIES  
(EXCEPT CEDAR)  

<table>
<thead>
<tr>
<th>STILES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot; WIDTHS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6'8&quot; to 6'10&quot;</td>
<td>2-3/4&quot;</td>
<td>7'7&quot; to 8'1&quot;</td>
</tr>
<tr>
<td>6'11&quot; to 7'6&quot;</td>
<td>3'</td>
<td></td>
</tr>
<tr>
<td>6&quot; WIDTHS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6'8&quot; — 3-1/4&quot;</td>
<td>7'4&quot; to 7'8&quot;</td>
<td>7'9&quot; to 8'1&quot;</td>
</tr>
<tr>
<td>6'9&quot; to 7'3&quot;</td>
<td>3-1/2&quot;</td>
<td></td>
</tr>
</tbody>
</table>

| BOTTOM RAILS     |                         |                |
| 9" WIDTHS       |                         |                |
| 1'11" to 2'2"   | 1-1/2'                  |                |
| 2'3" to 2'5"    | 1-3/4'                  |                |
| 2'6" to 2'10"   | 2'                      |                |
| 2'11" to 3'2"   | 2-1/4'                  |                |
| 10" WIDTHS      |                         |                |
| 1'11" — 1-1/2'  |                         | 2'11" to 3'1"  |
| 2'0" to 2'3"    |                         | 2-1/2'         |
| 2'4" to 2'6"    | 2'                      |                |
| 2'7" to 2'10"   | 2-1/4'                  |                |
| 12" WIDTHS      |                         |                |
| 1'11" to 2'1"   | 2'                      | 3'2" to 3'4"   |
| 2'2" to 2'4"    | 2-1/4'                  | 3'5" to 3'7"   |
| 2'5" to 2'7"    | 2-1/2'                  | 3'8" to 3'10"  |
| 2'8" to 2'10"   | 2-3/4'                  | 3'11" and 4'0" |
| 2'11" to 3'1"   | 3'                      |                |

| MUNTINS         |                         |                |
| 5" WIDTHS       |                         |                |
| 3'6" to 3'10"   | 1-1/2'                  | 3'11" and 4'0" |
| 6" WIDTHS       |                         |                |
| 3'6" to 3'9"    | 1-3/4'                  | 3'10" to 4'0"  |
| 3'10" to 4'0"   | 2'                      |                |

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FACTORY LUMBER
ALL WEST COAST SPECIES
(EXCEPT CEDAR)

TOP RAILS

<table>
<thead>
<tr>
<th>5&quot; WIDTHS</th>
<th>6&quot; WIDTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'11&quot; to 2'1&quot; — 3/4'</td>
<td>3'4&quot; to 3'10&quot; — 1-1/2'</td>
</tr>
<tr>
<td>2'2&quot; to 2'8&quot; — 1'</td>
<td>3'11&quot; and 4'0&quot; — 1-3/4'</td>
</tr>
<tr>
<td>2'9&quot; to 3'3&quot; — 1-1/4'</td>
<td></td>
</tr>
</tbody>
</table>

DOOR CUTTINGS

157. In determining the percentage of door cuttings in 1-3/8" and thicker stock, consideration is given to the fact that stock is to be ripped full length before crosscutting, in such manner as will yield the highest grade and largest percentage of door cuttings, except in such cases where stock will yield a higher value by first being crosscut for rails. In instances where stock is crosscut for rails and some of the stock so obtained contains stiles or muntins or top rails, which can be obtained by ripping this crosscut stock, the door cuttings so obtained are figured in when determining percentages. Where cutout knots occur, the computation of cuttings commences 1" from the nearest edge of knot. Imperfections, other than knots that will machine out, are permissible.

157-a. When 8" widths are ordered, the width of cuttings permitted in a grade is 7" to 8" instead of 5" to 6" for the purpose of computing percentages.

157-b. Three grades of Door Cuttings only are recognized: NO. 1, NO. 2 and NO. 3.

157-c. NO. 1 CUTTINGS have at least 8 annual growth rings per inch, excepting Sitka spruce. Slope of grain not to exceed 1 in 8. Will admit:
Light pink color.
Pitch or bark pocket - one small, not through.
FACTORY LUMBER
ALL WEST COAST SPECIES
(EXCEPT CEDAR)

157-d. NO. 2 CUTTINGS have at least 6 annual growth rings per inch, excepting Sitka spruce. Slope of grain not to exceed 1 in 8. Will admit:

Firm stained wood and one of the following:

(a) One small pocket, not through.
(b) Two small pockets, not through, in a stile, if located within 20" of the ends.
(c) One or more seasoning checks, none through, with a combined length of not more than 6".
(d) Very light torn grain (1/64") on one side of piece.
(e) Light pitch or pitch streaks that are not pronounced.

157-e. NO. 3 CUTTINGS will permit one of the following:

(a) One 6" pocket, not through, for each 20" of length or equivalent of seasoning checks.
(b) Medium pitch streaks.
(c) Firm stain, other than black.
(d) Light torn grain (1/32").

SASH CUTTINGS

157-f. SASH CUTTINGS contain at least 6 annual growth rings per inch and may have light pink color as well as very light (1/64") torn grain.

SASH CUTTINGS are 2-1/2", 3-1/2" and 4-1/2" wide by 28" and over in length.

157-g. FACTORY SELECT. Each piece contains 70% or more NO. 1 DOOR CUTTINGS.

Sizes and grades of cutting admissible in any combination are as follows:

5" and 6" Widths - Any number of No. 1 Stiles; one only No. 1 Top Rail; in pieces requiring three Stiles to get the necessary percentage of cuttings, one No. 2 Stile is allowed. Muntins are not permitted in this grade.
FACTORY LUMBER
ALL WEST COAST SPECIES
(EXCEPT CEDAR)

10" and 12" Widths - Any number of No. 1 Stiles, one No. 1 Top Rail and two only No. 1 Bottom Rails are allowed. In pieces requiring three Stiles to get the necessary percentage of cuttings, one No. 2 Stile is allowed. Muntins are not permitted in this grade.

157-h. NO. 1 SHOP. Each piece contains 50% to 70% of Door Cuttings.

Sizes and grades of cuttings admissible are any of the following or combination thereof:

(1) any number of No. 1 Stiles; (2) any number of No. 1 Rails 9", 10" and 12" wide; (3) two only No. 1 Muntins or No. 1 Top Rails; (4) one only No. 2 Stile allowed. Each 5" or 6" piece of this grade contains at least one Stile.

157-i. NO. 2 SHOP. Each piece contains not less than 25% No. 1 Door Cuttings, or 40% No. 2 Door Cuttings, or 60% No. 3 Door Cuttings, or 33 1/3% of No. 1 and No. 2 Door Cuttings combined. Any combination of Stiles, Rails or Muntins admissible except No. 1 Top Rails are figured as No. 2.

157-j. NO. 3 SHOP or SASH is of factory type lumber admitting all pieces below the grade of No. 2 Shop that contain approximately: 10% or more of mixed Door Cuttings and 30% or more of mixed Sash Cuttings, 50% of Sash Cuttings, or 40% No. 3 Door Cuttings.

158-a. CUT DOOR STOCK - KD. Cut to lengths and widths.

<table>
<thead>
<tr>
<th>Stiles</th>
<th>Bottom Rails</th>
<th>Top Rails</th>
<th>Muntins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Thicknesses Inches</td>
<td>1-3/8&quot;</td>
<td>2-5/8&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Finished Thicknesses, 2S2 - Inches</td>
<td>1-5/32&quot;</td>
<td>1-13/32&quot;</td>
<td>1-25/32&quot;</td>
</tr>
</tbody>
</table>
FACTORY LUMBER
ALL WEST COAST SPECIES
(EXCEPT CEDAR)

5" and 6" widths rough are not more than 1/8" scant in width when dry. Imperfections on faces and edges that will stick, tenon or sand out are permitted. Door stock shows on two sides, therefore the grade is determined from the poorer face.

STILES, RAILS, TOP RAILS, NARROW LOCK RAILS AND MUNTINS

158-b. NO. 1 - Will admit:

Torn grain - very light (1/64") and one of the following: (see Notes)

Pitch or bark pockets - one 3" not through thickness nor into edge.

NOTE: In Stiles, pocket located 35" or less from end of Stile.

NOTE: In top and narrow lock rails and muntins, no pockets admitted.

158-c. NO. 2 - Will admit:

Torn grain - very light (1/64") and one of the following or equivalent:

Seasoning checks - one or more with a combined length of not over 8".

Bark or pitch pockets - two 4", not through thickness nor into edge.

Pitch streak - small.

Stain - light, not over 50% of one side of piece.

158-d. NO. 3 - Will admit:

Torn grain - light (1/32") and one of the following or equivalent:

Seasoning checks - one or more with a combined length of not over 8".

Bark or pitch pockets - two, not over 6" in length.

Pitch - light.
FACTORY LUMBER
WESTERN RED CEDAR
SHOP

159. Factory lumber shall be measured for the percentage of cuttings which can be obtained from a piece of lumber by ripping or cross-cutting or both to obtain clear or virtually clear cuttings for use in joining or similar factory work.

DRESSED THICKNESSES

159-a. The following thicknesses shall be considered standard. All other thicknesses shall be considered special.

<table>
<thead>
<tr>
<th>Nominal Thickness Inches</th>
<th>Finished Thickness S2S Inches</th>
<th>Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; cut full size</td>
<td>25/32&quot;</td>
<td></td>
</tr>
<tr>
<td>1-3/8&quot; cut full size</td>
<td>1-5/32&quot;</td>
<td></td>
</tr>
<tr>
<td>1-5/8&quot; cut full size</td>
<td>1-13/32&quot;</td>
<td></td>
</tr>
<tr>
<td>2&quot; cut full size</td>
<td>1-25/32&quot;</td>
<td></td>
</tr>
<tr>
<td>2-1/2&quot; cut full size</td>
<td>2-9/32&quot;</td>
<td>Lengths 4&quot; and longer multiples of 1&quot; Not more than 25% 8&quot; and shorter</td>
</tr>
<tr>
<td>3&quot; cut full size</td>
<td>2-3/4&quot;</td>
<td></td>
</tr>
<tr>
<td>4&quot; cut full size</td>
<td>3-3/4&quot;</td>
<td></td>
</tr>
</tbody>
</table>

WIDTHS

Standard widths shall be 5" and wider, but permitting narrow widths if specified. Shop Lumber is usually shipped in random widths although specified widths may be supplied. Widths 6" and narrower shall not be more than 1/8" scant when dry; 8" and wider widths shall not be more than 1/4" scant when dry.

SIZE OF CUTTINGS

(a) 9-1/2" or wider, 18" or longer.
(b) 5" or wider, 3’ or longer.
(c) A strip 2" or wider the length of the piece, or 12’ or longer.
(d) Full width cuttings only in 2", 3" and 4”–3’ and longer.
159-b. **GRADE OF CUTTINGS**

No. 1 Cuttings in 1" and thicker stock shall be clear on both sides of the piece.

No. 2 Cuttings shall be the same size as No. 1, but will admit one of the following:

- Checks - 1 or more small, whose combined length does not exceed 8".
- Torn or raised grain - very light, on one side only.
- Knots - one, tight 5/8".

159-c. **“SELECT SHOP.”** Each piece contains 70% or more of No. 1 Cuttings.

159-d. **“NO. 1 SHOP.”** No. 1 Shop shall be cutting stock containing not less than 50% of No. 1 Cuttings, or not less than 70% of No. 1 and No. 2 Cuttings of which there shall be not less than 25% of No. 1 Cuttings in each piece.

159-e. **“NO. 2 SHOP.”** No. 2 Shop shall be cutting stock falling below No. 1 Shop and containing not less than 35% of No. 1 Cuttings, or not less than 55% of No. 2 Cuttings, or 45% of No. 1 and No. 2 Cuttings combined.

159-f. **“NO. 3 SHOP.”** No. 3 Shop shall be of cutting stock admitting all pieces below the grade of No. 2 Shop that contain approximately 25% of No. 1 Cuttings, or 45% of No. 2 Cuttings, or 35% of No. 1 and No. 2 Cuttings combined.
MOULDING STOCK
ALL WEST COAST SPECIES

161. This grade to consist of stock developed in the making of other standard grades, each piece to be a type suitable for ripping into strips one inch and wider, 10 feet and longer.

Each piece to contain not less than 2/3 of its area of such rips of the grade permissible in standard mouldings.

Up to 10% of stock 6' to 9' may be included, provided each piece contains 2/3 of its area or more of full length moulding rips.

Wane, stain, skips in dressing or other characteristics that will surface off in making mouldings of standard size are admissible in computing the percentage of obtainable rips.

In rough 4/4 Moulding Stock, up to 10% of the material may be less than 7/8" thick, provided 5/8" mouldings can be manufactured from the thinner stock.

Rough Moulding Stock 5/4" and thicker shall be the same thickness as other grades of Clears as provided in Para. 250 with reference to the table of surfaced sizes shown in Para. 250-e.

Moulding Stock thinner than these minimums shall be included and tallied as of the next lower thickness.

Excessive waste caused by massed pitch, shake, rot or wane due to improper trimming or edging, which creates a total loss of 10% or more of the area of the piece to the nearest square foot, shall be scaled off and such scale-off shall be marked on the piece.

162. Moulding grade description is based on a piece 1"x 2"-12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. Standard lengths of Mouldings are 3' to 16' or longer in multiples of one foot with not over 15% under 8' in any one item. Each length under 8' is bundled separately.

There is only one grade of Mouldings: “MOULDINGS.”

In addition to the following specific provisions applicable to Mouldings, the appropriate provisions in all other paragraphs in the rules apply.
**162-a. “MOULDINGS.”** Mouldings of this grade are of sound wood and pieces are entirely clear or have only a few minor and unimportant characteristics, such as:

- Medium stained wood, if otherwise high line.
- Light torn or raised grain.
- A short seasoning check.
- Some pieces may have, in addition to the above, one of the following or its equivalent:
  - A small pitch streak. Two small pitch or bark pockets.
  - Two pin knots or one small knot.
- Characteristics that will not show when the piece is laid are not given the same consideration as characteristics elsewhere.

  Not more than 10% of the pieces in an item may have one cutout: any characteristic not larger than 4" at least 3' from either end which can be trimmed out of the piece is admissible if otherwise high line in random length shipments.

  Stop patterns 7' in length shall be considered long lengths when figuring percentage of shorts.

  The above paragraphs will apply to all finger-joint shipments. Patching and/or filling is allowed in fingerjoint Mouldings if same produces a good paintable surface.
LADDER AND POLE STOCK
DOUGLAS FIR, WESTERN HEMLOCK
(HEM-FIR) AND SITKA SPRUCE
ROUGH OR SURFACED

163. Ladder and Pole Stock is well manufactured to the sizes ordered.

There is only one grade of Ladder and Pole Stock: “LADDER and POLE STOCK.” The grade description is based on a piece 4" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

Lumber of this grade has not less than 6 annual rings per inch. The slope of grain may not exceed 1 in 15 except that 15% may have a slope of grain not to exceed 1 in 12.

In addition to the following specific provisions applicable to Ladder and Pole Stock, the appropriate provisions in all other paragraphs in the rules apply.

163-a. “LADDER and POLE STOCK.” Most pieces of this grade are entirely clear or have only minor and unimportant characteristics such as:

Three very small pitch or bark pockets.
Burls - not over 1/4" in diameter.
Very light torn or raised grain.

**LADDER SIZES**

<table>
<thead>
<tr>
<th>Thickness Nominal</th>
<th>Thickness Surfaced</th>
<th>Widths Nominal</th>
<th>Widths Surfaced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/4&quot; to 1-1/2&quot;</td>
<td>3/16&quot; off</td>
<td>2-1/2&quot; to 4&quot;</td>
<td>3/8&quot; off</td>
</tr>
<tr>
<td>1-5/8&quot; to 1-3/4&quot;</td>
<td>1/4&quot; off</td>
<td>over 4&quot;</td>
<td>1/2&quot; off</td>
</tr>
<tr>
<td>2&quot; to 4&quot;</td>
<td>3/8&quot; off</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ladder Rails are customarily furnished in Douglas fir, Western hemlock (Hem-Fir) and Sitka spruce as ordered, but when specified, any other West Coast species may be graded under these rules.

164. Ladder Rails are well manufactured to sizes ordered and are practically straight, permitting only very light crook or bow in occasional pieces. Limitations on compression wood in these grades apply to the type that
LADDER RAILS
SEASONED AND SURFaced FOUR SIDES

is readily identifiable by visual inspection. Ladder Rails are dried to a maximum of 15% moisture content. Grade descriptions are based on a piece 3" wide. The number of characteristics in wider or narrower pieces may vary accordingly.

There are three grades of Ladder Rails: “VG LADDER RAILS,” “FG or MG LADDER RAILS” and “LADDER RAIL STOCK.”

In addition to the following specific provisions for Ladder Rails, the appropriate provisions in all other paragraphs in the rules apply.

164-a. “VG LADDER RAILS.” Pieces of this grade are vertical grain and have an average rate of growth of 6 or more annual rings per inch. Slope of grain is limited to 1 in 12. Most pieces are entirely clear or have only minor or unimportant characteristics such as:

- Torn grain - very light.
- Burls - less than 1/2" in diameter.
- Seasoning checks - small, one in any 3 linear feet.
- Compression wood - a streak 1/2" wide or equivalent narrower streaks.
- Pitch or bark pockets - very small, one in any 3 linear feet.

164-b. “FG or MG LADDER RAILS.” Pieces of this grade may be Vertical, Flat or Mixed Grain at shipper’s option unless otherwise specified. Slope of grain is limited to 1 in 12 and the rate of growth averages 6 or more rings per inch. Most pieces are clear or have only minor or unimportant characteristics such as:

- Torn grain - very light.
- Burls - less than 1/2" in diameter.
- Seasoning checks - small, one in any 3 linear feet.
- Compression wood - a streak 1/2" wide or equivalent narrower streaks.
- Pitch or bark pockets - very small, one in any 3 linear feet.
LADDER RAILS

Pin knots, sound and tight, less than 1/2” in diameter and located 1/2” or more from the edges, are permitted on wide faces if not more frequent than one in any 3 linear feet.

164-c. “LADDER RAIL STOCK” (VG, FG or MG)

Pieces of this grade have one or more characteristics which are of size or number that the pieces are not of the “LADDER RAIL” grade, but are suitable for use in shorter components.

Characteristics and limiting provisions are:

- Torn grain - light.
- Very light skips on occasional pieces.
- Seasoning checks - two small (6”) in any 3 linear feet.
- Splits - short in 5% of the pieces.
- Stained wood - firm, medium.
- Slope of grain - 1 in 10.
- Compression wood - narrow streaks, with the aggregate not to exceed 1/4 the volume of the piece.
- Burts - less than 1/2” in diameter.
- Pitch or bark pockets - small, one in any 3 linear feet.
- Pin knots, sound and tight, less than 1/2” in diameter and located 1/2” or more from the edges are permitted on wide faces if not more frequent than one in any 3 linear feet.

A 3” cutout is permissible in 10% of the shipment if the resultant pieces are 3’ long or longer and meet the provisions of “LADDER RAIL STOCK.”

All or nearly all of the permissible characteristics of the grade are never present in maximum size or number in any one piece. Any piece with an unusual combination of characteristics which seriously affects normal serviceability is excluded from the grade.
167. Tank Stock is well manufactured to full sizes ordered. Edges do not contain characteristics that will prevent a watertight joint when worked. The slope of grain is not more than 1 in 8. Pieces average 8 or more annual growth rings per inch at either one end or the other.

No sapwood is permitted in any thickness.

There are two grades of Tank Stock: “UNDER FOUR INCH” and “FOUR INCH and THICKER.”

Grade descriptions are based on a piece 6” wide and 12’ long, FG and/or VG. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

In addition to the following specific provisions applicable to Tank Stock, the appropriate provisions in all other paragraphs in the rules apply.

167-a. “UNDER FOUR INCH” - TANK STOCK. Most pieces of this grade are entirely clear or have only a few minor and unimportant characteristics, such as:

   Medium seasoning checks, none through.
   Two small pitch or bark pockets, none through.
   Two small, sound, tight knots, none through.
   One additional pocket and/or knot for each two additional inches in width.

167-b. “FOUR INCH and THICKER” - TANK STOCK. Pieces of this size may have a few characteristics which do not affect utility, such as:

   Medium seasoning checks, none through.
   Three medium pitch or bark pockets, none through.
   Three sound, tight knots, 1” in 4” thickness to four 2” in 12” thickness.
   One additional pocket and/or knot for each two additional inches in width.
TANK STOCK
DOUGLAS FIR AND WESTERN RED CEDAR

Reverse side and corresponding half of narrow face may have:

Four sound, tight knots, 1" in size in 4" thickness
to three 2" in 12" thickness. Through knots are
intergrown on one face.

Four medium pitch or bark pockets, none through.

PIPE STAVE STOCK
DOUGLAS FIR

168. Douglas fir Pipe Stave Stock is well manufactured to
full sizes ordered. Edges do not contain characteristics that
will prevent a watertight joint when worked.

There is only one grade of Pipe Stave Stock: “PIPE
STAVE STOCK.”

Grade descriptions are based on a piece 2" by 6" by
12', FG and/or VG. The number of characteristics
in larger or smaller pieces may vary in proportion
to the size of the piece.

In addition to the following specific provisions
applicable to Pipe Stave Stock, the appropriate
provisions in all other paragraphs in the rules
apply.

168-a. “PIPE STAVE STOCK.” Pieces may have a
few minor and unimportant characteristics such as:

Bright sapwood for not more than one-half the
thickness from the inside of the piece.

Sound, tight 1" knots, none through.

Small pitch pockets, none through.
TRANSMISSION CROSSARMS,
PLANKS AND TIMBERS
DOUGLAS FIR
3" to 8" Thick
6" and Wider

169. There is only one grade of Transmission Crossarms, Planks and Timbers: “SELECT STRUCTURAL.”

169-a. “SELECT STRUCTURAL” - TRANSMISSION CROSSARMS, PLANKS and TIMBERS.

Characteristics and limiting provisions are:

Stained sapwood.

FOHC (side cut) as specified in Para. 714-c.

Warp - 1/2" per 10' of length permitted.

Very short splits.

Seasoning checks 1/4 the thickness of piece if not opposite each other; if opposite, combinations equal to above depth.

Medium torn grain.

Close grain as specified in Para. 204-b.

Slope of grain, spiral or diagonal, as specified in Para. 203:

Plank sizes (3" and 4" thickness):
  1 in 12 full length of piece.

Timber sizes (5" and thicker):
  1 in 15 in center 2/3 of length.
  1 in 12 at ends.

Skips in dressing - light if not opposite each other.

Medium pitch pockets.

Medium pitch streaks.

Wane approximately 1/16 of any face.

Knot holes and/or tool cuts approximately 1/2" in 4" to 6" widths; 3/4" in 8" and wider.

Knots, sound, tight and well spaced if not in clusters.
  When two or more knots on a face occur in the same cross section (opposite each other), the sum of the diameters shall not exceed the size of the maximum size knot permitted.
ALLOWABLE KNOT SIZES
Dimension Sizes: (3" and 4" Planks only)

<table>
<thead>
<tr>
<th>Nominal Width of Face</th>
<th>On Narrow Face</th>
<th>At Edge of Wide Face, Middle 1/2 of Length</th>
<th>Elsewhere</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>5/8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>3/4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td></td>
<td>1&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td></td>
<td>1-3/8&quot;</td>
<td>1-7/8&quot;</td>
</tr>
<tr>
<td>9&quot;</td>
<td></td>
<td>1-3/4&quot;</td>
<td>2-1/4&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td></td>
<td>1-3/4&quot;</td>
<td>2-1/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td></td>
<td>2&quot;</td>
<td>2-1/2&quot;</td>
</tr>
</tbody>
</table>

Timber Sizes: (5" and thicker only)

<table>
<thead>
<tr>
<th>Nominal Width of Face</th>
<th>On Narrow Face Full Length</th>
<th>At Edge of Wide Face, Middle 1/2 of Length</th>
<th>Elsewhere</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot;</td>
<td></td>
<td>1&quot;</td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td></td>
<td>1-1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td></td>
<td>1-1/2&quot;</td>
<td>1-7/8&quot;</td>
</tr>
<tr>
<td>9&quot;</td>
<td></td>
<td></td>
<td>2-1/4&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td></td>
<td></td>
<td>2-1/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td></td>
<td></td>
<td>2-1/2&quot;</td>
</tr>
</tbody>
</table>

Increase in knot sizes:

The size of knots specified at the edge of the wide face in the middle 1/2 of the length may increase proportionately toward the center of the width of the piece and toward the ends to the size permitted along the center line of the wide face.

Measurement of knots:

General – The sum of the diameters of all knots in any 6" of length must not exceed twice the diameter of the largest knot permitted. More than one knot of maximum permissible size must not be in the same 6" of length.
Method of Measurement – Knots extending from narrow faces to the adjacent 1/4 width of the wide faces are measured on the wide face only. If extending past the adjacent 1/4 the width of the wide face, the knot is measured both on the narrow face and the wide face. All knots to be measured on the least dimension of the knot.

CROSSARMS, DOUGLAS FIR AND WESTERN HEMLOCK (HEM-FIR)
ROUGH OR SURFACED

170. Rough stock must be sawn full to sizes ordered, free of heart centers (FOHC) and close grain. Grade descriptions are based on 3"x4" to 4"x6" by 8' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. The best narrow face shall be considered the top of the arm.

There is only one grade of Crossarms:
“CROSSARMS.”

In addition to the following specific provisions applicable to “CROSSARMS,” the appropriate provisions in all other paragraphs in the rules apply.

170-a. “CROSSARMS.”

Characteristics and limiting provisions are:

Crook or bow - 1/2".
Medium stained sapwood.
Seasoning checks - small on top of arm, medium on other faces.
Pin holes - scattered, 10% of girth.
Medium torn grain.
Slope of grain limited to 1 in 12 except that 20% of the pieces may have a slope of grain not to exceed 1 in 10.
Medium pitch streak.
Skips - one light or equivalent very light.
Knots - pin knots - 3/8" or less not considered.
CROSSARMS, DOUGLAS FIR AND WESTERN HEMLOCK (HEM-FIR)

Top of arm - two 3/4" knots or equivalent smaller, well spaced.
Other faces - four 1" knots or equivalent smaller, well spaced.
Occasional pieces may have one additional knot, and knots may be 25% larger.
Pitch or bark pockets.
Top of arm - two small or equivalent smaller.
Other faces - three medium or equivalent smaller.
Wane - 1" on rough, 1/2" on S4S, measured across corner.
Minor surface characteristics equivalent to 1/3 the size of knots are permitted.
Cutouts - an occasional piece 18' or longer may contain one large characteristic which can be removed by crosscutting. The shortest piece of Crossarms grade will be 8' or longer. Limit of waste is 2 lineal feet.
Sitka spruce, Western hemlock, and HEM-FIR may also be graded under these rules. Appropriate stress values are provided in Para. 200.

**171.** Douglas fir Scaffold Plank is well manufactured. The grade is determined from the poorer face. On wide faces, the average of the maximum and minimum dimensions of the end section of a knot shall be used in measuring the size except that knots located at the edges of wide faces and spiked across the adjacent narrow face are measured between lines parallel to the edge on the wide face. Pieces are FOHC (side cut).

There are two grades of Scaffold Plank: “PREMIUM” and “SELECT STRUCTURAL.”

In addition to the following specific provisions applicable to Scaffold Plank, the appropriate provisions in all other paragraphs in the rules apply.

For stress values, see Table 8, Para. 200.

**171-aa. “DENSE PREMIUM” - SCAFFOLD PLANK** (Douglas fir only). Conforms to all the provisions of Para. 171-a with the additional requirement of density as defined in Para. 204-c.

**171-a. “PREMIUM” - SCAFFOLD PLANK.**

Characteristics and limiting provisions are:

- Very short splits.
- Surface seasoning checks. If through at ends, equivalent to splits.
- Close grain.
- Slope of grain not more than 1 in 15.
- Small pitch pockets, well scattered.
- Small pitch streaks.
- Medium stained sapwood.
Knots, sound, tight and well spaced, are permitted in the following approximate sizes:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>9&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1-1/2&quot;</td>
</tr>
</tbody>
</table>

Knots occurring within 1/4 the width from the edge on wide faces and extending into the adjacent narrow face are considered as wide face knots. Otherwise, knots showing on narrow faces are not permitted.

171-bb. “DENSE SELECT STRUCTURAL” - SCAFFOLD PLANK (Douglas fir only). Conforms to all the requirements of Para. 171-b. with the additional requirement of density as defined in Para. 204-c.

171-b. “SELECT STRUCTURAL” - SCAFFOLD PLANK.

Characteristics and limiting provisions are:

- Very short splits.
- Surface seasoning checks. If through at ends, equivalent to splits.
- Close grain.
- Slope of grain not more than 1 in 12.
- For nominal 2" scaffold surfaced to standard ALS sizes, slope of grain cannot be more than 1 in 14.
- Medium pitch pockets.
- Medium pitch streaks.
- Medium stained sapwood.
Knots, sound, tight and well spaced, may be present in the following approximate sizes:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>1-5/8&quot;</td>
</tr>
<tr>
<td>9&quot;</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>1-7/8&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2-3/8&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>2-5/8&quot;</td>
</tr>
</tbody>
</table>

Knots on narrow faces are permitted if displacing no more of the cross section than knots permitted on wide faces. Knots spiked across the width are not permitted.

Chipped or sloughed knots on a wide face extending into or across a narrow face are permitted if not larger than 1" in size and if not through the thickness. One wide face must be free of holes on the corners.
STADIUM PLANKS
ALL WEST COAST SPECIES
ROUGH OR SURFACED
1-1/4" to 3" Thick, 4" and Wider

172. Lumber of this grade is recommended and widely used for outdoor seating and walkway boards for bleachers and stadiums.

It is recommended that Stadium Planks furnished in resinous species such as Douglas fir and Sitka spruce be kiln dried. Temperatures used in kiln schedules should be sufficient to set the pitch, preventing any bleeding of resin in use.

Stadium Planks are well manufactured and are FOHC.

Except for characteristics affecting strength, the grade is determined from the best face and best edge; the reverse side and edge may contain characteristics as noted.

Wood plugs and fillers as described in Para. 736 are permitted.

For flatwise bending values, see Table 9, Para. 200.

There is only one grade of Stadium Planks: “STADIUM PLANKS.”

172-a. “STADIUM PLANKS.”

Characteristics and limiting provisions are:

- Short splits.
- Medium stained sapwood. Heart stain firm.
- Medium seasoning checks. If through at ends, limit as splits.
- Medium torn or raised grain.
- Medium grain.
- Slope of grain not to exceed 1 in 10 (1 in 14 if specified).
- Medium bark or pitch pockets.
- Small pitch streak.
- Warp - light.

Knots, sound, tight and well spaced, are limited to the following approximate sizes:
STADIUM PLANKS
ALL WEST COAST SPECIES

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>12&quot; and wider</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

Knots on narrow faces and spike knots are permitted if displacing no more of the cross section than knots specified on wide faces.

One wide face and edge must be free of holes, skip and wane; the other face and edge may contain sloughed knots if not through, wane 1" wide and 1/2 the thickness, hit and miss skips, large seasoning checks and pockets, heavy torn or raised grain.

Under these rules, “STADIUM PLANKS” are not grade stamped. Certificates of inspection will be furnished on request, clearly stating the conditions of seasoning and the limitation applied on slope of grain.
Douglas fir Barge Framing, Planking and Decking are well manufactured and square edged.

There are two grades of Barge Framing, Planking and Decking: “BARGE FRAMING” and “BARGE PLANKING and DECKING.”

Where stock is run with caulking seam, caulking stock is beveled 3/32” by a depth of 1/3 thickness of piece, thus providing for a caulking seam of 3/16”, unless otherwise specified.

In addition to the following specific provisions applicable to Barge Framing and Barge Planking and Decking, the appropriate provisions in all other paragraphs in the rules apply.

173-a. “BARGE FRAMING.”

Characteristics and limiting provisions are:

Seasoning checks.

Medium pitch pockets.

Bright sapwood limited to approximately 1/4 the width and not to exceed 1/4 the thickness.

Knots, sound, tight, approximately:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>3-1/2&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>Over 16&quot;</td>
<td>4-1/2&quot;</td>
</tr>
</tbody>
</table>

Knots extending into caulking seam are intergrown on one surface of the piece.
173-b. “BARGE PLANKING and DECKING.” 4"
and less in thickness is FOHC (side cut).

Characteristics and limiting provisions are:

- Seasoning checks.
- Medium pitch pockets.
- Bright sapwood limited to approximately 1/4 the width and not to exceed 1/4 the thickness. Knots, sound, tight, approximately:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>12&quot; and wider</td>
<td>2-1/2&quot;</td>
</tr>
</tbody>
</table>

Knots extending into caulking seam are intergrown on one surface of the piece.
SHIP DECKING
DOUGLAS FIR

175. Douglas fir Ship Decking is full sawn and free from knots on face and upper half of edges. Flat sizes are VG on broad face.

Grade descriptions are based on a piece 4” wide. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

There are two grades of Ship Decking: “SHIP DECKING” and “C SHIP DECKING.”

In addition to the following specific provisions applicable to Ship Decking, the appropriate provisions in all other paragraphs in the rules apply.

175-a. “SHIP DECKING.”
Characteristics and limiting provisions are:

- Slope of grain not more than 1 in 10.
- One pitch pocket not to exceed 3” in length for each 12 lineal feet.
- Bright sapwood on face side, 1/4 the width or equivalent and 1/2 the thickness on narrow face.
- Reverse side and lower half of edges may have:
  - Sound, tight knots - 1” or less in diameter, and/or small pitch pockets.

175-b. “C SHIP DECKING.”
Characteristics and limiting provisions are:

- Three small pitch pockets to each 12 lineal feet.
- Bright sapwood approximately 1/3 width on either or both faces.
- Reverse side and lower half of edges may have:
  - Sound, tight knots - 1-1/2” or less in diameter, and/or small to medium pitch pockets.

Up to 20% of the pieces 20’ or longer in a shipment may contain one cutout which can be eliminated by wasting not more than 5% of the length of such piece with resulting pieces being 8’ or longer.
MARGIN PLANK
DOUGLAS FIR

176. Douglas fir Margin Plank is full sawn and free from knots on wide face and corresponding half of thickness of narrow faces. Pieces are VG for at least 70% of width of face.

The grade description is based on a piece 8" wide and 12' long.

The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

There is only one grade of Margin Plank: “MARGIN PLANK.”

In addition to the following specific provisions applicable to Margin Plank, the appropriate provisions in all other paragraphs in the rules apply.

176-a. “MARGIN PLANK.”
Characteristics and limiting provisions are:

- Slope of grain not more than 1 in 10.
- Two small pitch pockets.
- Bright sapwood approximately 1/4 width of face and corresponding 1/2 the thickness of narrow face.
- Reverse side and corresponding half of thickness of narrow faces may have:
  - Knots - 1" or less in diameter and/or medium pitch pockets.

SHIP PLANK
DOUGLAS FIR
ROUGH

177. Douglas fir Ship Plank is used for outboard planking, garboards, wales, clamps, rails and similar purposes. Pieces 4" and less in thickness are FOHC (side cut).

There is only one grade of Ship Plank: “SHIP PLANK.”

In addition to the following specific provisions applicable to Ship Plank, the appropriate provisions in all other paragraphs in the rules apply.
177-a. “SHIP PLANK.”
Characteristics and limiting provisions are:

- Small pitch pockets not extending through the piece.
- Small, sound, tight knots not extending into caulking seam edge.
- Bright sapwood on face side, 1/4 width or its equivalent and 1/2 the thickness.

Characteristics are considered in connection with size and length of piece and its quality otherwise.

**MAST, SPAR AND BOAT LUMBER**

**SITKA SPRUCE**

178. Sitka spruce Mast, Spar and Boat Lumber, FG and/or VG, is well manufactured and FOHC. The grade description is based on a piece 8" wide and 12' long. Averages not less than five rings of annual growth to the inch on either one end or the other of the piece. Slope of grain not to exceed 1 in 10.

In addition to the following specific provisions applicable to Mast, Spar and Boat Lumber, the appropriate provisions in all other paragraphs in the rules apply.

178-a. “ONE TO TWO INCH.”
Characteristics and limiting provisions are:

- Four small seasoning checks.
- Three very small pitch pockets.
- Bright sapwood 1/3 width or equivalent in flat grain, and 1/3 width on both faces in vertical grain or equivalent.
- Short splits in not more than 5% of the pieces.

And on reverse side:

- Four small pitch pockets or equivalent slightly larger.
- Two small knots or equivalent pin knots.
178-b. TWO AND ONE-FOURTH INCH AND THICKER. Characteristics and limiting provisions on wide face and corresponding half of narrow faces are the following or equivalent:

Six small seasoning checks in 2-1/4" thickness to six medium in 6" and thicker.

Three small pitch pockets in 2-1/4" thickness to four in 4" and thicker.

Bright sapwood 1/3 width or equivalent in flat grain and 1/3 width on both faces in vertical grain or equivalent.

Short splits in not more than 5% of pieces.

And on reverse side and corresponding half of narrow faces:

Three 1" knots in 2-1/4" thickness to three 2" knots in 12" thickness.

Four medium pitch pockets.
182. In sizes 4" or less in thickness, round or oval knots on wide faces are measured on the least dimension of the end section of the knot. Narrow face knots are permitted if displacing no more of the cross section than knots permitted on wide faces. Spike knots are permitted if judged to have no more effect than other knots. In sizes 5" and thicker, knots are measured as illustrated in Para. 201-c and 201-d.

182-a. “SELECT STRUCTURAL” - FRAMING and TIMBERS. Are of sound wood and free of wane. Characteristics and limiting provisions are:

- Medium stained sapwood, approximately 25% of face.
- Seasoning checks.
- Medium torn grain.
- Close grain.
- Slope of grain not more than 1 in 15.
- Occasional light skips, not opposite each other.
- Medium pitch pockets.

Knots, sound and tight, not in clusters, approximately:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Over 12&quot;</td>
<td>2-1/2&quot;</td>
</tr>
</tbody>
</table>
182-b. “SELECTED” - FRAMING and TIMBERS.

Are of sound wood and free of wane. Pieces of this grade may have characteristics such as:

- Medium stained sapwood, 25% of face.
- Seasoning checks.
- Medium torn grain.
- Occasional light skips, not opposite each other.
- Medium pitch pockets.

Knots, sound and tight, not in clusters, approximately:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Over 12&quot;</td>
<td>2-1/2&quot;</td>
</tr>
</tbody>
</table>

182-c. “NO. 1” - FRAMING and TIMBERS. Are of sound wood. Pieces of this grade may have characteristics such as:

- Medium stained sapwood. Heart stain firm.
- Seasoning checks.
- Torn grain.
- Occasional light skips, not opposite each other.
- Short splits.
- Pitch pockets.
- Slight wane.
Knots, sound and tight, not in clusters, approximately:

<table>
<thead>
<tr>
<th>Face Width</th>
<th>Knot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3”</td>
<td>1-1/2”</td>
</tr>
<tr>
<td>4”</td>
<td>1-1/2”</td>
</tr>
<tr>
<td>6”</td>
<td>1-3/4”</td>
</tr>
<tr>
<td>8”</td>
<td>2”</td>
</tr>
<tr>
<td>10”</td>
<td>2-1/2”</td>
</tr>
<tr>
<td>12”</td>
<td>3”</td>
</tr>
<tr>
<td>Over 12”</td>
<td>3-1/2”</td>
</tr>
</tbody>
</table>
CAR DECKING
DOUGLAS FIR
ROUGH OR SURFACED
1-1/2" to 4" Thick
4" to 12" Wide

183. Douglas fir Car Decking is well manufactured. Surfaced sizes and patterns are subject to special contract.

Grade descriptions are based on a piece 1-1/2" by 6" by 9'. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

There are four grades of Car Decking: “B&BTR”, “C”, “SELECTED” and “NO. 1.”

In addition to the following specific provisions applicable to Car Decking, the appropriate provisions in all other paragraphs in the rules apply.

183-b. “B & BTR” CAR DECKING, VG or FG. If specified VG, angle of grain is not more than 45 degrees from vertical.

Pieces of this grade may have characteristics such as:
- Light stained wood.
- Light torn grain.
- With the above, one of the following or its equivalent:
  - Three small seasoning checks, none through.
  - Three small pitch pockets or one medium, none through.
- Occasional light skips on back if specified S2S.

183-c. “C” CAR DECKING, VG or FG. If specified VG, angle of grain is not more than 45 degrees from vertical.

Pieces of this grade may have characteristics such as:
- Medium stained wood. Heart stain firm.
- Medium torn grain.
- Very light skips.

With the above, one of the following or its equivalent:
- Small seasoning checks or a few 8" checks, none through.
Five small pitch pockets or equivalent larger, none through.
Four small, sound, intergrown knots.
Occasional light skips on back if specified S2S.

183-d. “SELECTED” (grain tight) CAR DECKING, see Para. 713.

Pieces of this grade may have characteristics such as:
- Stained wood.
- Seasoning checks.
- Medium torn grain.
- Very light skips.
- Medium pitch pockets, none through.
- Sound, intergrown knots, approximately 1/4 the width of piece.
- Occasional light skips on back if specified S2S.

183-e. “NO. 1” CAR DECKING.

Pieces of this grade may have characteristics such as:
- Stained wood.
- Seasoning checks.
- Heavy torn grain.
- Very light skips.
- Large pitch pockets, none through.
- Sound and tight knots approximately 1/3 width
CAR FRAMING
DOUGLAS FIR
1" to 2" Thick
VG and/or FG

of piece.
Occasional light skips on back if specified S2S.

184. If specified VG, angle of grain is not more than 45 degrees from vertical.

If Air Dried or Kiln Dried must be so specified.

Grade descriptions are based on a piece 6" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

There are two grades of 1" and 2" thick Car Framing: “B&BTR” and “C.”

In addition to the following specific provisions applicable to Car Framing, the appropriate provisions in all other paragraphs in the rules apply.

184-b. “B & BTR” CAR FRAMING.

Pieces of this grade may have characteristics such as:

Bright sapwood 1/3 the width of face in unseasoned stock.

Very light torn grain.

With the above, one of the following or its equivalent:
Three small seasoning checks.
Three small pitch pockets, none through.
Three sound, intergrown pin knots.
Occasional light skips on back if specified S2S.

184-c. “C” CAR FRAMING.

Pieces of this grade may have characteristics such as:

Medium stained wood, 25% of face.

Light torn grain.

With the above, one of the following or its equivalent:
Small seasoning checks.
Five small pitch pockets or equivalent slightly larger.
CAR FRAMING
DOUGLAS FIR
2-1/2" and Thicker
VG and/or FG

Small pitch streak.
Three sound and tight 1" knots or equivalent pin knots.
Occasional light skips on back if specified S2S.

185. If specified VG, angle of grain is not more than 45 degrees from vertical.
If Air Dried or Kiln Dried must be so specified.
Grade descriptions are based on a piece 6" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

There are two grades of 2-1/2" and thicker Car Framing: “B&BTR” and “C.”

In addition to the following specific provisions applicable to Car Framing, the appropriate provisions in all other paragraphs apply.

185-b. “B & BTR” CAR FRAMING.
Pieces of this grade may have characteristics such as:
Bright sapwood 1/3 the width of face in unseasoned stock.
Light torn grain.
With the above will admit on face and adjacent half of edges one of the following or equivalent:
Three small seasoning checks.
Three 6” pitch pockets or equivalent smaller, none through.
Three small, sound and tight knots.
Occasional light skips on back if specified S2S.

185-c. “C” CAR FRAMING.
Pieces of this grade may have characteristics such as:
Medium stained wood, 25% of face.
Light torn grain.
With the above will admit on face and adjacent half of
edges one of the following or equivalent:

- Small seasoning checks.
- Five 6” pitch pockets or equivalent smaller.
- Medium pitch streak.
- Three medium sound and tight knots or equivalent smaller knots.
- Occasional light skips on back if specified S2S.

**CAR LINING**

**DOUGLAS FIR**

**VG and/or FG**

186. If specified VG, angle of grain is not more than 45 degrees from vertical.

If Air Dried or Kiln Dried must be so specified.

Grade descriptions are based on a piece 4" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

There are three grades of Car Lining: “B&BTR”, “C” and “SELECTED.”

In addition to the following specific provisions applicable to Car Lining, the appropriate provisions in all other paragraphs of the rules apply.

186-b. “B & BTR” CAR LINING, VG or FG.

Pieces of this grade may have characteristics such as:
CAR LINING
DOUGLAS FIR
VG and/or FG

Light stained wood.
Very light torn or raised grain.
Warp - light.

With the above, one of the following or its equivalent:
Four small seasoning checks, none through.
Four small pitch or bark pockets, none through.
Three sound, intergrown pin knots.
Occasional light skips on back if specified S2S.

186-c. “C” CAR LINING, VG or FG.

Pieces of this grade may have characteristics such as:
Medium stained sapwood. Heart stain firm.
Medium torn or raised grain.
Very light skips.
Warp - light.

With the above, one of the following or its equivalent:
Small seasoning checks.
Five small to medium pitch or bark pockets, none open through.
Three small, sound intergrown knots or equivalent pin knots.
Occasional light skips on back if specified S2S.

186-d. “SELECTED” (grain tight) CAR LINING, see Para. 713.

Pieces of this grade may have the following characteristics or their equivalent:
Stained wood.
Seasoning checks.
Torn grain.
Very light skips.
Medium pitch or bark pocket, none open through.
Warp - light.
RUNNING BOARD
DOUGLAS FIR
VG and/or FG

Sound, intergrown knots approximately 1" in 4" widths and 1-1/2" in 6" widths.
Occasional light skips on back if specified S2S.

191. If specified VG, angle of grain is not more than 60 degrees from vertical.

Running Boards are usually shipped unseasoned. If Air Dried or Kiln Dried must be so specified.

Grade descriptions are based on a piece 6" wide and 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

Running Boards ordered SIS are graded from the rough face.

There are two grades of Running Boards: “B&BTR” and “C.”

In addition to the following specific provisions applicable to Running Boards, the appropriate provisions in all other paragraphs in the rules apply.

191-b. “B & BTR” RUNNING BOARDS, VG or FG.

Pieces of this grade may have characteristics such as:

- Sapwood - 25% of the face.
- With the above, one of the following or its equivalent:
  - Three small seasoning checks.
  - Three small pitch pockets.

191-c. “C” RUNNING BOARDS, VG or FG.

Pieces of this grade may have characteristics such as:

- Medium stained sapwood.
- With the above, one of the following or its equivalent:
  - Three small seasoning checks.
RAILROAD TIES
ALL WEST COAST SPECIES

Five small pitch pockets.
Three sound, tight 1" knots, if located away from edges.

192. Railroad Ties are of sound wood and are well manufactured.

There are three grades of Railroad Ties: “SELECT”, “NO. 1” and “NO. 2.”

In addition to the following specific provisions applicable to Railroad Ties, the appropriate provisions in all other paragraphs of the rules apply.

192-a. “SELECT” RAILROAD TIES. They are square edged. Pieces shall have not less than 6 annual rings per inch, on any radius from the pith, over the top 1/4 of the tie.

Pieces of this grade may have characteristics such as:
- Seasoning checks.
- Pitch pockets.
- Stained wood.
- Sound and tight knots, approximately 1/4 the width of face.
- Tolerance in size 1/8" under or 1/2" over.
- Tolerance in length 1" under or over.

192-b. “NO. 1” RAILROAD TIES.

Pieces of this grade may have characteristics such as:
- Stained wood.
- Seasoning checks.
- Pitch pockets.
- Wane which does not reduce face width more than 1" or equivalent.
RAILROAD TIES
ALL WEST COAST SPECIES

Sound, tight knots approximately 1/3 the width of face.
Tolerance in size 1/8" under or 1/2" over.
Tolerance in length 1" under or over.

192-c. “NO. 2” RAILROAD TIES. Pieces of this grade are free of decay and suitable for side track purposes and may have characteristics such as:

- Stained wood.
- Seasoning checks.
- Pitch pockets.
- Shake.
- Wane which does not reduce face width more than 2" or equivalent.
- Large knots.

Tolerance in size 1/2" under or over.
Tolerance in length 2" under or over.
STRESS GRADES

200. Allowable unit working stresses herein are for lumber of species and groups of species manufactured by mills located in the West Coast region. The West Coast region is covered by these rules. Species covered include both Western US Domestic soft wood species and species imported into the US. Design values for visually graded lumber are shown in Tables 5a through 11. Design values for Machine Stress Rated lumber are shown in Table 13.

Machine Stress Rated lumber is lumber which has been non-destructively evaluated and sorted by determining a physical or mechanical property. The design strength values are determined from known correlations between a physical or mechanical property, stiffness and strength and from certification and quality control testing programs.

The design values for visually graded lumber are divided into two categories, (1) Dimension Grades (Structural Light Framing, Light Framing, Structural Joist and Plank, and Stud) and (2) all other visual grades.

Design values for Fb, Ft, Fc, and MOE for the Dimension Grades are based on the analysis of test data of full size lumber specimens. The test data were sampled in accordance with ASTM D2915 (Standard Practice for Evaluating Allowable Properties for Grades of Structural Lumber), tested in accordance with ASTM D4761 (Standard Test Methods for Mechanical Properties of Lumber and Wood-Base Structural Material), and allowable properties derived from the test data in accordance with ASTM D1990 (Standard Practice for Establishing Allowable Properties for Visually Graded Dimension Lumber from In-Grade Tests of Full Size Specimens). Design values for Fv and Fc⊥ for the dimension grades are developed as for the other visual grades, and are described below.

The design values for the other visual grades listed in Tables 7 to 11 are based upon the latest studies of Western species and are calculated in accordance with ASTM Standard D2555 (Standard Methods for Establishing Clear Wood Strength Values), and ASTM Standard D245 (Standard Methods for Establishing Structural Grades for Visually Graded Lumber).
200-a. SPECIES COMBINATIONS. Administrative and marketing considerations often make it desirable to combine species into a single marketing group. In determining clear wood properties for combinations of species, equitable treatment for each species in the combination is assured by using a weighting factor based on the standing timber volume. The clear wood properties for the combination of species are the weighted averages of the included species with an additional limit to ensure that the properties for the group do not deviate significantly from the lowest species in the group. The following combinations of species and regions have been made for West Coast woods. Clear wood values for these combinations are determined in accordance with ASTM D2555.


Group 2. Pacific silver fir, Noble fir, Grand fir, California red fir and White fir.


Group 4. Western red cedar, Incense cedar, Alaska cedar and Port Orford cedar.


For Fb, Ft, Fc and MOE, groups 3 and 5 were grouped according to the procedures for grouping in ASTM D1990. In addition to the above groups clear wood values have been determined for individual species of Western hemlock, Sitka spruce and Mountain hemlock.

200-b. VARIABILITY. The various species of wood used structurally differ in their strength and stiffness properties. There is also a variability in the strength and stiffness of clear wood within each species, resulting from natural and normal differences in the growth of individual trees.
200-c. DESIGN VALUES.

DIMENSION GRADES

Tables 5 (a, b, c & d) and 6 (a, b, c, d & e) show the base design values for Dimension Grades of West Coast lumber. Base values must be multiplied by appropriate Table 4 factors for width. Design values for Fb, Ft, and Fc are derived from tests of full size dimension lumber. The nonparametric fifth percentile tolerance limit values (75% confidence) have been adjusted for condition of seasoning, size, and grade. The values are further reduced by a factor of safety and duration of load. Modulus of elasticity values are mean values. The MOE values shown in the tables have been adjusted for condition of seasoning, grade, and span to depth ratio. Property adjustments are in accordance with ASTM D1990. For Fv and Fc⊥ allowable properties are derived using the clear wood approach of D2555 and D245 as for the non-dimension grades.

OTHER GRADES

Tables 7 through 11 show the design values for Structural grades other than Dimension Grades of West Coast lumber. Design values for strength properties such as fiber stress in bending are derived from basic clear wood values reduced to reflect the 5% exclusion limit value. They are further reduced by a safety factor and a duration of load factor and then adjusted for condition of seasoning, density, depth effect and strength ratio. Modulus of elasticity values are average values for species or groups of species. Recommended modulus of elasticity “E” values shown in the tables are computed from unadjusted clear wood values shown in ASTM D2555. The values are adjusted 6.4% for span-depth ratio and where appropriate, for seasoning and for density. Also in accordance with ASTM D245, species average E values have been reduced for grade effect.

MSR GRADES

The E value for machine rated lumber is determined by nondestructively testing each piece. Stress rating machines segregate material into ranges of E. The MOE design values for MSR lumber are the average values for these ranges. Tests show the coefficient of variation in MOE of this material to be approximately 0.11.
200-d. ENGINEERING DESIGN VALUES. The design values shown in the tables assume that any piece may contain the maximum strength reducing characteristics allowed in the grade. The values are premised on the assumption of the individual member carrying its own design load.

200-e. REPETITIVE MEMBER DESIGN VALUES. Generally relatively few pieces in a grade contain the maximum strength reducing characteristics permitted in the grade. Therefore most of the pieces will have actual values higher than the assigned engineering value. When these pieces are used together an increase of 15% may be taken in design values for fiber stress in bending (Fb). A repetitive member system is defined as framing or supporting members such as joists, studs, planks or decking that are continuous or spaced not more than 24 inches on center and are joined by floor, roof, or other load-distributing elements.

200-f. WIDTH EFFECT ON DESIGN VALUES The tabulated values herein are based on a nominal width for Light Framing and nominal thickness for Decking of 4". Studs are based on a 6" width. Values for Structural Light Framing, Structural Joist and Plank, beams, stringers and posts are for a 12" width. Table 4 provides factors to adjust the base properties of Structural Light Framing, Structural Joist and Plank, and Studs for width. ASTM D245 provides a method to adjust bending stress values for width in beams, stringers, posts, and timbers.

200-g. FLAT USE FACTORS. Table 1 provides adjustment factors which may be used to adjust the fiber stress in bending (Fb) values of the Dimension Grades when pieces of these grades are used flatwise rather than on edge. The adjustment factors should be used on the base value after adjusting for width (Table 4).
Table 1. Adjustment Factors for Flatwise Use of Dimension Lumber.

<table>
<thead>
<tr>
<th>Width (nominal)</th>
<th>Less than 4&quot;</th>
<th>4&quot;</th>
<th>5&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot; &amp; Wider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor for:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot; and 3&quot; Thickness</td>
<td>1.0</td>
<td>1.10</td>
<td>1.10</td>
<td>1.15</td>
<td>1.15</td>
<td>1.20</td>
</tr>
<tr>
<td>4&quot; Thickness</td>
<td>1.00</td>
<td>1.05</td>
<td>1.05</td>
<td>1.05</td>
<td>1.10</td>
<td></td>
</tr>
</tbody>
</table>

To determine allowable design stresses for structural loads applied to the wide face of Beams & Stringers graded per paragraph 130, multiply the assigned design values (Table 10, Para. 200) by the following factors:

**ADJUSTMENT FACTORS FOR FLATWISE USE OF BEAMS & STRINGERS**

<table>
<thead>
<tr>
<th>Beam &amp; Stringer Grade</th>
<th>Extreme fiber in Bending, Fb</th>
<th>Modulus of Elasticity, E</th>
<th>Other Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Structural</td>
<td>0.86</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>No. 1</td>
<td>0.74</td>
<td>0.9</td>
<td>1.0</td>
</tr>
<tr>
<td>No. 2</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

200-h. EFFECT OF MOISTURE CONTENT ON DESIGN VALUES. The design values shown in the tables are applicable to lumber surfaced either unseasoned or dry as long as it is used under dry conditions such as in most covered structures. The section properties of lumber for design use should be those applicable to the “dry” surfaced sizes shown in these rules. In calculating design values, the change in strength and stiffness that occurs as lumber dries has been taken into consideration as well as the reduction in size that occurs when unseasoned lumber shrinks.
There are two situations where the tabulated design values should be adjusted:

1. When 4" and thinner lumber is used where the moisture content will exceed 19%, the design values should be multiplied by the adjustment factors shown in Table 2.

2. When lumber 5" and thicker is used where the moisture content will exceed 19% for an extended period of time, the design values should be multiplied by the adjustment factors shown in Table 3.

Design values for scaffold plank are based on exposed conditions of use.

**ADJUSTMENT FACTORS FOR SEASONING**

**Table 2. Adjustment Factors for Nominal 4" and Thinner Lumber.**

<table>
<thead>
<tr>
<th>Extreme Fiber in Bending</th>
<th>Tension Parallel to Grain</th>
<th>Compression Parallel to Grain</th>
<th>Horizontal Shear</th>
<th>Compression Perp. To Grain</th>
<th>Modulus of Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fb</td>
<td>Ft</td>
<td>Fc</td>
<td>Fv</td>
<td>Fc⊥</td>
<td>E</td>
</tr>
<tr>
<td>.85*</td>
<td>1.0</td>
<td>.80**</td>
<td>0.97</td>
<td>0.67</td>
<td>0.9</td>
</tr>
</tbody>
</table>

*Use these factors only when moisture content will exceed 19% in use.*

* When size adjusted bending values do not exceed 1150 psi a factor of 1.0 may be used.

** When size adjusted compression values do not exceed 750 psi a factor of 1.0 may be used.

**Table 3. Adjustment Factors for 5" and Thicker Lumber.**

<table>
<thead>
<tr>
<th>Extreme Fiber in Bending</th>
<th>Tension Parallel to Grain</th>
<th>Compression Parallel to Grain</th>
<th>Horizontal Shear</th>
<th>Compression Perp. To Grain</th>
<th>Modulus of Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fb</td>
<td>Ft</td>
<td>Fc</td>
<td>Fv</td>
<td>Fc⊥</td>
<td>E</td>
</tr>
<tr>
<td>1.0</td>
<td>1.0</td>
<td>0.91</td>
<td>1.0</td>
<td>0.67</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Use these factors only when moisture content will exceed 19% in use.*
200-i. ADJUSTMENT FACTORS FOR HORIZONTAL SHEAR. The tabulated horizontal shear values shown herein are based on the conservative assumption that the most severe checks, shakes or splits possible are present. Since shear stress in most joists and beams is greatest near the ends the restrictions are applied only for a distance from each end equal to three times the width of the wide face of the piece. Since shear stress is greatest near the neutral axis the restrictions also are applied only in the middle one-half of the height of the piece and only the shakes, checks and splits in this section are measured.

200-j. COMPRESSION PERPENDICULAR TO GRAIN. Compression perpendicular to grain design values are calculated according to the latest editions of ASTM Standard D2555 and D245. These design values are based on an allowable deformation limit of .04 inches and are for standard design of most structures. Values at .02 inch deformation can be obtained by using the formula:

$$F_{c\perp}(.02) = 0.73F_{c\perp}(.04)+5.60$$

200-k. Design values listed in this rule book are for use with Allowable Stress Design (ASD) procedures. Load Resistance Factor Design (LRFD) is an alternative engineering design procedure. Reference resistance values for use with LRFD design procedures can be computed from the ASD design values listed in this book by multiplying the design values by the factors listed below:

**CONVERSION FACTORS FOR USE WITH LRFD DESIGN**

<table>
<thead>
<tr>
<th>Extreme Fiber in Bending</th>
<th>Tension Parallel to Grain</th>
<th>Horizontal Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_b$</td>
<td>$F_t$</td>
<td>$F_v$</td>
</tr>
<tr>
<td>2.54</td>
<td>2.70</td>
<td>2.88</td>
</tr>
<tr>
<td>Compression Perp. To Grain</td>
<td>Compression Parallel To Grain</td>
<td>Modulus of Elasticity</td>
</tr>
<tr>
<td>$F_{c\perp}$</td>
<td>$F_{c//}$</td>
<td>$E$</td>
</tr>
<tr>
<td>1.67</td>
<td>2.40</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Factors established in accordance with ASTM D5457.**
The table of conversion factors to convert Allowable Design Values for use with ASD design procedures to reference resistance values for use with LRFD design procedures converts the values in pounds per square inch (psi) units to psi units. Recent publications utilizing LRFD design procedures have standardized on listing reference resistance values in thousands pounds per square inch (ksi) units to avoid confusion with ASD allowable design values. To convert allowable design values in psi units to reference resistance values in ksi units, the factors given in paragraph 200k must be divided by 1000.

200-I. ASSIGNED SPECIES AVERAGE SPECIFIC GRAVITY

<table>
<thead>
<tr>
<th>Species or Species Group</th>
<th>Specific Gravity (OD WT/OD VOL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td></td>
</tr>
<tr>
<td>Douglas Fir &amp; Douglas Fir/Larch</td>
<td>0.50</td>
</tr>
<tr>
<td>Hem-Fir</td>
<td>0.43</td>
</tr>
<tr>
<td>Spruce-Pine-Fir South</td>
<td>0.36</td>
</tr>
<tr>
<td>Mountain Hemlock</td>
<td>0.47</td>
</tr>
<tr>
<td>Sitka Spruce</td>
<td>0.43</td>
</tr>
<tr>
<td>Western Cedars</td>
<td>0.36</td>
</tr>
<tr>
<td>Western Hemlock</td>
<td>0.47</td>
</tr>
<tr>
<td>Western Woods</td>
<td>0.36</td>
</tr>
<tr>
<td>Port Orford Cedar</td>
<td>0.44</td>
</tr>
<tr>
<td>Alaska Cedar</td>
<td>0.47</td>
</tr>
<tr>
<td>Species or Species Group</td>
<td>County of Origin</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td><strong>Imported</strong></td>
<td></td>
</tr>
<tr>
<td>Austrian Spruce</td>
<td>Austria/Czech Rep.</td>
</tr>
<tr>
<td>Douglas Fir/EU Larch</td>
<td>Austria/Czech Rep.</td>
</tr>
<tr>
<td>Douglas Fir</td>
<td>Germany/France</td>
</tr>
<tr>
<td>Montane Pine</td>
<td>Rep. South Africa</td>
</tr>
<tr>
<td>Norway Spruce</td>
<td>Baltic States</td>
</tr>
<tr>
<td>Norway Spruce</td>
<td>Finland</td>
</tr>
<tr>
<td>Norway Spruce</td>
<td>Germany/NE France/Switzerland</td>
</tr>
<tr>
<td>Norway Spruce</td>
<td>Romania/Ukraine</td>
</tr>
<tr>
<td>Norway Spruce</td>
<td>Sweden</td>
</tr>
<tr>
<td>Scots Pine</td>
<td>Austria/Czech Rep.</td>
</tr>
<tr>
<td>Scots Pine</td>
<td>Finland</td>
</tr>
<tr>
<td>Scots Pine</td>
<td>Germany</td>
</tr>
<tr>
<td>Scots Pine</td>
<td>Baltic States</td>
</tr>
<tr>
<td>Silver Fir</td>
<td>Germany/NE France/Switzerland</td>
</tr>
</tbody>
</table>

Calculated in accordance with American Wood Council Standards,
### TABLE 4. WIDTH ADJUSTMENT FACTORS FOR USE WITH VALUES IN TABLES 5 AND 6.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Width (depth)</th>
<th>Fb</th>
<th>Ft</th>
<th>Fc</th>
<th>Other Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Less than 4&quot; thick</td>
<td>4&quot; thick</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select Struct., No. 1, 2, 3</td>
<td>4&quot; &amp; less 5&quot;</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.15</td>
</tr>
<tr>
<td></td>
<td>6&quot;</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>8&quot;</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>10&quot;</td>
<td>1.2</td>
<td>1.3</td>
<td>1.2</td>
<td>1.05</td>
</tr>
<tr>
<td></td>
<td>12&quot;</td>
<td>1.1</td>
<td>1.2</td>
<td>1.1</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>14&quot; &amp; Wider</td>
<td>1.0</td>
<td>1.1</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Const., Stand.</td>
<td>2&quot; &amp; 3&quot; 4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>2&quot; &amp; 3&quot; 4&quot;</td>
<td>0.4</td>
<td>—</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Utility</td>
<td>4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Studs*</td>
<td>4&quot; &amp; less 5&quot;</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
<td>1.05</td>
</tr>
<tr>
<td></td>
<td>6&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Factors are for Stud widths 6" and less. For Studs wider than 6" use the property values and width adjustment factors for No. 3 grade.
### TABLE 5a. Domestic Species Base Values For:
STRUCTURAL LIGHT FRAMING and STRUCTURAL JOISTS AND PLANKS
Design Values, PSI, Normal Loading

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOUGLAS FIR</td>
<td>Sel. Struct.</td>
<td>1,500</td>
<td>1,000</td>
<td>1,700</td>
<td>180</td>
<td>625</td>
<td>1,900,000</td>
</tr>
<tr>
<td></td>
<td>No. 1 &amp; Btr.</td>
<td>1,200</td>
<td>800</td>
<td>1,550</td>
<td>180</td>
<td>625</td>
<td>1,800,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>1,000</td>
<td>675</td>
<td>1,500</td>
<td>180</td>
<td>625</td>
<td>1,700,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>900</td>
<td>575</td>
<td>1,350</td>
<td>180</td>
<td>625</td>
<td>1,600,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>525</td>
<td>325</td>
<td>775</td>
<td>180</td>
<td>625</td>
<td>1,400,000</td>
</tr>
<tr>
<td>HEM-FIR</td>
<td>Sel. Struct.</td>
<td>1,400</td>
<td>925</td>
<td>1,500</td>
<td>150</td>
<td>405</td>
<td>1,600,000</td>
</tr>
<tr>
<td></td>
<td>No. 1 &amp; Btr.</td>
<td>1,100</td>
<td>725</td>
<td>1,350</td>
<td>150</td>
<td>405</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>975</td>
<td>625</td>
<td>1,350</td>
<td>150</td>
<td>405</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>850</td>
<td>525</td>
<td>1,300</td>
<td>150</td>
<td>405</td>
<td>1,300,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>500</td>
<td>300</td>
<td>725</td>
<td>150</td>
<td>405</td>
<td>1,200,000</td>
</tr>
</tbody>
</table>
| SPRUCE-PINE-FIR S
| Sel. Struct.        | 1,300           | 575                    | 1,200                   | 135                   | 335                  | 1,300,000                |
| SOUTH               | No. 1          | 875                 | 400                      | 1,050                  | 135                   | 335                  | 1,200,000                |
|                     | No. 2          | 775                 | 350                      | 1,000                  | 135                   | 335                  | 1,100,000                |
|                     | No. 3          | 450                 | 200                      | 575                    | 135                   | 335                  | 1,000,000                |
| WESTERN WOODS       | Sel. Struct.   | 900                 | 400                      | 1,050                  | 135                   | 335                  | 1,200,000                |
|                     | No. 1          | 675                 | 300                      | 950                    | 135                   | 335                  | 1,100,000                |
|                     | No. 2          | 675                 | 300                      | 900                    | 135                   | 335                  | 1,000,000                |
|                     | No. 3          | 375                 | 175                      | 525                    | 135                   | 335                  | 900,000                  |

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
### Table 5b. Domestic Cedars Base Values For:
**STRUCTURAL LIGHT FRAMING and STRUCTURAL JOISTS AND PLANKS**
Design Values, PSI, Normal Loading

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⁺</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALASKA CEDAR</td>
<td>Sel. Struct.</td>
<td>1,150</td>
<td>625</td>
<td>1,000</td>
<td>165</td>
<td>525</td>
<td>1,400,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>975</td>
<td>525</td>
<td>900</td>
<td>165</td>
<td>525</td>
<td>1,300,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>800</td>
<td>425</td>
<td>750</td>
<td>165</td>
<td>525</td>
<td>1,200,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>450</td>
<td>250</td>
<td>425</td>
<td>165</td>
<td>525</td>
<td>1,100,000</td>
</tr>
<tr>
<td>PORT ORFORD CEDAR*</td>
<td>Sel. Struct.</td>
<td>1,250</td>
<td>700</td>
<td>1,150</td>
<td>165</td>
<td>470</td>
<td>1,600,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>1,050</td>
<td>575</td>
<td>1,050</td>
<td>165</td>
<td>470</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>875</td>
<td>475</td>
<td>875</td>
<td>165</td>
<td>470</td>
<td>1,400,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>500</td>
<td>275</td>
<td>500</td>
<td>165</td>
<td>470</td>
<td>1,300,000</td>
</tr>
<tr>
<td>WESTERN CEDAR</td>
<td>Sel. Struct.</td>
<td>1,000</td>
<td>600</td>
<td>1,000</td>
<td>155</td>
<td>425</td>
<td>1,100,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>725</td>
<td>425</td>
<td>825</td>
<td>155</td>
<td>425</td>
<td>1,000,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>700</td>
<td>425</td>
<td>650</td>
<td>155</td>
<td>425</td>
<td>1,000,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>400</td>
<td>250</td>
<td>375</td>
<td>155</td>
<td>425</td>
<td>900,000</td>
</tr>
</tbody>
</table>

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
**TABLE 5c. Imported Norway and Austrian Spruce Base Values For:**

**STRUCTURAL LIGHT FRAMING and STRUCTURAL JOIST AND PLANKS**

**Design Values, PSI, Normal Loading**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AUSTRIAN SPRUCE</strong></td>
<td>Sel. Struct.</td>
<td>1,500</td>
<td>675</td>
<td>1,250</td>
<td>175</td>
<td>260</td>
<td>1,700,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>1,000</td>
<td>450</td>
<td>1,100</td>
<td>175</td>
<td>260</td>
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<tr>
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<td>No. 2</td>
<td>925</td>
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<td>1,050</td>
<td>175</td>
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<tr>
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<td>No. 3</td>
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<td>225</td>
<td>675</td>
<td>175</td>
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</tr>
<tr>
<td><strong>NORWAY SPRUCE BALTIC STATES (ESTONIA / LATVIA / LITHUANIA)</strong></td>
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<td>1,200</td>
<td>550</td>
<td>1,200</td>
<td>150</td>
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<td>200</td>
<td>575</td>
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<td>430</td>
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<tr>
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<tr>
<td></td>
<td>No. 2</td>
<td>625</td>
<td>275</td>
<td>875</td>
<td>125</td>
<td>220</td>
<td>1,200,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
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<td>125</td>
<td>220</td>
<td>1,100,000</td>
</tr>
<tr>
<td><strong>NORWAY SPRUCE GERMANY NE FRANCE / SWITZERLAND</strong></td>
<td>Sel. Struct.</td>
<td>1,200</td>
<td>550</td>
<td>1,200</td>
<td>170</td>
<td>355</td>
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<td>No. 1</td>
<td>825</td>
<td>375</td>
<td>1,050</td>
<td>170</td>
<td>355</td>
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<tr>
<td></td>
<td>No. 2</td>
<td>725</td>
<td>325</td>
<td>950</td>
<td>170</td>
<td>355</td>
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<tr>
<td></td>
<td>No. 3</td>
<td>425</td>
<td>200</td>
<td>550</td>
<td>170</td>
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<tr>
<td><strong>NORWAY SPRUCE SWEDEN</strong></td>
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<td>No. 1</td>
<td>825</td>
<td>375</td>
<td>1,050</td>
<td>170</td>
<td>285</td>
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<td>1,200,000</td>
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<tr>
<td></td>
<td>No. 3</td>
<td>400</td>
<td>175</td>
<td>525</td>
<td>170</td>
<td>285</td>
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</tr>
<tr>
<td><strong>NORWAY SPRUCE ROMANIA UKRAINE</strong></td>
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<td>575</td>
<td>1,200</td>
<td>275</td>
<td>100</td>
<td>1,500,000</td>
</tr>
<tr>
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<td>No. 1</td>
<td>850</td>
<td>375</td>
<td>1,050</td>
<td>275</td>
<td>100</td>
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<td>425</td>
<td>200</td>
<td>550</td>
<td>275</td>
<td>100</td>
<td>1,100,000</td>
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</tbody>
</table>

*All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.

* Does not include states of Baden-Wurtemburg nor Saarland.*
### TABLE 5c. Imported Norway and Austrian Spruce Base Values For:
**STRUCTURAL LIGHT FRAMING and STRUCTURAL JOISTS AND PLANKS**
Design Values, PSI, Normal Loading

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Pemp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOUGLAS FIR</strong></td>
<td>Sel. Struct.</td>
<td>1,500</td>
<td>675</td>
<td>1,250</td>
<td>205</td>
<td>540</td>
<td>1,900,000</td>
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</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>475</td>
<td>225</td>
<td>600</td>
<td>205</td>
<td>540</td>
<td>1,300,000</td>
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<tr>
<td><strong>FRANCE / GERMANY</strong></td>
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All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.

### TABLE 5d. Imported Scots Pine Base Values For:
**STRUCTURAL LIGHT FRAMING and STRUCTURAL JOISTS AND PLANKS**
Design Values, PSI, Normal Loading

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Pemp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCOTS PINE</strong></td>
<td>Sel. Struct.</td>
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<td>600</td>
<td>1,200</td>
<td>135</td>
<td>270</td>
<td>1,700,000</td>
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<td>200</td>
<td>575</td>
<td>135</td>
<td>270</td>
<td>1,300,000</td>
</tr>
<tr>
<td><strong>AUSTRIA / CZECH REPUBLIC / ROMANIA / UKRAINE</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SCOTS PINE</strong></td>
<td>Sel. Struct.</td>
<td>1,150</td>
<td>525</td>
<td>1,150</td>
<td>130</td>
<td>430</td>
<td>1,500,000</td>
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<td>130</td>
<td>430</td>
<td>1,100,000</td>
</tr>
<tr>
<td><strong>BALTIC COUNTRIES ESTONIA / LATVIA / LITHUANIA</strong></td>
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</table>

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
TABLE 5d. Import Scots Pine Base Values For:  
STRUCTURAL LIGHT FRAMING and STRUCTURAL JOISTS AND PLANKS  
Design Values, PSI, Normal Loading  
2" to 4" thick; 2" to 4" wide Grade Descriptions - Para 124  
2" to 4" thick; 5" and wider Grade Descriptions - Para 123

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fb. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCOTS PINE FINLAND</td>
<td>Sel. Struct.</td>
<td>1,300</td>
<td>600</td>
<td>1,200</td>
<td>150</td>
<td>210</td>
<td>1,500,000</td>
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</tr>
<tr>
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<td>No. 3</td>
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<td>250</td>
<td>625</td>
<td>150</td>
<td>210</td>
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</tr>
<tr>
<td>SCOTS PINE GERMANY</td>
<td>Sel. Struct.</td>
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<td>160</td>
<td>395</td>
<td>1,600,000</td>
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<tr>
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<td>No. 1</td>
<td>800</td>
<td>375</td>
<td>1,050</td>
<td>160</td>
<td>395</td>
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</tr>
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<td>No. 3</td>
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<td>175</td>
<td>550</td>
<td>160</td>
<td>395</td>
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</tr>
<tr>
<td>SCOTS PINE SWEDEN</td>
<td>Sel. Struct.</td>
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<td>600</td>
<td>1,200</td>
<td>120</td>
<td>410</td>
<td>1,700,000</td>
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<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>625</td>
<td>275</td>
<td>875</td>
<td>120</td>
<td>410</td>
<td>1,300,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>375</td>
<td>175</td>
<td>500</td>
<td>120</td>
<td>410</td>
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</tr>
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<td>MONTANE PINE REPUBLIC OF SOUTH AFRICA</td>
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<td>No. 1</td>
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<td>300</td>
<td>950</td>
<td>135</td>
<td>325</td>
<td>1,100,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>600</td>
<td>275</td>
<td>850</td>
<td>135</td>
<td>325</td>
<td>1,000,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
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<td>475</td>
<td>135</td>
<td>325</td>
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<td>SILVER FIR REPUBLIC OF SOUTH AFRICA</td>
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<td>130</td>
<td>400</td>
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<tr>
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<td>No. 1</td>
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<td>325</td>
<td>975</td>
<td>130</td>
<td>400</td>
<td>1,400,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
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<td>325</td>
<td>950</td>
<td>130</td>
<td>400</td>
<td>1,300,000</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>425</td>
<td>200</td>
<td>550</td>
<td>130</td>
<td>400</td>
<td>1,100,000</td>
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</table>

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.

1 Does not include states of Baden-Württemberg nor Saarland.
### TABLE 6a. Domestic Species Base Values For:
LIGHT FRAMING and STUD
Design Values, PSI, Normal Loading

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOUGLAS FIR</strong></td>
<td>Construction</td>
<td>1,000</td>
<td>650</td>
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<tr>
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<tr>
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<td>Utility</td>
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<td>175</td>
<td>900</td>
<td>180</td>
<td>625</td>
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<td>850</td>
<td>180</td>
<td>625</td>
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<td>405</td>
<td>1,300,000</td>
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<tr>
<td></td>
<td>Standard</td>
<td>550</td>
<td>325</td>
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<td>1,200,000</td>
</tr>
<tr>
<td></td>
<td>Utility</td>
<td>250</td>
<td>150</td>
<td>850</td>
<td>150</td>
<td>405</td>
<td>1,100,000</td>
</tr>
<tr>
<td></td>
<td>* Studs</td>
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<td>800</td>
<td>150</td>
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<tr>
<td></td>
<td>Standard</td>
<td>500</td>
<td>225</td>
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<td>135</td>
<td>335</td>
<td>900,000</td>
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<td></td>
<td>Utility</td>
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<td>675</td>
<td>135</td>
<td>335</td>
<td>900,000</td>
</tr>
<tr>
<td></td>
<td>* Studs</td>
<td>600</td>
<td>275</td>
<td>625</td>
<td>135</td>
<td>335</td>
<td>1,000,000</td>
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<td><strong>WESTERN WOODS</strong></td>
<td>Construction</td>
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<td>350</td>
<td>1,100</td>
<td>135</td>
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<td>335</td>
<td>800,000</td>
</tr>
<tr>
<td></td>
<td>* Studs</td>
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<td>225</td>
<td>575</td>
<td>135</td>
<td>335</td>
<td>900,000</td>
</tr>
</tbody>
</table>

* Values are for Stud width 6” and less. Multiply the values by the appropriate width adjustment factors Table 4. For Studs wider than 6” use the property values and width adjustment factors for No. 3 grade. Note: All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
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</table>

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
* Values are for Stud width 6" and less. Multiply the values by the appropriate width adjustment factors Table 4. For Studs wider than 6" use the property values and width adjustment factors for No. 3 grade. All values are in psi.
<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
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<tr>
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<td>* Stud</td>
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<td>325</td>
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<td>260</td>
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<td>275</td>
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<td>400</td>
<td>175</td>
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<tr>
<td></td>
<td>Utility</td>
<td>200</td>
<td>100</td>
<td>625</td>
<td>170</td>
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<td>* Stud</td>
<td>550</td>
<td>250</td>
<td>575</td>
<td>170</td>
<td>285</td>
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</tbody>
</table>

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.* Values are for Stud width 6” and less. Multiply the values by the appropriate width adjustment factors Table 4. For Studs wider than 6” use the property values and width adjustment factors for No. 3 grade.
<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
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<td>600</td>
<td>100</td>
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All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h. * Values are for Stud width 6” and less. Multiply the values by the appropriate width adjustment factors Table 4. For Studs wider than 6” use the property values and width adjustment factors for No. 3 grade.
### TABLE 6d. Imported Scots Pine Base Values For:
- **LIGHT FRAMING and STUDS**
- Design Values, PSI, Normal Loading

<table>
<thead>
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<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fe⊥</th>
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<td>625</td>
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<td>225</td>
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<tr>
<td></td>
<td>* Stud</td>
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<tr>
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<td>Utility</td>
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<tr>
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<td>Construction</td>
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<td>975</td>
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<td>550</td>
<td>120</td>
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</table>

*All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
* Values are for Stud width 6" and less. Multiply the values by the appropriate width adjustment factors Table 4. For Studs wider than 6" use the property values and width adjustment factors for No. 3 grade.

¹ Does not include states of Baden-Wurttemberg nor Saarland.
<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
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</thead>
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<td>135</td>
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<td>* Stud</td>
<td>575</td>
<td>250</td>
<td>600</td>
<td>130</td>
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</tbody>
</table>

All values are in psi. * Values are for Stud width 6” and less. Multiply the values by the appropriate width adjustment factors Table 4. For Studs wider than 6” use the property values and width adjustment factors for No. 3 grade. Certain foreign species and species groups have assigned design values for nominal 2x4 size only. These species are listed in Table 6e.
TABLE 6e. Limited Size Values - 2X4, 2X6 Values For:
STRUCTURAL LIGHT FRAMING, LIGHT FRAMING, AND STUD
Design Values, PSI, Normal Loading

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Tension Par. To Grain Ft</th>
<th>Comp. Par. To Grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
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<tr>
<td></td>
<td>* Stud</td>
<td>800</td>
<td>350</td>
<td>700</td>
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<td>Select Structural</td>
<td>2,300</td>
<td>1,050</td>
<td>1,400</td>
<td>175</td>
<td>315</td>
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</tr>
<tr>
<td></td>
<td>No. 1</td>
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<tr>
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<td>315</td>
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<tr>
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<td>No. 3</td>
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<td>1,400</td>
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<tr>
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<td>775</td>
<td>175</td>
<td>315</td>
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</tr>
<tr>
<td></td>
<td>* Stud</td>
<td>975</td>
<td>450</td>
<td>775</td>
<td>175</td>
<td>315</td>
<td>1,200,000</td>
</tr>
<tr>
<td>NORWAY SPRUCE FROM ARCHANGEL RUSSIA</td>
<td>Select Structural</td>
<td>2,000</td>
<td>900</td>
<td>1,350</td>
<td>175</td>
<td>315</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>1,500</td>
<td>675</td>
<td>1,300</td>
<td>175</td>
<td>315</td>
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</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>1,500</td>
<td>675</td>
<td>1,300</td>
<td>175</td>
<td>315</td>
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</tr>
<tr>
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<td>No. 3</td>
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<td>375</td>
<td>750</td>
<td>175</td>
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<tr>
<td></td>
<td>* Stud</td>
<td>900</td>
<td>400</td>
<td>750</td>
<td>175</td>
<td>315</td>
<td>1,200,000</td>
</tr>
</tbody>
</table>

* Values are for Stud width indicated only. Factors in Table 4 are not applicable. For repetitive member values, see Para. 200-h.
1 Assigned Species Specific Gravity is 0.42. Rules writing authority transferred from NeLMA.
TABLE 7. "DEX" HEAVY WALL AND ROOF PLANK
Design Values, PSI, Normal Loading

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb</th>
<th>Comp. Perp. To Grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOUGLAS FIR</td>
<td>Select Dex</td>
<td>1,750</td>
<td>625</td>
<td>1,800,000</td>
</tr>
<tr>
<td></td>
<td>Commercial Dex</td>
<td>1,450</td>
<td>625</td>
<td>1,700,000</td>
</tr>
<tr>
<td>WESTERN HEMLOCK</td>
<td>Select Dex</td>
<td>1,500</td>
<td>410</td>
<td>1,600,000</td>
</tr>
<tr>
<td></td>
<td>Commercial Dex</td>
<td>1,300</td>
<td>410</td>
<td>1,400,000</td>
</tr>
<tr>
<td>HEM-FIR</td>
<td>Select Dex</td>
<td>1,400</td>
<td>405</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>Commercial Dex</td>
<td>1,150</td>
<td>405</td>
<td>1,400,000</td>
</tr>
<tr>
<td>WESTERN CEDAR</td>
<td>Select Dex</td>
<td>1,250</td>
<td>425</td>
<td>1,100,000</td>
</tr>
<tr>
<td></td>
<td>Commercial Dex</td>
<td>1,050</td>
<td>425</td>
<td>1,000,000</td>
</tr>
<tr>
<td>SITKA SPRUCE</td>
<td>Select Dex</td>
<td>1,300</td>
<td>435</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>Commercial Dex</td>
<td>1,100</td>
<td>435</td>
<td>1,300,000</td>
</tr>
</tbody>
</table>

Values apply to lumber used at 19% maximum moisture content such as in most covered structures. For other use conditions, see section 200-h. For repetitive member values, see Para. 200-e.
**STRESS GRADES**

*ASTM D2395, and WCLIB submission to ALSC 6/15/2000.*

**TABLE 8a. SCAFFOLD PLANK**  
(2" scaffold surfaced to standard ALS sizes)

Surfaced Scaffold (Nominal 2" maximum thickness, 8" and wider). Flatwise bending values, psi. Grade description — Para. 171. The values in Table 8-a apply to Scaffold surfaced dry or surfaced green to standard ALS sizes as long as the material is 19% maximum moisture content at time of use. The standard dressed “Dry” sizes shall be used to all span calculations.

For “Wet” conditions of use where the moisture content in service will exceed 19% the values in Table 8-a shall be multiplied by the following adjustment factors:

- Extreme fiber in bending, Fb Factor – .86
- Modulus of Elasticity, E Factor – .97

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb (psi)</th>
<th>Modulus of Elasticity E (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOUGLAS FIR</strong></td>
<td>Dense Premium</td>
<td>2,450</td>
<td>1,900,000</td>
</tr>
<tr>
<td></td>
<td>Premium</td>
<td>2,250</td>
<td>1,800,000</td>
</tr>
<tr>
<td></td>
<td>Dense Select Struc.</td>
<td>2,400</td>
<td>1,900,000</td>
</tr>
<tr>
<td></td>
<td>Select Structural</td>
<td>2,200</td>
<td>1,800,000</td>
</tr>
<tr>
<td><strong>SITKA SPRUCE</strong></td>
<td>Premium</td>
<td>1,600</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>Select Structural</td>
<td>1,550</td>
<td>1,500,000</td>
</tr>
<tr>
<td><strong>WESTERN HEMLOCK</strong></td>
<td>Premium</td>
<td>1,850</td>
<td>1,600,000</td>
</tr>
<tr>
<td></td>
<td>Select Structural</td>
<td>1,800</td>
<td>1,600,000</td>
</tr>
<tr>
<td><strong>HEM-FIR</strong></td>
<td>Premium</td>
<td>1,650</td>
<td>1,500,000</td>
</tr>
<tr>
<td></td>
<td>Select Structural</td>
<td>1,600</td>
<td>1,500,000</td>
</tr>
</tbody>
</table>
STRESS GRADES

TABLE 8-b SCAFFOLD PLANK.
(3” and thinner, 8” and wider)

Flatwise bending values, psi Grade description — Para. 171. The values in Table 8-b apply to Scaffold used under wet use conditions. Actual manufactured sizes shall be used in span calculations.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Ex. Fib. Bending Fb (psi)</th>
<th>Modulus of Elasticity E (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOUGLAS FIR</td>
<td>Dense Premium</td>
<td>1,850</td>
<td>1,700,000</td>
</tr>
<tr>
<td></td>
<td>Premium</td>
<td>1,700</td>
<td>1,600,000</td>
</tr>
<tr>
<td></td>
<td>Dense Select Str.</td>
<td>1,700</td>
<td>1,700,000</td>
</tr>
<tr>
<td></td>
<td>Select Structural</td>
<td>1,550</td>
<td>1,600,000</td>
</tr>
<tr>
<td>SITKA SPRUCE</td>
<td>Premium</td>
<td>1,200</td>
<td>1,300,000</td>
</tr>
<tr>
<td></td>
<td>Select Structural</td>
<td>1,100</td>
<td>1,300,000</td>
</tr>
<tr>
<td>WESTERN HEMLOCK</td>
<td>Premium</td>
<td>1,400</td>
<td>1,400,000</td>
</tr>
<tr>
<td></td>
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<tr>
<td>HEM-FIR</td>
<td>Premium</td>
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<tr>
<td></td>
<td>Select Structural</td>
<td>1,100</td>
<td>1,300,000</td>
</tr>
</tbody>
</table>

All Scaffold Plank design values are calculated using ASTM Standards D245 and D2555. These values are modified using procedures shown in “Calculating Apparent Reliability of Wood Scaffold Planks,” as published by the Journal on Structural Safety, 2 (1984) 47-57.

For modification of design values for Scaffold Plank which has been fire-retardant treated, see the National Design Specification of the American Forest & Paper Association.
TABLE 9. STADIUM PLANK
(1-1/4" TO 3" thick, 4" and wider.)

Flatwise Bending Values.

PSI Grade Description — Para. 172

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>Extreme fiber in bending Fb</th>
<th>Modulus of Elasticity E (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope of grain 1:10</td>
<td>Slope of grain 1:14</td>
</tr>
<tr>
<td>DOUGLAS FIR</td>
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<td>2,400</td>
</tr>
<tr>
<td>WESTERN HEMLOCK</td>
<td>1,700</td>
<td>2,100</td>
</tr>
<tr>
<td>HEM-FIR</td>
<td>1,550</td>
<td>1,900</td>
</tr>
<tr>
<td>WESTERN CEDAR</td>
<td>1,400</td>
<td>1,650</td>
</tr>
<tr>
<td>SITKA SPRUCE</td>
<td>1,500</td>
<td>1,800</td>
</tr>
<tr>
<td>MOUNTAIN HEMLOCK</td>
<td>1,600</td>
<td>1,900</td>
</tr>
</tbody>
</table>

Values apply to lumber used at 19% maximum moisture content such as in most covered structures. For other conditions of use, see section 200-h.
<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Extreme fiber in bending Fb</th>
<th>Tension parallel to grain Ft</th>
<th>Comp. parallel to grain Fc</th>
<th>Horizontal Shear Fv</th>
<th>Comp. perp. to grain Fc⊥</th>
<th>Modulus of Elasticity E</th>
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</thead>
<tbody>
<tr>
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<td>Dense Select Str.</td>
<td>1,900</td>
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<td>1,300</td>
<td>170</td>
<td>730</td>
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</tr>
<tr>
<td></td>
<td>Select Structural</td>
<td>1,600</td>
<td>950</td>
<td>1,100</td>
<td>170</td>
<td>625</td>
<td>1,600,000</td>
</tr>
<tr>
<td></td>
<td>Dense No. 1</td>
<td>1,550</td>
<td>775</td>
<td>1,100</td>
<td>170</td>
<td>730</td>
<td>1,700,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>1,350</td>
<td>675</td>
<td>925</td>
<td>170</td>
<td>625</td>
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</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>875</td>
<td>425</td>
<td>600</td>
<td>170</td>
<td>625</td>
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</tr>
<tr>
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<td>1,400</td>
<td>825</td>
<td>1,000</td>
<td>170</td>
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</tr>
<tr>
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<td>No. 1</td>
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<td>575</td>
<td>850</td>
<td>170</td>
<td>410</td>
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</tr>
<tr>
<td></td>
<td>No. 2</td>
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<td>375</td>
<td>550</td>
<td>170</td>
<td>410</td>
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</tr>
<tr>
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<td>750</td>
<td>925</td>
<td>140</td>
<td>405</td>
<td>1,300,000</td>
</tr>
<tr>
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<td>No. 1</td>
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<td>525</td>
<td>750</td>
<td>140</td>
<td>405</td>
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<tr>
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<td>No. 2</td>
<td>675</td>
<td>350</td>
<td>500</td>
<td>140</td>
<td>405</td>
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</tr>
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<tr>
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<td>No. 1</td>
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<td>525</td>
<td>900</td>
<td>155</td>
<td>470</td>
<td>1,400,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
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<td>325</td>
<td>600</td>
<td>155</td>
<td>470</td>
<td>1,100,000</td>
</tr>
<tr>
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<td>675</td>
<td>875</td>
<td>140</td>
<td>425</td>
<td>1,000,000</td>
</tr>
<tr>
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<td>No. 1</td>
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<td>475</td>
<td>725</td>
<td>140</td>
<td>425</td>
<td>1,000,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>625</td>
<td>325</td>
<td>475</td>
<td>140</td>
<td>425</td>
<td>800,000</td>
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</tbody>
</table>

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
### TABLE 10. BEAMS AND STRINGERS (continued)

**Design Values, PSI, Normal Loading**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Extreme fiber in bending (F_b)</th>
<th>Tension parallel to grain (F_t)</th>
<th>Comp. parallel to grain (F_c)</th>
<th>Horizontal Shear (F_v)</th>
<th>Comp. perp. to grain (F_{c\perp})</th>
<th>Modulus of Elasticity (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITKA SPRUCE</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select Structural</td>
<td>No. 1</td>
<td>1,200</td>
<td>675</td>
<td>825</td>
<td>140</td>
<td>435</td>
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</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>1,000</td>
<td>500</td>
<td>675</td>
<td>140</td>
<td>435</td>
<td>1,300,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>650</td>
<td>325</td>
<td>450</td>
<td>140</td>
<td>435</td>
<td>1,000,000</td>
</tr>
<tr>
<td><strong>MOUNTAIN HEMLOCK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select Structural</td>
<td>No. 1</td>
<td>1,350</td>
<td>775</td>
<td>875</td>
<td>170</td>
<td>570</td>
<td>1,100,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>1,100</td>
<td>550</td>
<td>725</td>
<td>170</td>
<td>570</td>
<td>1,100,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>725</td>
<td>375</td>
<td>475</td>
<td>170</td>
<td>570</td>
<td>900,000</td>
</tr>
<tr>
<td><strong>SPRUCE-PINE-FIR SOUTH</strong></td>
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</tr>
<tr>
<td>Select Structural</td>
<td>No. 1</td>
<td>1,050</td>
<td>625</td>
<td>675</td>
<td>125</td>
<td>335</td>
<td>1,200,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>900</td>
<td>450</td>
<td>550</td>
<td>125</td>
<td>335</td>
<td>1,200,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>575</td>
<td>300</td>
<td>375</td>
<td>125</td>
<td>335</td>
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</tr>
<tr>
<td><strong>WESTERN WOODS</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Select Structural</td>
<td>No. 1</td>
<td>1,050</td>
<td>625</td>
<td>750</td>
<td>125</td>
<td>345</td>
<td>1,100,000</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>900</td>
<td>450</td>
<td>625</td>
<td>125</td>
<td>345</td>
<td>1,100,000</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>300</td>
<td>425</td>
<td>125</td>
<td>345</td>
<td>900,000</td>
</tr>
</tbody>
</table>

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Extreme fiber in bending $F_b$</th>
<th>Tension parallel to grain $F_t$</th>
<th>Comp. parallel to grain $F_c$</th>
<th>Horizontal Shear $F_v$</th>
<th>Comp. perp. to grain $F_{c,l}$</th>
<th>Modulus of Elasticity $E$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOUGLAS FIR</td>
<td>Dense Select Str.</td>
<td>1,750</td>
<td>1,150</td>
<td>1,350</td>
<td>170</td>
<td>730</td>
<td>1,700,000</td>
</tr>
<tr>
<td></td>
<td>Select Structural</td>
<td>1,500</td>
<td>1,000</td>
<td>1,150</td>
<td>170</td>
<td>625</td>
<td>1,600,000</td>
</tr>
<tr>
<td></td>
<td>Dense No. 1</td>
<td>1,400</td>
<td>950</td>
<td>1,200</td>
<td>170</td>
<td>730</td>
<td>1,700,000</td>
</tr>
<tr>
<td></td>
<td>No. 1</td>
<td>1,200</td>
<td>825</td>
<td>1,000</td>
<td>170</td>
<td>625</td>
<td>1,600,000</td>
</tr>
<tr>
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<td>750</td>
<td>475</td>
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</table>

All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.
### TABLE 11. POSTS AND TIMBERS (continued)
**Design Values, PSI, Normal Loading**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>GRADE</th>
<th>Extreme fiber in bending (Fb)</th>
<th>Tension parallel to grain (Ft)</th>
<th>Comp. parallel to grain (Fc)</th>
<th>Horizontal Shear (Fv)</th>
<th>Comp. perp. to grain (Fc⊥)</th>
<th>Modulus of Elasticity (E)</th>
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<td>325</td>
<td>475</td>
<td>125</td>
<td>345</td>
<td>900,000</td>
</tr>
</tbody>
</table>

*All values are in psi. Values apply to lumber under protected conditions. For other use conditions, see section 200-h.*
STRESSES ILLUSTRATED

200-m. EXTREME FIBER IN BENDING - “Fb” AND HORIZONTAL SHEAR - “Fv.”

In structures, the stress grades of lumber used are Light Framing, Joists & Planks and Beams & Stringers. These members may carry loads on spans between supports and the lumber is stressed internally to the extent required to resist the external load. The loads cause pieces to bend, producing tension in the extreme fibers along the face farthest from the applied load and compression in the extreme fibers along the face nearest to the applied load. At the same time, over each support, there is a stress that tends to slide the fibers over each other horizontally. This action is similar to the way the ends of playing cards slide over each other when a deck is sharply bent. The internal force that resists this action is the horizontal shear value of the wood. The shearing stress is maximum at the center of the depth of the piece.

The extreme fibers are at the top and at the bottom of the piece.
STRESS GRADES

MODULUS OF ELASTICITY

MODULUS OF ELASTICITY - “E”:
The relationship between the amount a piece deflects and the load causing the deflection determines its stiffness. This is called the modulus of elasticity of the species. A piece may deflect slightly or a lot depending on its size, the span, the load and the modulus of elasticity for the particular species. A large deflection is not necessarily a sign of insufficient strength. For example: the floors of a residence are usually limited to a deflection 1/360th of the span, or less, while a scaffold plank may deflect substantially more.

![Diagram showing the stiffness ratio of a species determines the deflection from a load](image)

COMPRESSION PERPENDICULAR TO GRAIN - “Fc⊥”:
Where a joist, beam or similar piece of lumber bears on supports, the loads tend to compress the fibers. It is therefore necessary that the bearing area is sufficient to prevent side grain crushing.

![Diagram showing compression perpendicular to grain](image)
STRESS GRADES

COMPRESSION PARALLEL TO GRAIN - “Fc”:
In many parts of a structure, stress-grades are used as POSTS & TIMBERS with the loads supported on the ends of the pieces. Such uses are as studs, posts, columns and struts. LIGHT FRAMING JOISTS & PLANKS and BEAMS & STRINGERS can also be used in this manner.

The internal stress induced by this kind of loading is the same across the whole cross-section and the fibers are uniformly stressed parallel to and along the full length of the piece.

MEASUREMENT OF KNOTS

201. GENERAL. The sum of the sizes of all knots in any 6" of length of a piece must not exceed twice the size of the largest knot permitted. More than one knot of maximum permissible size must not be in the same 6" of length and the combination of knots must not be serious.

(Illustrations on the following pages are examples only. Judgment must be used in measuring the many different knots that occur in natural growth for equivalent effect on a piece.)
201-a. Unless otherwise specified, knots shall be measured as the average of the maximum and minimum diameters as shown in Figure 1.

![Figure 1](attachment:figure1.png)

201-b. In Grades of Studs, Light Framing, Structural Framing and other grades where specified, knots on wide faces are measured between lines parallel to the edges as shown in Figure 2. When tapering knots are encountered, their equivalent displacement is determined as shown in Figure 3. Narrow face and spike knots are judged by the amount of cross section they occupy as illustrated in Figures 4 and 5.

![Figure 2](attachment:figure2.png)  
**FIGURE 2**

![Figure 3](attachment:figure3.png)  
**FIGURE 3**

![Figure 4](attachment:figure4.png)  
**FIGURE 4**

![Figure 5](attachment:figure5.png)  
**FIGURE 5**
201-c. In Beam and Stringer grades, knots shall be measured as shown in Figures 6 and 7.

![Figure 6](image1)

E - Measure between lines parallel to the edges.
F - Measure least dimension.

![Figure 7](image2)

201-d. In Post and Timber grades, knots shall be measured as shown in Figure 8.

![Figure 8](image3)

F - Measure least dimension.
G - Measure along corner or measure size most nearly representing diameter of branch causing the knot.
SHAKES, CHECKS AND SPLITS

202. Due to the nature of shakes, checks and splits, judgment must be used in evaluating their extent.

I. BEAMS AND STRINGERS.

The measurement of shakes, checks and splits is confined to the middle 1/2 of the height of the piece and restrictions on checks are applied only for a distance from the ends equal to three times the width of the wide face.

II. POSTS AND TIMBERS.

Shakes and checks, as a rule, have little influence on the strength of a post or column, unless so extensive as to split the piece practically in two. The grade limitations are applied primarily for appearance.

III. MEASUREMENT OF SHAKES, CHECKS AND SPLITS.

(a) SHAKES in Structural Framing and Beams and Stringers are measured at the ends of pieces, between lines enclosing the shake and parallel to the wide faces.
(b) **SHAKES** in Posts and Timbers are measured at the ends of pieces, between lines parallel with the two faces that give the least dimension. The size of shake permitted in a grade is for unseasoned lumber. If the lumber is seasoned, the size of shake may be 1-1/2 times the size permitted in a grade.
(c) CHECKS are measured as an average of the penetration perpendicular to the wide face. Where two or more checks appear on the same face, only the deepest one is measured. Where two checks are directly opposite each other, the sum of their depths is considered.

(d) SPLITS are measured as the penetration of a split from the end of the piece and parallel to the edges of the piece.
203. Slope of grain is the deviation of the wood fiber from a line parallel to the edges of a piece. The deviation is expressed as a ratio such as a slope of grain of 1 in 8, 1 in 10, 1 in 12 and 1 in 15.

Slope of grain as measured is representative of the general slope of the fibers and local deviations are disregarded. Measurement of slope of grain should be over a sufficient length and area so that local deviations will not be misleading.
DENSITY & RATE OF GROWTH
(Any grade when specified)

204. The greater the specific gravity of lumber the greater is the strength of the wood fibers. Two methods of measuring specific gravity or density are available and are described in section 5.6 including sub-sections of ASTM D245-00. One method described herein is visually measuring the growth rings per inch along with the amount of summerwood in the growth rings.

Rate of growth requirements are sometimes a part of a grading rule for reasons of texture as well as strength.

204-a. "MEDIUM GRAIN" means an average of approximately 4 or more annual rings per inch on either one end or the other of a piece, measured as described in Para. 204-d. In Douglas fir, pieces averaging less than 4 rings per inch are accepted if averaging 1/3 or more summerwood - the dark portion of the annual ring.

204-b. "CLOSE GRAIN" means an average of approximately 6, but not more than approximately 30 annual rings per inch on either one end or the other of a piece, measured as described in Para. 204-d. In Douglas fir, pieces averaging 5 rings or more than 30 rings per inch, are accepted as close grain if averaging 1/3 or more summerwood.

204-c. "DENSE MATERIAL" in Douglas fir averages approximately 6 or more annual rings per inch and, in addition, 1/3 or more summerwood on either one end or the other of a piece, measured as described in Para. 204-d. The contrast in color between the summerwood and springwood must be distinct. Pieces averaging less than 6 annual rings per inch but not less than 4 are accepted as dense if averaging 1/2 or more summerwood.

204-d. MEASURING AVERAGE RATE OF GROWTH
Average rate of growth shall be made in such a way as to ensure that the measured radial line is representative. Measurement shall be made over a continuous length of 3" or as nearly 3" as is possible. The length shall be centrally located in side-cut (FOHC) pieces. In pieces containing the pith (boxed heart), the measurement may exclude an inner portion of the radius amounting to approximately one quarter of the least dimension.
RATE OF GROWTH

**FOHC (SIDE CUT)**

- Radial line
- 3" Measuring line

**BOXED HEART (PITH PRESENT)**

- Radial line
- Excluding inner portion of the radius
- 3" Measuring line if width permits
206-a. MECHANICALLY STRESS RATED LUMBER
Machine stress rated (MSR) lumber is lumber that has been evaluated by mechanical stress rating equipment. MSR lumber is distinguished from visually stress graded lumber in that each piece is nondestructively tested and marked to indicate the modulus of elasticity (E or MOE). MSR lumber is also required to meet certain visual requirements as set forth herein.

A grade stamp on Machine Stress Rated lumber indicates the stress rating system used meets requirements of the grading agency’s certification and required quality control procedures. The grade stamp will show the agency trademark, the mill name or number, will include the phrase “MSR,” the species identification and the “E” rating for the grade. The “E” rating is the rated average bending modulus of elasticity in millions of pounds per square inch for the grade when measured on edge (e.g. as a joist). Additionally, the grade stamp will include the fiber stress in bending value (Fb) and, when required, the allowable design tensile stress parallel to grain (Ft). The stamp will also include the Fv, Fc⊥, and long span E rating when the value is specifically qualified.

The “E” “Fb” grade combinations which can be qualified are not restricted to those combinations shown in Table 13. If the assigned allowable Ft is different for the MSR grade than that shown in Table 13 for the same Fb level, the assigned Ft value shall be included on the grade stamp. The remaining three assigned allowable properties (Fc, Fc⊥, Fv) for a grade shall be those listed for the equivalent Fb level. Higher values for Fv and Fc⊥ may be assigned as described below.

For some uses it may be desirable to qualify and quality control a bending modulus of elasticity representative of different test conditions (e.g., long span MOE per Paragraph 154-d.) in addition to the standard edge bending MOE qualification for MSR. When the MSR grade is qualified and quality controlled for this specific MOE, the qualifying MOE value for the grade may be included as an additional mechanical property value for the grade. When so qualified, the MOE value must be included on the grade stamp.
A specific gravity value (based on oven dry weight/oven dry volume) higher than that listed in Table 14 may be assigned to a grade when the specific gravity of the grade is verified by test and controlled as part of the daily quality control program. When so qualified, the specific gravity value shall be included on the grade stamp.

The allowable stresses for compression perpendicular to grain and horizontal shear listed after Table 14 are appropriate for all grades. Compression perpendicular to grain ($F_{c⊥}$) and horizontal shear ($F_v$) have been shown to be well correlated with specific gravity. The equations given to calculate compression perpendicular to grain ($F_{c⊥}$) and horizontal shear ($F_v$) allowable stresses from specific gravity are based on that correlation. When the equations given, using the assigned grade specific gravity, produce higher allowable stresses for $F_{c⊥}$ or $F_v$ than those assigned to all grades, the higher value may be used.

206-b. VISUAL GRADING REQUIREMENTS
Mechanically Stress Rated lumber must be well manufactured and visually graded to limit certain characteristics even though the actual strength is not affected. All pieces shall be visually graded to assure that the characteristics affecting strength are no more serious than the following limiting characteristics:

For grades 1000 Fb and above

- Checks - seasoning checks not limited. Through checks at ends limited as splits.
- Shake - if through at ends limited as splits. Away from ends through heart shakes up to 2' long, well separated. If not through, single shakes may be 3' or up to 1/4 the length, whichever is greater.
- Skips - hit and miss, and in addition 5% of the pieces may be hit or miss or heavy skip not longer than 2'. See Para. 720(e), (f) and (g).
- Splits - equal in length to 1-1/2 times the width of the piece.
MACHINE STRESS RATED LUMBER
ALL SPECIES

Wane - 1/3 thickness and 1/3 width full length, or equivalent on each face, provided that wane not exceed 2/3 thickness or 1/2 the width for up to 1/4 the length. See Para. 750.

Warp - light. See table, Para. 752.

Manufacture - standard “F.” See Para. 722(f)

For grades below 1000 Fb.

Checks - seasoning checks not limited. Through checks at ends limited as splits.

Shake - surface shakes permitted. If through at edges or ends, limited as splits. Elsewhere through shakes 1/3 the length, scattered along the length.

Skips - hit or miss, with a maximum of 10% of the pieces containing heavy skips. See Para. 720(c), and (g).

Splits - equal to 1/6 the length of the piece.

Stain - stained wood - not limited.

Wane - 1/2 thickness and 1/2 width full length, or equivalent on each face, provided that wane not exceed 7/8 the thickness or 3/4 the width for up to 1/4 the length See Para. 750.

Warp - medium. See table, Para. 752.

White Speck and Honeycomb - firm.

Manufacture - standard “F.” See Para. 722(f).
In addition to the visual limitations listed, knots, knot holes, burls, distorted grain or decay partially or wholly at edges of wide faces, must not occupy more of the net cross-section than:

**Fb Class**

<table>
<thead>
<tr>
<th>Fb Class</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 for 0 to 1000</td>
<td>1/4 for 1500 to 2050</td>
</tr>
<tr>
<td>1/3 for 1050 to 1450</td>
<td>1/6 for 2100 and over</td>
</tr>
</tbody>
</table>

Characteristics which occur in any end portion of the pieces which are not evaluated by the stress grading equipment shall be limited as follows:

Edge knots - Limited as listed above.

Non-edge knots - Equal to the largest non-edge knot in the tested portion of the piece or the next larger edge knot, whichever is greater. For 1/2 edge knot category, non-edge knot limited to 2/3 cross section.

Cross-section knots - Displacement of all knots in the same cross section must not exceed the size of the permitted non-edge knot.

Slope of grain - The general slope of grain in the untested end portion shall not exceed:

<table>
<thead>
<tr>
<th>Slope</th>
<th>Fb Class</th>
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</thead>
<tbody>
<tr>
<td>1 in 12</td>
<td>2100 and over</td>
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<tr>
<td>1 in 10</td>
<td>1500 to 2050</td>
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<tr>
<td>1 in 8</td>
<td>1050 to 1450</td>
</tr>
<tr>
<td>1 in 4</td>
<td>0 to 1000</td>
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</table>
### MACHINE STRESS RATED LUMBER
ALL SPECIES

**TABLE 13**

<table>
<thead>
<tr>
<th>Machine Stress Rated Lumber: 2&quot; or less in thickness - all widths</th>
<th>Design Values, PSI, Normal Loading</th>
<th>Grade Description Para. 206.</th>
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</table>

<table>
<thead>
<tr>
<th>Modulus of Elasticity E</th>
<th>Ex. Fiber in Bending Fb*</th>
<th>Tension Par. to Grain Ft</th>
<th>Comp. Par. to Grain Fc</th>
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</table>

For flatwise use, the modulus of elasticity (E) value listed in the table may be increased 100,000 psi for grades with assigned E greater than 1,300,000 psi, and 50,000 psi for grades with assigned E of 1,300,000 psi or less.
Note (Cont.)

Additional grades not listed may be qualified by test. When such grades are qualified, property values shall be rounded as indicated below. Compression parallel to grain (F_c) values may be interpolated based on assigned F_b.

<table>
<thead>
<tr>
<th>Property</th>
<th>Rounding</th>
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<tbody>
<tr>
<td>Modulus of Elasticity (E)</td>
<td>100,000 psi</td>
</tr>
<tr>
<td>Fiber Stress in Bending (F_b)</td>
<td>25 psi below 1000 psi</td>
</tr>
<tr>
<td></td>
<td>50 psi at 1000 psi and above</td>
</tr>
<tr>
<td>Tensile Stress Parallel to Grain (F_t)</td>
<td>25 psi</td>
</tr>
<tr>
<td>Compression Parallel to Grain (F_c)</td>
<td>25 psi</td>
</tr>
</tbody>
</table>
### TABLE 14. ASSIGNED SPECIFIC GRAVITY

<table>
<thead>
<tr>
<th>Species</th>
<th>Grade Modulus of Elasticity (psi)</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Douglas Fir</strong></td>
<td>Less than</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,000,000</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>2,000,000</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>2,100,000</td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>2,200,000</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>2,300,000</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>2,400,000</td>
<td>0.55</td>
</tr>
<tr>
<td><strong>Hem-Fir</strong></td>
<td>Less than</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,600,000</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>1,600,000</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>1,700,000</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>1,800,000</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>1,900,000</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>2,000,000</td>
<td>0.48</td>
</tr>
<tr>
<td></td>
<td>2,100,000</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>2,200,000</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>2,300,000</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>2,400,000</td>
<td>0.52</td>
</tr>
<tr>
<td><strong>S-P-F South</strong></td>
<td>All Grades</td>
<td>0.36</td>
</tr>
<tr>
<td><strong>Western Cedars</strong></td>
<td>All Grades</td>
<td>0.36</td>
</tr>
<tr>
<td><strong>Western Woods</strong></td>
<td>All Grades</td>
<td>0.36</td>
</tr>
</tbody>
</table>

1. Specific gravity basis is oven dry weight/oven dry volume. Higher values may be claimed, if specifically qualified and quality controlled, see Para. 206-a.

2. For imported species, see Para. 200-l.
MACHINE STRESS RATED LUMBER
ALL SPECIES

Assigned –
Horizontal Shear (Fv)
for all stress levels:

Douglas fir = 180 psi
Hem-Fir = 150 psi
S-P-F S = 135 psi
Western Cedars = 155 psi
Western Woods = 135 psi

Imported Species - Unless qualified by test, the assigned Horizontal Shear values for MSR lumber from imported species shall be equal to the value for the species assigned to visually graded lumber, see Tables 5c&d, para. 200-l.

When a grade is qualified by test and quality controlled for specific gravity, the allowable horizontal shear value may be calculated from the following formula:

\[ Fv = 40 + (266 \times \text{Sp. Gr.}) \]

Note: Specific gravity is at oven dry weight and oven dry volume. Assigned values shall be rounded to the nearest 5 psi.

Values calculated from the equation above may be multiplied by 1.05 for MC 15 material.

Assigned –
Compression Perpendicular
to Grain (Fc⊥) for all stress levels:

Douglas fir = 625 psi
Hem-Fir = 405 psi
S-P-F S = 335 psi
Western Cedars = 425 psi
Western Woods = 335 psi

Imported Species - Unless qualified by test, the assigned Compression Perpendicular to Grain values for MSR lumber from imported species shall be equal to the value for the species assigned to visually graded lumber, see
Tables 5c&d, Para. 200-L.

When a grade is qualified by test and quality controlled for specific gravity, the allowable compression perpendicular to grain value may be calculated from the following formula:

\[ F_{c\perp} = (2252.4 \times \text{Sp. Gr.}) - 480 \]

Note: Specific gravity is at oven dry weight and oven-dry volume. Assigned values shall be rounded to the nearest 5 psi.

Values calculated from the equation above may be multiplied by 1.16 for MC 15 material.

Compression perpendicular to grain values determined from the equation above are based on a 0.04 inch deformation limit and are for standard design of most structures.

Values at .02 inch deformation can be obtained with the following equations:

\[ F_{c\perp} (.02) = (0.71 \times F_{c\perp} .04) + 14.1 \]

\[ F_{c\perp} (.02) = (1605.5 \times \text{Sp. Gr.}) - 327.5 \]

Note: Specific gravity is at oven dry weight and oven-dry volume.

Unless qualified by test, the assigned Compression Perpendicular to Grain values for MSR lumber from imported species shall be the same value that was assigned the visually graded lumber, see Tables 5c & d, Para. 200-L.
MACHINE GRADED SCAFFOLD PLANK 
ALL SPECIES

207. There are three categories of machine graded scaffold plank, E-Rated Visual, E-Rated Machine Graded, and MSR. All categories of machine graded scaffold have been evaluated by mechanical stress rating equipment. It is distinguished from visually graded scaffold plank in that each piece is nondestructively tested and marked to indicate the long span modulus of elasticity (E). E-Rated Scaffold Plank grades shall be qualified and quality controlled in accordance with the requirements of the Bureau and the American Lumber Standard Committee, Inc. E-Rated Scaffold Plank grades shall be marked to indicate the designated E-rated grade E in millions of pounds per square inch (psi).

207-a. E-RATED VISUAL SCAFFOLD PLANK.
Conforms to all provisions of Paragraph 171a, 171aa, 171b, or 171bb as applicable.

All pieces shall be mechanically E-rated by a process approved by the American Lumber Standard Committee Board of Review and the Bureau.

The average long span modulus of elasticity of the E-rated grade shall be qualified by test and quality controlled. Only E-rated grades which equal or exceed the E-listed for the same visual grade and species as listed in Paragraph 200, Table 8a or 8b, may be qualified.

The 5th percentile tolerance limit (75% confidence) long span E for the grade shall equal or exceed 0.82 times the assigned average long Span E of the grade qualified.

The assigned extreme fiber in bending (Fb) shall be as specified in Paragraph 200, Table 8a or 8b, applicable for the visual grade and species.

E-Rated Scaffold shall be marked with an approved grade stamp which includes the agency logo, the mill identification, species, seasoning, the E-rated grade designation in millions of pounds per square inch (psi), and the applicable grade name as specified in Paragraph 171a, 171aa, 171b, or 171bb.
MACHINE GRADED SCAFFOLD PLANK
ALL SPECIES

207-b. E-RATED MACHINE GRADED SCAFFOLD PLANK.

E-Rated Machine Graded Scaffold Plank is graded from Machine Stress Rated lumber which conforms to the provisions of Paragraph 206, combined with the E-rating and visual limitations of the Paragraph.

All pieces shall be mechanically E-rated by a process approved by the American Lumber Standard Committee Board of Review, and the Bureau.

The average long span modulus of elasticity of the E-rated grade shall be qualified by test and quality controlled. Only E-rated grades which equal or exceed the E-listed for the same grade and species as listed in Paragraph 200, Table 8a or 8b, may be qualified.

The 5th percentile tolerance limit (75% confidence) long span E for the grade shall equal or exceed 0.82 times the assigned average long span E of the grade qualified.

The assigned extreme fiber in bending (Fb) of the E-Rated Machine Graded Scaffold Plank shall be the assigned Fb of the MSR grade from which E-Rated Machine Graded Scaffold Plank is graded adjusted for flatwise use in accordance with Paragraph 200g, and rounded to the nearest 50 psi.

The following visual characteristics and limiting provisions are permitted:

Cup - light.

Holes - limited to 1/6 the width or 1-1/2 inches, whichever is smaller.

Knots - knots may be sound, unsound, or encased.

- Edge knots are measured and limited in accordance with Paragraph 206.

- Knots away from the edge (elsewhere knots) are limited in size to the next larger edge knot category.

- Surface spike knots are limited on wide face to 1/3 the width.

- Chipped or sloughed knots at the edge of the wide face are permitted, if not through the thickness.
MACHINE GRADED SCAFFOLD PLANK
ALL SPECIES

Pitch Pockets - medium.

Pitch Streaks - medium.

Pith - pith (heart center) is permitted in all grades of machine graded scaffold.

Skips - light, hit & miss in a maximum of 10% of the pieces. See Paragraph 720f.

Shake - none through. Surface shakes up to 2' long.

Slope of Grain - limited to 1/15 for machines which do not evaluate slope of grain.

Wane - 1/3 the thickness and 1/10 the width for 1/4 the length, or equivalent except on the wide face.

Warp - light, except very light twist.

The ends of the lumber not tested by the stress grading equipment shall be limited as follows:

Knots

- Edge knots limited in accordance with Paragraph 206.

- Knots away from the edge (elsewhere knots) limited in size to the largest edge knot or non edge knot in the tested portion of the piece which ever is larger.

Slope of grain - limited to 1/12. Limited to 1/15 for machines which do not evaluate slope of grain.

E-Rated Machine Graded Scaffold Plank shall be marked with an approved grade stamp which includes the agency logo, the mill identification, species, seasoning with the applicable E-rated grade designation in millions of pounds per square inch (psi) and applicable flatwise Fb.
207-c. MACHINE STRESS RATED (MSR) SCAFFOLD PLANK.

Machine Stress Rated Scaffold Plank is graded to conform with all provisions of Paragraph 206, Machine Stress Rated Lumber, and the E-rating and visual limitations of the Paragraph.

All pieces shall be mechanically E-rated by a process approved by the American Lumber Standard Committee Board of Review, and the Bureau.

All MSR grades used to manufacture Machine Stress Rated Scaffold Plank shall be qualified and quality controlled in accordance with the provisions of Paragraph 206, and the Bureau Qualification and Quality Control Procedures for Machine Graded Lumber.

The average long span modulus of elasticity of the E-rated grade shall be qualified by test and quality controlled.

The 5th percentile tolerance limit (75% confidence) long span E for the grade shall equal or exceed 0.82 times the assigned average long span E of the grade qualified.

The assigned extreme fiber in bending (Fb) of a Machine Stress Rated Scaffold Plank grade shall be the assigned Fb for the MSR grade adjusted for flatwise use in accordance with Paragraph 200g, and rounded to the nearest 50 psi.

The following visual characteristics and limiting provisions are permitted:

Cup - light.

Holes - limited to 1/6 the width or 1-1/2 inches, whichever is smaller.

Knots - knots may be sounds, unsound, or encased.

- Edge knots are measured and limited in accordance with Paragraph 206.
- Knots away from the edge (elsewhere knots) are limited in size to the next larger edge knot category.
- Surface spike knots are limited on wide face to 1/3 the width.
- Chipped or sloughed knots at the edge of the wide face are permitted, if not through the thickness.
Pitch Pockets - medium

Pitch Streaks - medium

Pith - pith (heart center) is permitted in all grades of machine graded scaffold.

Skips - light, hit & miss in a maximum of 10% of the pieces. See Paragraph 720f.

Shake - none through. Surface shakes up to 2' long.

Slope of Grain - limited to 1/15 for machines which do not evaluate slope of grain.

Wane - 1/3 the thickness and 1/10 the width for 1/4 the length, or equivalent except on the wide face.

Warp - light, except very light twist.

The ends of the lumber not tested by the stress grading equipment shall be limited as follows:

Knots

- Edge knots limited in accordance with Paragraph 206.

- Knots away from the edge (elsewhere knots) limited in size to the largest edge knot or non edge knot in the tested portion of the piece which ever is larger.

Slope of grain - limited to 1/12. Limited to 1/15 for machines which do not evaluate slope of grain.

Machine Stress Rated Scaffold Plank shall be marked with an approved grade stamp which includes the agency logo, the mill identification, species, seasoning, the E-rated grade designation in millions of pounds per square inch (psi), the designation “MSR”, and the applicable MSR E-f grade designation.
MACHINE GRADED SCAFFOLD PLANK
ALL SPECIES

Grade Stamp Facsimiles.

Para. 207-a

MILL 10
1.8 E-RATED

DOUG FIR S-DRY

Para. 207-b

MILL 10
1.9 E-2500f E-RATED
MG Scaffold Plank
Prd. of 1.8E-2100f MSR

DOUG FIR S-DRY

Para. 207-c

MILL 10
1.9 E-2500f E-RATED
MSR Scaffold Plank

DOUG FIR S-DRY
210. STRUCTURAL GLUED LUMBER (all species). Glued lumber identified as structural glued lumber shall meet both the grade specifications of the grade rules under which the lumber is graded, and the glue bond requirements of this paragraph and the WCLIB Glued Lumber Certification and Quality Control Manual. Structural glued lumber identified by a Bureau structural glued quality mark shall be considered as a solid piece. Grade specifications and limitations for structural glued lumber are the same as for lumber without glue joints. The quality of the glue joints is considered a separate factor. Structural glued lumber shall be ordered, acknowledged, and invoiced as structural glued material.

210-a. “CERTIFIED GLUED LUMBER”. All structural glued lumber identified by the Bureau Certification of Structural Glue Joint mark shall meet all the requirements of the rules under which it is graded, and all applicable requirements for end, face, and/or edge joints for exterior adhesives of American National Standard ANSI A190.1 for Structural Glued Laminated Timber. Adhesives used shall meet the requirements of ASTM D2559.

210-b. “CERTIFIED END JOINT”. All end jointed material identified by the Bureau Certification of End Joint mark shall meet all the requirements of the rules under which it is graded, and all applicable requirements for end joints using exterior adhesives of American National Standard ANSI A190.1 for Structural Glued Laminated Timber. Adhesives used shall meet the requirements of ASTM D2559.
## STRUCTURAL GLUED LUMBER

### MAXIMUM PERMITTED KNOT SIZE IN END JOINT AREA

<table>
<thead>
<tr>
<th>Nom. Width</th>
<th>CERTIFIED END JOINT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select Structural</td>
</tr>
<tr>
<td>2&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1-1/4&quot;</td>
</tr>
</tbody>
</table>

* Lt. Framing Grades are 4” nominal width and less.

#### 210-c. “STUD USE ONLY”

End jointed lumber manufactured with adhesives meeting all the provisions of ASTM D2559 for exterior adhesives with the exception of creep (Section 16), may be stamped with “STUD USE ONLY” end joint stamps. “STUD USE ONLY” end jointed lumber is limited to 6” and less in nominal width and 12’ and shorter in length.

### MAXIMUM PERMITTED KNOT SIZE IN END JOINT AREA

<table>
<thead>
<tr>
<th>Nom. Width</th>
<th>STUD USE ONLY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select Structural</td>
</tr>
<tr>
<td>2&quot;</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>3/4&quot;</td>
</tr>
</tbody>
</table>

245
250. The minimum rough thickness of lumber in sizes 1" and thicker shall not be less than 1/8" thicker than the corresponding standard surfaced thickness, except that in 4" and thinner lumber, 20% of a shipment may not be less than 3/32" thicker than the corresponding standard surfaced thickness. The minimum rough widths shall not be less than 1/8" wider than the corresponding standard surfaced widths.

STANDARD SAWN (ROUGH GREEN) DIMENSION AND TIMBERS

<table>
<thead>
<tr>
<th>Nominal Size (Inch)</th>
<th>Standard Sawn</th>
<th>Variation over Standard Sawn Size</th>
<th>Variation under Standard Sawn Size</th>
<th>Minimum Rough Green Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>1-3/4&quot;</td>
<td>1/4&quot;</td>
<td>** 1/16&quot;</td>
<td>** 1-11/16&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>2-3/4&quot;</td>
<td>3/8&quot;</td>
<td>** 1/16&quot;</td>
<td>** 2-11/16&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3-3/4&quot;</td>
<td>3/8&quot;</td>
<td>** 1/16&quot;</td>
<td>** 3-11/16&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>4-3/4&quot;</td>
<td>3/8&quot;</td>
<td>-</td>
<td>4-3/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5-3/4&quot;</td>
<td>3/8&quot;</td>
<td>-</td>
<td>5-3/4&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>7-3/4&quot;</td>
<td>1/2&quot;</td>
<td>1/8&quot;</td>
<td>7-5/8&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>9-3/4&quot;</td>
<td>1/2&quot;</td>
<td>1/8&quot;</td>
<td>9-5/8&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>11-3/4&quot;</td>
<td>1/2&quot;</td>
<td>1/8&quot;</td>
<td>11-5/8&quot;</td>
</tr>
<tr>
<td>14&quot; &amp; larger</td>
<td>1/4&quot; off</td>
<td>1/2&quot;</td>
<td>1/8&quot;</td>
<td></td>
</tr>
</tbody>
</table>

*Standard sawn lumber 5" and thicker shall be cut not more than 3/8" under the nominal size. **20% of the pieces may be 1/32" less.

250-a. In full sawn lumber under these rules, a basic tolerance over the nominal size is permitted as follows: 1/8" over in one inch; 1/4" over in 2 inch; 3/8" over in 3 to 7 inch; and 1/2" over in 8 inch and larger. Full sawn lumber may not be undersized at time of manufacture.

When widths or thicknesses other than those specified above are required, they should be specified in the order.

250-b. Unless otherwise specified, lumber is customarily shipped in accordance with the sizes in the following tables. Some grading paragraphs give additional information on sizes applicable to various items. Additional information on size is contained in paragraphs on patterns.
FINISH, FLOORING, CEILING SIDING, RUSTIC, STEPPING

250-c. Thicknesses apply to all widths and all widths apply to all thicknesses except as modified.

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard Dressed Sizes</th>
<th>Standard Dressed Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finish</td>
<td>1</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Flooring [2]</td>
<td>1-1/2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Ceiling [2]</td>
<td>1-1/2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Stepping [2]</td>
<td>1-1/2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Rustic &amp; drop siding</td>
<td>5/8</td>
<td>2-7/8</td>
</tr>
<tr>
<td>(shiplapped, 3/8&quot; lap)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rustic &amp; drop siding</td>
<td>5/8</td>
<td>3-1/8</td>
</tr>
<tr>
<td>(shiplapped, 1/2&quot; lap)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rustic &amp; drop siding</td>
<td>5/8</td>
<td>5/8</td>
</tr>
<tr>
<td>(dressed and matched)</td>
<td></td>
<td>5/8</td>
</tr>
</tbody>
</table>

[1] For nominal thicknesses under 1 inch, the board measure count is based on the nominal surface dimensions (width by length). With the exception of nominal thicknesses under 1 inch, the nominal thicknesses and widths in this table are the same as the board measure or count sizes.

[2] In tongued-and-grooved flooring and in tongued-and-grooved and shiplapped ceiling of 5/16 inch, 7/16 inch, and 9/16 inch dressed thicknesses, the tongue or lap shall be 3/16 inch wide, with the overall widths 3/16 inch wider than the face widths shown in the table above. In all other worked lumber of dressed thicknesses of 5/8 inch to 1-1/4 inch, the tongue shall be 1/4 inch wide or wider in tongued-and-grooved lumber, and the lap 3/8 inch wide or wider in shiplapped lumber, and the overall widths shall not be less than the dressed face widths shown in the above table plus the width of the tongue or lap.
<table>
<thead>
<tr>
<th>Item</th>
<th>Thicknesses</th>
<th>Face Widths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nominal Size</td>
<td>Min. Dressed Size</td>
</tr>
<tr>
<td></td>
<td>1-1/4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1-1/2</td>
<td>1-1/4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2-1/2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2-1/2</td>
</tr>
<tr>
<td></td>
<td>3-1/2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>3-1/2</td>
</tr>
<tr>
<td></td>
<td>1-9/16</td>
<td>2-15</td>
</tr>
<tr>
<td>Dimenision [2]</td>
<td>5</td>
<td>1/2 off</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>3/4 off</td>
</tr>
<tr>
<td></td>
<td>7-15</td>
<td>3/4 off</td>
</tr>
<tr>
<td></td>
<td>16 &amp; wider</td>
<td>1 off</td>
</tr>
<tr>
<td>Timbers [3]</td>
<td>5 &amp; 6</td>
<td>1/2 off</td>
</tr>
<tr>
<td></td>
<td>7-15</td>
<td>3/4 off</td>
</tr>
<tr>
<td></td>
<td>16 &amp; wider</td>
<td>1 off</td>
</tr>
<tr>
<td></td>
<td>Larger</td>
<td>1&quot; off nom.</td>
</tr>
<tr>
<td>Shiplap</td>
<td>1</td>
<td>3/4</td>
</tr>
<tr>
<td></td>
<td>3/8 inch lap</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1-1/4</td>
<td>1-1/4</td>
</tr>
<tr>
<td></td>
<td>1-1/2</td>
<td>1-1/2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td></td>
<td>3/8 inch tongue</td>
<td></td>
</tr>
<tr>
<td>Centermatch</td>
<td>1</td>
<td>3/4</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1-1/2</td>
<td>1-1/4</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td></td>
<td>3/8 inch tongue</td>
<td></td>
</tr>
<tr>
<td>2 Inch D &amp; M</td>
<td>2</td>
<td>1-1/2</td>
</tr>
</tbody>
</table>

[1] See Para. 3-b(2) for the definition of dry lumber.
[2] Boards less than the minimum thicknesses for 1 inch nominal but 5/8 inch or greater shall be regarded as American Standard Lumber, but such boards shall be marked to show the size and condition of seasoning at the time of dressing. They shall also be distinguished from 1 inch boards on invoices and certificates.
### SIZE STANDARDS
**INDUSTRIAL CLEARS**
**SEASONED AND UNSEASONED**

250-e. Thicknesses apply to all widths and all widths to all thicknesses.

<table>
<thead>
<tr>
<th>Thicknesses</th>
<th>Face Widths</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Dressed</strong></td>
<td><strong>Standard Dressed</strong></td>
</tr>
<tr>
<td>Nominal Inches</td>
<td>Dry Inches</td>
</tr>
<tr>
<td>1</td>
<td>3/4</td>
</tr>
<tr>
<td>1-1/4</td>
<td>1</td>
</tr>
<tr>
<td>1-1/2</td>
<td>1-1/4</td>
</tr>
<tr>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>2-1/2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>2-1/2</td>
</tr>
<tr>
<td>3-1/2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>3-1/2</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE OF RANDOM LENGTHS
ALL WEST COAST SPECIES

See Western Red Cedar, Para. 260-b, for items not covered under “ALL SPECIES.”

260-a. Standard lengths are multiples of 1’. Standard random length loading practices for some items are listed below. In all items longer lengths than those listed may be included at shipper’s option.

(a) FINISH, CASING and BASE. “C&BTR” GRADE
3’ to 16’ or longer; not less than 90% 7’ to 16’ or longer; not more than 3% 3’ and/or 4’.
“D” GRADE
to 16’ or longer; not less than 80% 7’ to 16’ or longer.
“E” GRADE
3’ and longer.

(b) FLOORING, CEILING and SIDING. “C&BTR” GRADE
4’ to 16’ or longer; not less than 90% 8’ to 16’ or longer; not more than 3% 4’ and/or 5’.
“D” GRADE
4’ to 16’ or longer; not less than 80% 8’ to 16’ or longer.
“E” GRADE
4’ or longer.

(c) STEPPING.
“C&BTR” GRADE
3’ to 16’ or longer; not less than 70% 10’ to 16’ or longer.

(d) GUTTER.
GUTTER GRADE
8’ to 24’ or longer; average 18’ or longer.

(e) MOULDINGS.
“MOULDINGS” GRADE
4’ to 16’ or longer; not less than 85% 8’ to 16’ or longer.

(f) BOARDS.
“SELECT MERCHANTABLE,”
“CONSTRUCTION” and “STANDARD” GRADES
6’ to 16’ or longer.
COMMONLY USED LUMBER ABBREVIATIONS

(g) LIGHT FRAMING.
“CONSTRUCTION” and “STANDARD” GRADES
6’ to 16’ or longer.

(h) STRUCTURAL FRAMING.
“STRUCTURAL “ GRADES
2" thick - 6' to 16' and longer. 3" and 4" thick - 8' to 16' and longer.

(i) BEAMS and STRINGERS, POST and TIMBERS.
“SELECT STRUCTURAL,” “NO. 1 STRUCTURAL”, “NO. 2 STRUCTURAL” and “STANDARD” GRADES
8' to 16' or longer.

(j) INDUSTRIAL CLEARS. All thicknesses.
ALL GRADES
6' to 16' or 6' to 20' at mill’s option.
(Shorter lengths are available if ordered)

260-b. Standard lengths are multiples of 1'. Standard random length loading practice for some items is listed below. On all items longer lengths than those listed may be included at shipper’s option.

(a) FINISH, CLEAR PANELING and CEILING.
“A”GRADE
3’ to 16’ or longer; not less than 85% 8’ to 16’ or longer - not more than 15% 3’ to 7’.

“B” GRADE
3’ to 16’ or longer; not less than 75% 8’ to 16’ or longer.

(b) BEVEL SIDING.
Standard lengths are 3' and longer. Multiples of 1'. Standard bundles are 6' to 16' with the inclusion of 17' to 20' optional with the shipper.
“CLEAR HEART” GRADE

“A” GRADE
6" and narrower; not more than 20% of the footage may be 6’ and 7’ bundles. 8" and wider; not more than 15% of the footage may be 6’ and 7’ bundles.

“B” GRADE
Not more than 20% of the footage may be 6’ and 7’ bundles.

“C” GRADE
No specified percentage of lengths guaranteed.

(c) TIGHT KNOT PANELING and SIDINGS.

“SELECT KNOTTY” GRADE
3’ to 16’ or longer; not less than 85% 8’ to 16’ or longer - not more than 15% 3’ to 7’.

“QUALITY KNOTTY” GRADE
3’ to 16’ or longer; not less than 75% 8’ to 16’ or longer - not more than 25% 3’ to 7’.

260-r. LENGTHS IN RADIUS EDGE DECKING.

In specifications for assorted lengths, random lengths, standard stock lengths and for lengths unspecified or indefinite as to range or assortment, standard practice shall be to furnish a fair assortment of standard stock lengths of 10’ to 16’, 18’ or 20’, except percentages of total board-foot quantities in length under 10’ shall be permitted as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>4’ and/or 5’</th>
<th>6’ and/or 7’</th>
<th>8’ and/or 9’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium</td>
<td>0%</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>Standard</td>
<td>0%</td>
<td>6%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Any unfilled portion of 6’ and/or 7’ may be filled in 8’ and/or 9’.
COMMONLY USED LUMBER ABBREVIATIONS

280.
AAR – Association American Railroads
AD – Air dried
ADF – After deduction freight
ALS – American Lumber Standards
AST – At ship tackle
AV – Average
AW&L – All widths and lengths
BD – Board
BD, FT. – Board feet
BDL – Bundle
BEV – Bevel
BH – Boxed heart
B/L, BL – Bill of lading
BM – Board measure
BSND – Bright sapwood no defect
BTR – Better
c – Allowable stress in compression in lbs. per square inch
CB – Center beaded
CF – Cost and freight
CIF – Cost, insurance and freight
CIFE – Cost, insurance, freight, exchange
C/L – Carload
CLG – Ceiling
CLR – Clear
CM – Center matched
CS – Causing seam
CSG – Casing
CV – Center V
DET – Double end trimmed
DF – Douglas fir
DIM – Dimension
DKG – Decking
D/S, DS – Drop siding
D&M – Dressed and matched
D&CM – Dressed and center matched
D&SM – Dressed and standard matched
D2S&CM – Dressed two sides and center matched
D2S&SM – Dressed two sides and standard matched
E – Edge
EB1S – Edge bead one side
EB2S, SB2S – Edge bead two sides
COMMONLY USED LUMBER ABBREVIATIONS

E&CB2S, DB2S, BC&2S – Edge and center bead two sides
EV1S, SV1S – Edge vee one side
EV2S, SV2S – Edge vee two sides
E&CV1S, DV1S, V&CV1S – Edge and center vee one side
E&CV2S, DV2S, V&CV2S – Edge and center vee two sides
EE – Eased edges
EG – Edge (vertical) grain
EM – End matched
f – Allowable stress in bending lbs. per square inch
FAS – Free alongside (vessel)
FG – Flat (slash) grain
FLG – Flooring
FOB – Free on board (named point)
FOHC – Free of heart center
FRT – Freight
Ft – Foot
FT. BM – Feet board measure
FT. SM – Feet surface measure
H. B. – Hollow back
HEM – Hemlock
H & M – Hit and miss
H or M – Hit or miss
IN – Inch or inches
JTD – Jointed
KD – Kiln dried
LBR – Lumber
LCL – Less than carload
LGR – Longer
LGTH – Length
LIN – Lineal
LNG – Lining
M – Thousand
M. BM – Thousand (ft.) board measure
MC – Moisture content
MERCH – Merchantable
MG – Mixed grain
MLDG – Moulding
MSR – Machine Stress Rated
N – Nosed
NBM – Net board measure
COMMONLY USED LUMBER ABBREVIATIONS

N1E – Nose one edge  
PARA. – Paragraph  
PART – Partition  
PAT – Pattern  
PET – Precision end trim  
PLIB – Pacific Lumber Inspection Bureau  
RDM – Random  
REG – Regular  
RGH – Rough  
R/L, RL – Random lengths  
R/W, RW – Random widths  
SB1S – Single bead one side  
SDG – Siding  
SEL – Select  
SG – Slash (flat) grain  
SIT. SPR – Sitka spruce  
S/L or SL – Shiplap  
STD. M – Standard matched  
SM – Surface measure  
SQ – Square  
SQRS – Squares  
SR – Stress Rated  
STD – Standard  
STK – Stock  
STPG – Stepping  
STRUCT – Structural  
S&E – Side and edge  
S1E – Surfaced one edge  
S2E – Surfaced two edges  
S1S – Surfaced one side  
S2S – Surfaced two sides  
S4S – Surfaced four sides  
S1S&CM – Surfaced one side and center matched  
S2S&CM – Surfaced two sides and center matched  
S4S&CS – Surfaced four sides and caulking seam  
S1S1E – Surfaced one side, one edge  
S1S2E – Surfaced one side, two edges  
S2S1E – Surfaced two sides, one edge  
S2S&SM – Surfaced two sides and standard matched  
TBR – Timber  
T&G – Tongued and grooved  
VG – Vertical (edge) grain
COMMONLY USED LUMBER ABBREVIATIONS

WCLB or WCLIB – West Coast Lumber Inspection Bureau
WH – Western hemlock
WDR – Wider
WRC – Western red cedar
WT – Weight
WTH – Width

SYMBOLS
" – Inch or inches
' – Foot or feet
x – By, as 4x4
4/4, 5/4, 6/4, etc. – Thickness expressed in fractions
REINSPECTION

300. Buyer and seller may agree in the terms of sale or otherwise on any basis for the settlement of complaints in respect to the grade, tally, size or moisture content of a shipment or upon any person or agency to reinspect the shipment. Unless otherwise specified by terms of sale or special contract, the grading of lumber is based upon its dimensions as originally manufactured. “Any subsequent change in manufacture or any subsequent change in condition which includes, but is not restricted to, defacing of the material by use of instruments or marks or otherwise, will prohibit a reinspection except with the consent of the parties interested.” In the absence of special agreement, reinspection of lumber of the species covered by these rules originating in an area roughly comprising California, western Oregon, western Washington, and British Columbia will be made by the West Coast Lumber Inspection Bureau. Export shipments inspected and certificated by the West Coast Lumber Inspection Bureau under Export R or N List Rules may be reinspected under current WCLB reinspection provisions. Reinspection services of the Bureau are available to buyer and seller at a reasonable charge. However, the Bureau or its representatives assume no responsibility for, or concern in, arrangement or paying for labor or other service necessary to the reinspection. Reinspection by the Bureau is subject to the following provisions:

a. Upon receipt of complaint from the buyer, unless otherwise settled, the seller shall immediately request the Portland, Oregon office of the Bureau to provide reinspection or re-tally as the case may be, according to its rules in effect at the time of execution of contract; and the buyer shall lend all reasonable assistance to facilitate the reinspection or re-tally. Failing action by the seller, the buyer may request reinspection or re-tally by the Bureau. In any event, both parties shall lend all reasonable assistance to the Bureau to facilitate the reinspection or re-tally. All requests for reinspection or re-tally must be made to the Bureau in writing and must be accompanied by two copies of the exact order or acknowledgment of the order, and two copies of the invoice. (Prices may be deleted.)
b. The buyer shall accept delivery of the shipment prior to filing complaint with the seller. Neither the acceptance nor unloading of the shipment, nor the payment of the invoice, nor the payment of the freight by the buyer, shall be construed as a waiver of his rights to claim that the material received is not of the kind, size, moisture content or grade specified in the seller’s acceptance. Complaints must be filed within 10 days of receipt of the shipment, except that in the case of shipments composed of wrapped, strapped or packaged units, reinspection for grade will be permitted if complaint is filed within 90 days after receipt of shipment.

In such cases, reinspection shall involve only natural grade and manufacturing characteristics which are not altered by time, such as knots, wane, skips, etc. This extension of the time limit for filing complaints is provided solely to protect the buyer’s right to reinspection until units are opened, up to 90 days, and shall not be construed to permit a delay in payment of invoices.

Complaints involving moisture content are to be filed as soon as possible, in any event not more than 72 hours after unloading of the shipment. On complaint involving tally or on factory lumber, the buyer shall hold the entire shipment intact for reinspection. On other complaints, the buyer is required to accept that portion of the shipment which is up to grade, size, or moisture content specified, as the case may be, holding intact only that portion which is in dispute. Buyer’s acceptance of the material he deems to be part of the grade or size ordered does not prejudice his just claim on unaccepted material. Material in dispute shall be properly protected and held until reinspection. The disputed material shall be held intact for not exceeding 30 days after filing the request for reinspection.

If the item is not held intact, that portion which has been accepted or used shall be considered as of the highest grade specified in the order. The volume of any lower grade specified in the order, found on reinspection, shall be considered as applying, in percentage, on the shipment as a whole.

c. All claims for shortage or damage must be supported by affidavit of buyer or his agent, giving piece tally, numbers of car seals if any, car numbers and initials,
also by report of transportation agent at destination or by affidavit that the transportation agent was requested to make such a report and refused to do so.

d. On a complaint on moisture content, reinspection by the Bureau will be made only under the following conditions:

(aa) Moisture content provisions in the rules apply at time of loading of the lumber. Any change in moisture content due to exposure to the weather or to any other cause will make reinspection impossible.

(bb) Moisture content specifications must be furnished the inspector at the time reinspection is requested and must be within the testing range of Bureau moisture meters.

(cc) Unless otherwise agreed upon between buyer and seller, reinspection will include tests of all the pieces that are under complaint in an item.

(dd) A shipment is considered to be of the moisture content specified in the shipment if not more than 5% of the board footage of each item exceeds the allowable moisture content.

e. For reinspection purposes, an item of a shipment consists of a grade and size, without reference to lengths. In mixed grade shipments, the grades specified in the mixture are considered as one grade in determining items. A shipment applying on an order which specifies quantities or percentages of grades is not considered a mixed grade shipment. In shipments containing more than one item, each item is considered separately.

f. The contractual obligation of the seller shall be deemed to have been fulfilled if each item in a car load or a cargo lot shall, upon reinspection under the grading and inspection rules under which the lumber has been graded and sold, be found to be 95% or more of said grade or better, the material below said grade to be accepted by the buyer as of its invoiced grade. When the degrades are in excess of 5%, or when the degrades are found upon reinspection to be more than one grade lower than the grade invoiced, the degrades shall be the property of the seller, while that portion of the shipment which is on or above grade shall be accepted by the buyer as invoiced.
g. The responsibility of the Bureau on reinspections shall be deemed to have been fulfilled when it has supplied all parties concerned with a report on the reinspection.

h. The expense of such reinspection shall be borne by the shipper if the item under complaint is found to be more than 5% below grade; if 5% or less, the expense of reinspection shall be borne by the buyer. If more than one item is under complaint, the expense of reinspection shall be prorated between buyer and seller in the ratio of the invoiced footage of the items found to be more than 5% below grade to those found to be 5% or less below grade. In either case, the person calling for reinspection shall be responsible to the inspection agency for the cost thereof. The Bureau reserves the right to demand prepayment of all charges or a deposit to cover estimated costs of such charges.
400. Standard Patterns

FLOORING

5/8 x 4 C.M. FLOORING

1 x 3, 1 x 4, 1 x 6 FLOORING

1-1/4 x 3, 1-1/4 x 4, 1-1/4 x 6 FLOORING
STANDARD PATTERNS

CEILING
DOUBLE BEADED

5/8 x 4 B. and C.B. 2S CEILING

3/4 x 4 B. and C.B. 2S CEILING
STANDARD PATTERNS

CEILING
DOUBLE BEADED

1 x 6 B. AND C.B. 2S CEILING
STANDARD PATTERNS

CEILING
COMBINATION

5/8 x 4 COMBINATION CEILING

3/4 x 4 COMBINATION CEILING
STANDARD PATTERNS

CEILING

COMBINATION

1 x 6 COMBINATION CEILING
STANDARD PATTERNS

CEILING
E. & C.V. 1S CEILING

5/8 x 4 E. & C.V. 1S CEILING

3/4 x 4 E. & C.V. 1S CEILING

5/8 x 4 E. & C.B. 1S CEILING

3/4 x 4 E. & C.B. 1S CEILING

(See Also Page 301 For Western Red Cedar Bevel Siding Patterns)
SIDING AND PANELING

- 5-3/8" 7-1/8"
- 5" 6-3/4" Face
- 3-3/4" 5-1/2"
- 1-1/4" 1-1/8"R
- 3/8" 23/64 "
- 3/8" 23/64 "
- 23/64 " 23/64 "
- 3/8" 23/64"

1 x 6, 1 x 8 WC-105
STANDARD PATTERNS

SIDING AND PANELING

1 x 8 WC-106

7-1/8" 6-3/4" Face
3/8" 1-3/16" 5-3/8"
1/4" 7/16"
15/64" 9/32" 23/32"
13/64" 11/64" 13/64"
STANDARD PATTERNS

SIDING AND PANELING

1 x 8 WC-116

1 x 6 WC-117
STANDARD PATTERNS

SIDING AND PANELING

12

1 1/4"  1/4"  3/8"  5/32"  1/64"

1"  7/16"  5/32"  15/64"  13/64"  9/32"  23/32"  1/4"

1/4"  1/4"  3/8"  1 x 4, 1 x 6 WC-124

3/8"  1/4"  3/32"  7/64"  3/32"  1/8"  5/32"  13/64"

1"  7/16"  5/32"  15/64"  13/64"  9/32"  23/32"  1/4"

1/4"  1/4"  3/8"  1 x 8 WC-124
STANDARD PATTERNS

SIDING AND PANELING

1 x 4 to 1 x 12 WC-130*

1 x 6, 1 x 8, 1 x 10 WC-131*
STANDARD PATTERNS

SIDING AND PANELING

1 x 4 to 1 x 12 WC-132*

1 x 4 to 1 x 12 WC-133*

1 x 4 to 1 x 12 WC-134*

1 x 4 to 1 x 12 WC-135*

(Recommended use as paneling)
STANDARD PATTERNS

SIDING AND PANELING

1 x 4 to 1 x 12 WC-136

1 x 6, 1 x 8 WC-137

1 x 4 to 1 x 12 WC-138

(Recommended use as paneling)
STANDARD PATTERNS

SIDING AND PANELING

5-3/8" 7-1/8" 9-1/8" 11-1/8"  
5" 6-3/4" 8-3/4" 10-3/4"  
Face  
3/8" 7/32" R 7/32"  
7/16" 7/32" R 7/32"  
7/16" 7/32" R 7/32"  
3-5/16" 5-5/16" Face  
1/8" 9/64" 1/64" 5/64"  
3/16" 1/8" 7/64"  
7/32" 1/4" R  
1/2 x 4, 1/2 x 6 WC-142  
1/2 x 4 to 1/2 x 12 WC-142  
This face rough, saw textured or surfaced
STANDARD PATTERNS

BEVEL SIDING
(DOUGLAS FIR, WESTERN HEMLOCK, SITKA SPRUCE)

(See Also Page 305 For Western Red Cedar Bevel Siding Patterns)
STANDARD PATTERNS

CONSTRUCTION PATTERNS

SHIPLAP

Seasoned
Unseasoned

5-1/8"  7-1/8"  9-1/8"

5-1/8"  6-7/8"  8-7/8"

5-5/8"  7-1/2"  9-1/2"

3/8"

25/32" 3/4" 25/64"

3/8" 3/8" 3/8"

25/64" 25/64" 25/64"

1 x 6, 1 x 8, 1 x 10
STANDARD PATTERNS

CONSTRUCTION PATTERNS

SHIPLAP

Seasoned

Unseasoned

5-\(\frac{1}{8}\)”  7”  9”  11”  Face Seasoned

5”  6-\(\frac{3}{4}\)”  8-\(\frac{3}{4}\)”  10-\(\frac{3}{4}\)”  Face Unseasoned

Seasoned

Unseasoned

5-\(\frac{5}{8}\)”  7-\(\frac{1}{2}\)”  9-\(\frac{1}{2}\)”  11-\(\frac{1}{2}\)” Seasoned

5-\(\frac{1}{2}\)”  7-\(\frac{3}{4}\)”  9-\(\frac{3}{4}\)”  11-\(\frac{3}{4}\)” Unseasoned

Seasoned 1/2”

Unseasoned 1/2”

2 x 6, 2 x 8, 2 x 10, 2 x 12
STANDARD PATTERNS

CONSTRUCTION PATTERNS
SHIPLAP

Seasoned

Unseasoned

5-1/8"  7"  9"  11"  Face
5"  6-3/4"  8-3/4"  10-3/4" Face
Seasoned
Unseasoned

5-5/8"  7-1/2"  9-1/2"  11-1/2"
5-1/2"  7-1/4"  9-1/4"  11-1/4"
Seasoned
Unseasoned

1/2"  1-1/4"
1-9/32"  1-1/4"
1-9/32"  1-1/4"
Seasoned
Unseasoned

3 x 6, 3 x 8, 3 x 10, 3 x 12
STANDARD PATTERNS

CONSTRUCTION PATTERNS
DRESSED and CENTER MATCHED

<table>
<thead>
<tr>
<th>Seasoned</th>
<th>Unseasoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-3/16&quot;</td>
<td>5-1/4&quot;</td>
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<tr>
<td>9/32&quot;</td>
<td>11/32&quot;</td>
</tr>
<tr>
<td>15/64&quot;</td>
<td>17/64&quot;</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
</tr>
</tbody>
</table>
CONSTRUCTION PATTERNS
DRESSED and CENTER MATCHED

STANDARD PATTERNS

2 x 6, 2 x 8, 2 x 10, 2 x 12 D & C.M.
STANDARD PATTERNS

CONSTRUCTION PATTERNS
DRESSED and CENTER MATCHED

<table>
<thead>
<tr>
<th>Seasoned</th>
<th>Unseasoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-3/8&quot;</td>
<td>7-3/8&quot;</td>
</tr>
<tr>
<td>5-1/8&quot;</td>
<td>7&quot;</td>
</tr>
<tr>
<td>Face Seasoned Unseasoned</td>
<td></td>
</tr>
<tr>
<td>5&quot;</td>
<td>6-3/4&quot;</td>
</tr>
<tr>
<td>27/32&quot;</td>
<td>13/16&quot;</td>
</tr>
<tr>
<td>27/32&quot;</td>
<td>13/16&quot;</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Seasoned</th>
<th>Unseasoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>7/16&quot;</td>
</tr>
<tr>
<td>1/8&quot;R</td>
<td></td>
</tr>
</tbody>
</table>

3 x 6, 3 x 8, 3 x 10, 3 x 12 D & C.M.
STANDARD PATTERNS

CONSTRUCTION PATTERNS
GROOVED FOR SPLINES

<table>
<thead>
<tr>
<th>Seasoned</th>
<th>Unseasoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-3/8&quot;</td>
<td>7-1/2&quot;</td>
</tr>
<tr>
<td>5-1/2&quot;</td>
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<td>7-1/2&quot;</td>
</tr>
<tr>
<td>5-1/2&quot;</td>
<td>7-1/4&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seasoned</th>
<th>Unseasoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/8&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>3/4&quot;</td>
</tr>
</tbody>
</table>

3" GROOVED FOR SPLINES S2S
STANDARD PATTERNS

CONSTRUCTION PATTERNS
GROOVED FOR SPLINES

4" S2S GROOVED FOR SPLINES
6" AND THICKER, ALL WIDTHS GROOVED
1-5/8" WIDE AND 1-11/32" DEEP
STANDARD PATTERNS

CONSTRUCTION PATTERNS

"V" JOINT

Seasoned
5-3/8"  7-1/8"

Unseasoned
5-1/8"  7-3/8"

Seasoned
5"  6-3/4" Face

Unseasoned
5-3/8"  7-1/8"

Seasoned
5-1/8"  7-3/8"

Unseasoned
5-1/2"  7-3/8"

Seasoned
5-3/8"  7-1/8"

Unseasoned
5-1/8"  7-3/8"

Seasoned
5"  6-3/4" Face

Unseasoned
5-1/2"  7-3/8"

2 x 6, 2 x 8 WC-200
### Construction Patterns

#### "V" Joint

<table>
<thead>
<tr>
<th>Seasoned</th>
<th>Unseasoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot; 3/8&quot;</td>
<td>7 1/8&quot;</td>
</tr>
<tr>
<td>5 1/2&quot;</td>
<td>7 3/8&quot;</td>
</tr>
<tr>
<td>5&quot; 1/8&quot;</td>
<td>7&quot;</td>
</tr>
<tr>
<td></td>
<td>3/8&quot;</td>
</tr>
</tbody>
</table>

- **Face**: Seasoned, Unseasoned

<table>
<thead>
<tr>
<th>Seasoned</th>
<th>Unseasoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/16&quot;</td>
<td>7/16&quot;</td>
</tr>
<tr>
<td>7/32&quot;</td>
<td>23/32&quot;</td>
</tr>
<tr>
<td>3/32&quot;</td>
<td>27/32&quot;</td>
</tr>
</tbody>
</table>

- **Face**: Seasoned, Unseasoned

### Measurements

- **3 x 6, 3 x 8 WC-300**

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**STANDARD PATTERNS**

**289**
STANDARD PATTERNS

CONSTRUCTION PATTERNS
SEASONED ACOUSTICAL

2 x 6, 2 x 8 WC-202
STANDARD PATTERNS

CONSTRUCTION PATTERNS
SEASONED ACOUSTICAL

3 x 6, 3 x 8 WC-302
STANDARD PATTERNS

CONSTRUCTION PATTERNS

SEASONED ACOUSTICAL
and “V” JOINT COMBINATION

5-3/8” 6-3/4” Face
7/16” 7/16” R
3/16” 1/4” 3/16”
1/8” 1/8” 1/8”
1/4”
1/2”
1-1/2”
1/2”
1/2”
1/2”
5” 6-3/4” Face
7-1/8”
5/32”
17/32”
9/32”
7/16”
7/16”
3/16”
3/16”
1/8”
1/8”
1/8”
1/8”
1/4”
2 x 6, 2 x 8 WC-204
STANDARD PATTERNS

CONSTRUCTION PATTERNS
SEASONED ACOUSTICAL
and “V” JOINT COMBINATION
V – JOINT PATTERN
V – JOINT PATTERN

STANDARD PATTERNS
STANDARD PATTERNS

GROOVED PATTERN

5-9/16" Face

Equal spaces

3 x 6 WC-305-b
GROOVED PATTERN

- Face: 5-1/4"
- 5º
- 5/16"
- 3/8" (repeated)
- 1-25/32"
- 3-1/2"
- Equal spaces

Dimensions:
- 5-9/16"
- 27/64"
- 7/16"
- 1-29/32"
- 3/8"
- 3/16"
- 7/16"
- 27/64"

Material: 4 x 6 WC-405-b
STANDARD PATTERNS

STRIATED PATTERN

3 x 6 WC-305-c
STANDARD PATTERNS

STRIATED PATTERN

5-9/16" Face

5-1/4" Face

5º

5º

5º

3/8"

1-25/32" 3-1/2"

27/64"

7/16"

1-25/32" 3-1/2"

27/64"

7/16"

27/64"

7/16"

1/8" R

1/8" R

1/8" R

Equal spaces

4 x 6 WC-405-c

299
STANDARD PATTERNS

EASED JOINT PATTERN

5-9/16" Face
5-1/4" 2-1/2"
1-1/16" 7/16"
7/32" 7/16"
9/32" 5/16"
5/16" 3/8" 5/16"
1/8"R 1/8"R 3/16"R
3/16"R 1/8"R 5/16"
3/8" 1-1/8" 3/8"
5/16" 1/4"
5º 5º 5º

3 x 6 WC-305-d
STANDARD PATTERNS

EASED JOINT PATTERN

4 x 6 WC-405-d

5-9/16"
5-1/4"

5º

3/8"

5/16" R 3/16" R

29/64"
27/64"
7/64"
7/16"
1-25/32"
3-1/2"
27/64"
3/8"
1/8" R
1/4"

3/16" R

3/16"

1-27/32"
3/8"
7/16"
7/16"

1/4"

5/16"

5-1/4" Face

5-21/32"
STANDARD PATTERNS

LOG CABIN SIDING

5-7/16" Face
4-19/32" Face
4-3/16"
2-7/8"R
2 x 6 WC-206
STANDARD PATTERNS

PANELING

Note: These patterns are usually placed vertically.
STANDARD PATTERNS

PANELING

1-3/8", 5/16" 3/4"Face 5/16" 1/4" 1/4" 3/4" 1/2 x 1-1/2 WC-173S (Spline)

1 x 3, 1 x 4, 1 x 6, 1 x 8, 1 x 10, 1 x 12 WC-173

Sometimes rough face

Face

Face

Face

WC-172


1 x 3, 1 x 4, 1 x 6, 1 x 8, 1 x 10, 1 x 12 WC-172


1 x 3, 1 x 4, 1 x 6, 1 x 8, 1 x 10, 1 x 12 WC-172

1/32" 3/8" 3/8" 3/4" 9/32" 7/32" 1/4" 1/32"

1 x 3, 1 x 4, 1 x 6, 1 x 8, 1 x 10, 1 x 12 WC-172

305
STANDARD PATTERNS

PANELING

Random widths may be used to give a uniform face pattern.
STANDARD PATTERNS

GUTTER

3 x 4 Boston

3 x 5 Boston
GUTTER

STANDARD PATTERNS

1-1/8" R

3/16"

1-1/8" R

1-3/16" R

1/2" R

1/16" R

1/16" R

9/16"

3/16"

3/16"

3/16"

3/16"

7/16"

11/32"

1/16"

1/16"

1/16"

1/16"

1/16"

1/16"

1-3/32"

1-3/32"

1-3/32"

1-3/32"

1-3/6"

1-3/6"

5-1/2"

1-1/8"

1-3/2"

2-7/16 R

1-7/8"

1-1/2" R

1-1/2" R

1-1/2" R

1-1/4" R

4 x 6 Boston

13/16"

2-5/8"

3-1/2"

1/8"

1/8"
STANDARD PATTERNS

GUTTER

4 x 5 Ohio
STANDARD PATTERNS

CEDAR BEVEL SIDING

1/2 x 4, 1/2 x 5, 1/2 x 6, 1/2 x 8  WR-161

5/8 x 8, 5/8 x 10  WR-163

3/4 x 8, 3/4 x 10, 3/4 x 12  WR-165
STANDARD PATTERNS

CEDAR CEILING

1 x 4 WR-166

1 x 4 WR-168
GLOSSARY

700. Throughout these rules various words and terms are used with meanings specifically applicable to lumber. In the use of these rules, a full understanding of the words and terms in this Glossary is essential. An Index to the Glossary follows:

702. BURL
704. CHECKS
706. COMPRESSION WOOD
708. DECAY
710. EDGE
711. FULL SAWN
712. GRAIN
713. GRAIN TIGHT
714. HEART
715. HEAT TREATED (HT)
716. HOLES
718. KNOTS
720. MANUFACTURING IMPERFECTIONS
722. MANUFACTURING CLASSIFICATION
724. MOISTURE CONTENT
726. OCCASIONAL PIECES
728. PITCH
730. PITCH STREAK
732. PITH
734. POCKETS (including Pitch Pockets and Bark Pockets)
736. PLUGS AND FILLERS
738. SAPWOOD
739. SAW-SIZED
740. SHAKE
742. SPLITS
744. STAINS
746. STRESS GRADES
748. TRIM
750. WANE
752. WARP
DEFINITIONS

702. BURL – A distortion of grain, usually caused by abnormal growth due to injury of the tree. The effect of burls is assessed in relation to knots.

704. CHECKS – A separation of the wood normally occurring across or through the rings of annual growth and usually as a result of seasoning.

(a) A surface check occurs on a face of a piece.
(b) A through check extends from one surface of a piece to the opposite or adjoining surface.
(c) Small checks are not over 1/32" wide and not over 4" long.
(d) Medium checks are not over 1/32" wide and not over 10" long.
(e) Large checks are more than 1/32" wide or longer than 10" or both.
(f) A roller check is a crack in the wood structure caused by a piece of cupped lumber being flattened in passing between the machine rollers.

A light roller check is a perceptible opening not over 2' long.
A medium roller check is a perceptible opening over 2' long but not exceeding 4' in length.
A heavy roller check is over 4' in length.

706. COMPRESSION WOOD – Abnormal wood that forms on the under side of leaning and crooked coniferous trees. It is characterized, aside from its distinguishing color, by being hard and brittle and by its relatively lifeless appearance. Compression wood shall be limited in effect to other appearance or strength reducing characteristics permitted in the grade.

708. DECAY (UNSOUND WOOD) – A disintegration of the wood substance due to action of wood-destroying fungi, and is also known as dote or rot. Some examples are as follows:

(a) Heart center decay is a localized decay developing along the pith in some species and is detected by visual inspection. The limitation for heart center decay applies to Southern Pine. Heart center decay develops in the living tree and does not progress further after the tree is cut.
(b) White specks are small white or brown pits or spots in wood caused by the fungus “Fomes pini.” It develops in the living tree and does not develop further in wood in service. Where permitted in these rules it is so limited that it has no more effect on the intended use of the pieces than other characteristics permitted in the same grade. Pieces containing white speck are no more subject to decay than pieces which do not contain it. NOTE: “Firm” in relation to white speck infers that it will not crumble readily under thumb pressure and cannot be easily picked out.

(c) Honeycomb is similar to white speck but the pockets are larger. Where permitted in the rules it is so limited that it has no more effect on the intended use of the piece than other characteristics permitted in the same grade. Pieces containing honeycomb are no more subject to decay than pieces which do not contain it. NOTE: “Firm” in relation to honeycomb infers that it will not crumble readily under thumb pressure and cannot be easily picked out.

(d) Incipient decay is an early stage of decay in which disintegration of the wood fibers has not proceeded far enough to soften or otherwise change the hardness of the wood perceptibly. It is usually accompanied by a slight discoloration or bleaching of the wood.

(e) Peck is channeled or pitted areas or pockets found in cedar and cypress. Wood tissue between pecky areas remains unaffected in appearance and strength. All further growth of the fungus causing peckiness ceases after the trees are felled.

710. **EDGE** – There are three meanings for edge: (1) The narrow face of rectangular-shaped pieces. (2) The corner of a piece at the intersection of two longitudinal faces. (3) In stress grades that part of the wide face nearest the corner of the piece.

(a) Eased edges means slightly rounded surfacing on pieces of lumber to remove sharp corners. The standard radius for 1", 2", 3" and 4" nominal thickness lumber shall not exceed 1/16", 1/8",
DEFINITIONS

3/16" and 1/4" respectively. NOTE: Lumber 4" or less in thickness is frequently shipped with eased edges unless otherwise specified.

(b) Square edged means free from wane and without eased edges.

(c) Free of wane means without wane but has either eased or square edges. (See WANE definition.)

(d) Square corners means without eased edges but has an allowance for wane in certain grades.

(e) To “destroy the nailing edge” shall mean (1) the decay occupies more of the narrow face than the allowable maximum wane in thickness when in streak form, or (2) the decay occupies more than twice the length of the allowable knot hole when a spot occurs completely through the narrow face.

711. FULL SAWN – When specified to be full sawn, lumber may be manufactured to the basic oversize tolerance as provided in Para. 250-a, but may not be undersize at time of manufacture.

712. GRAIN – The fibers in wood and their direction, size, arrangement, appearance or quality.

(a) For requirements and method of measuring medium grain, close grain and dense material, see Para. 204.

(b) Slope of grain is the deviation of the line of fibers from a straight line parallel to the sides of the piece. For method of measurement, see Para. 203.

(c) Summerwood is the portion of the annual growth ring formed during the latter part of the yearly growth ring. It is darker in color, more dense, and stronger mechanically than springwood.

(d) Springwood is the portion of the annual growth ring formed during the early part of the yearly growth period. It is lighter in color, less dense, and not as strong mechanically as summerwood.

(e) Vertical grain (VG) (Edge grain EG) (Rift grain) lumber is a piece or pieces sawn at approximately right angles to the annual growth rings so that the rings form an angle of 45 degrees or more with the surface of the piece.
(f) Flat grain (FG) (Slash grain SG) lumber is a piece or pieces sawn approximately parallel to the annual growth rings so that all or some of the rings form an angle of less than 45 degrees with the surface of the piece.

(g) Mixed grain (MG) lumber includes either or both vertical and flat grained pieces.

(h) Spiral grain is a deviation in the slope of grain caused when the fibers in a tree take a spiral course around the trunk of the tree, instead of the normal vertical course.

(i) Diagonal grain is a deviation in the slope of grain caused by sawing at an angle with the bark of the tree. See slope of grain.

713. GRAIN TIGHT – Lumber which is suitable for lining and decking of rail cars which transport cereal grains.

714. HEART – (Heartwood) Inner core of the tree trunk comprising the annual rings containing nonliving elements. In some species, heartwood has a prominent color different from sapwood.

(a) Boxed heart means with the pith enclosed in the piece.

(b) Heart center is the pith or center core of the log.

(c) Free of heart centers (FOHC) means without pith (side cut). An occasional piece (See Para. 726) when showing pith for not more than 1/4 the length on the surface shall be accepted.

(d) Firm red heart is a stage of incipient decay characterized by a reddish color in the heartwood, which does not render the wood unfit for the majority of yard purposes.

(e) Heartwood and sapwood of equivalent character are of equal strength. No requirement of heartwood is made when strength alone is the governing factor.

(f) Heartwood is more durable than sapwood. When wood is to be exposed to decay-producing conditions without preservative treatment, it shall be permitted to specify the minimum percentage of
heartwood to be present in all pieces in a shipment.

(g) Sapwood takes preservative treatment more readily than heartwood.

715. HEAT TREATED (HT) – Green lumber which has been placed in a closed chamber and artificial heat added until the lumber achieves a minimum core temperature of 56°C for a minimum of 30 minutes.

716. HOLES – Holes either extend partially or wholly through the piece. An alternate designation for holes which extend only partially through the piece is surface pits. Unless otherwise specified, holes are measured the same as knots. Holes are classified by size as follows:

(a) A pin hole is not over 1/16” in diameter.

(b) A medium (small) hole is not over 1/4” in diameter.

(c) A large hole is not over 1” in diameter.

(d) A very large hole is over 1” in diameter.

718. KNOTS – A portion of a branch or limb that has become incorporated in a piece of lumber. In lumber, knots are classified as to form, size, quality and occurrence. A red knot is one that results from a live branch growth in the tree and is intergrown with the surrounding wood. A black knot is one that results from a dead branch which the wood growth of the tree has surrounded.

(a) A round knot is produced when the limb is cut at approximately a right angle to its long axis.

(b) An oval knot is produced when the limb is cut at slightly more than a right angle to the long axis.

(c) A spike knot is produced when the limb is cut either lengthwise or diagonally.

(d) A pin knot is not over 1/2”.

(e) A small knot is not over 3/4”.

(f) A medium knot is not over 1-1/2”.

(g) A large knot is over 1-1/2”.

(h) A sound knot contains no decay.

(i) A pith knot is sound in all respects except it
contains a pith hole not over 1/4” in diameter.

(j) A hollow knot is a sound knot containing a hole greater than 1/4” in diameter. Through opening of a hollow knot is limited to the size of other holes permitted.

(k) An unsound knot contains decay.

(l) A “firm” knot is solid across its face but contains incipient decay.

(m) A tight knot is so fixed by growth, shape or position that it retains its place in the piece.

(n) An intergrown knot is one whose growth rings are partially or completely intergrown on one or more faces with the growth rings of the surrounding wood.

(o) A watertight knot has its annual rings completely intergrown with those of the surrounding wood on one surface of the piece, and it is sound on that surface.

(p) An encased knot is one which is not intergrown with the growth rings of the surrounding wood.

(q) A “loose” or “not firmly fixed” knot is one not held tightly in place by growth, shape or position.

(r) A “fixed” knot will retain its place in dry lumber under ordinary conditions but is movable under pressure though not easily pushed out.

(s) A knot cluster is two or more knots grouped together as a unit with the fibers of the wood deflected around the entire unit. A group of single knots is not a knot cluster.

(t) A star-checked knot has radial checks.

(u) Well-scattered knots are not in clusters and each knot is separated from any other by a distance at least equal to the diameter of the smaller of the two.

(v) Well-spaced knots means that the sum of the sizes of all knots in any 6” of length of a piece must not exceed twice the size of the largest knot permitted. More than one knot of maximum permissible
DEFINITIONS

size must not be in same 6” of length and the combination of knots must not be serious.

720. MANUFACTURING IMPERFECTIONS — Means all imperfections or blemishes which are the result of surfacing, such as the following:

(a) Chipped grain is a barely perceptible irregularity in the surface of a piece caused when particles of wood are chipped or broken below the line of cut. It is too small to be classed as torn grain and is not considered unless in excess of 25% of the surface involved.

(b) Torn grain is an irregularity in the surface of a piece where wood has been torn or broken out by surfacing. Torn grain is described as follows:

Very light torn grain not over 1/64” deep.
Light torn grain not over 1/32” deep.
Medium torn grain not over 1/16” deep.
Heavy torn grain not over 1/8” deep.
Very heavy torn grain over 1/8” deep.

(c) Raised grain is a roughened condition of the surface of dressed lumber in which the hard summerwood is raised above the softer springwood, but not torn loose from it. Very light raised grain is not over 1/64”.

Light raised grain is not over 1/32”.
Medium raised grain is not over 1/16”.
Heavy raised grain is not over 1/8”.

(d) Loosened grain is a grain separation or loosening between springwood and summerwood without displacement.

Very light loosened grain is not over 1/64” separation.
Light loosened grain is not over 1/32” separation.
Medium loosened grain is not over 1/16” separation.
Heavy loosened grain is not over 1/8” separation.
Very heavy loosened grain is over 1/8” separation.
(e) Skips are areas on a piece that failed to surface clean. Skips are described as follows:

Very light skip is not over 1/64” deep. *[and approximately 6” in length.]

Light skip is not over 1/32” deep. *[On face, may be 12” in length and on edge, may be 2’ long.]

Medium skip is not over 1/16” deep. *[On face, may be 12” in length and on edge, may be 2’ long.]

Heavy skip is not over 1/8” deep.

* Portions of definitions of skips in brackets are not included in National definitions.

(f) Hit and miss is a series of skips not over 1/16” deep with surfaced areas between.

(g) Hit or miss means completely or partly surfaced or entirely rough. Scantness may be 1/16”.

(h) Mismatch is an uneven fit in worked lumber when adjoining pieces do not meet tightly at all points of contact or when the surface of adjoining pieces are not in the same plane. Slight mismatch is a barely evident trace of mismatch.

Very light mismatch is not over 1/64”.

Light mismatch is not over 1/32”.

Medium mismatch is not over 1/16”.

Heavy mismatch is not over 1/8”.

(i) Machine burn is a darkening of the wood due to overheating by machine knives or rolls when pieces are stopped in machine.

(j) Machine bite is a depressed cut of the machine knives at the end of the piece.

Very light machine bite is not over 1/64” deep.

Light machine bite is not over 1/32” deep.

Medium machine bite is not over 1/16” deep.

Heavy machine bite is not over 1/8” deep.

Very heavy machine bite is over 1/8” deep.

(k) Machine gouge is a groove cut by the machine below the desired line.
DEFINITIONS

Very light machine gouge is not over 1/64” deep.
Light machine gouge is not over 1/32” deep.
Medium machine gouge is not over 1/16” deep.
Heavy machine gouge is not over 1/8” deep.
Very heavy machine gouge is over 1/8” deep.

A machine offset is an abrupt dressing variation in the edge surface which usually occurs near the end of the piece and without reducing the width or without changing the plane of the wide surface. Very light machine offset is a variation not over 1/64”.
Light machine offset is a variation not over 1/32”.
Medium machine offset is a variation not over 1/16”.
Heavy machine offset is a variation not over 1/8”.
Very heavy machine offset is a variation over 1/8”.

Chip marks are shallow depressions or indentations on or in the surface of dressed lumber caused by shavings or chips getting embedded in the surface during dressing.
Very light chip marks are not over 1/64” deep.
Light chip marks are not over 1/32” deep.
Medium chip marks are not over 1/16” deep.
Heavy chip marks are not over 1/8” deep.

Knife marks are the imprints or markings of the machine knives on the surface of dressed lumber. Very slight knife marks are visible only from a favorable angle and are perfectly smooth to the touch. Slight knife marks are readily visible but evidence no unevenness to the touch.

Wavy dressing involves more uneven dressing than knife marks.
Very light wavy dressing is not over 1/64” deep.
Light wavy dressing is not over 1/32” deep.
Medium wavy dressing is not over 1/16” deep.
Heavy wavy dressing is not over 1/8” deep.
DEFINITIONS

Very heavy wavy dressing is over 1/8” deep.

722. CLASSIFICATION OF MANUFACTURING IMPERFECTIONS

(a) Standard “A” Manufacture admits: Very light torn grain; occasional very light chip marks; very slight knife marks.

(b) Standard “B” Manufacture admits: Very light torn grain; very light raised grain; very light loosened grain; very light chip marks; average of one very light chip mark per lineal foot but not more than two in any lineal foot; very slight knife marks; slight mismatch.

(c) Standard “C” Manufacture admits: Medium torn grain; light raised grain; light loosened grain; very light machine bite; very light machine gouge; very light machine offset; light chip marks if well scattered; occasional medium chip marks; very slight knife marks; slight mismatch.

(d) Standard “D” Manufacture admits: Heavy torn grain; medium raised grain; very heavy loosened grain; light machine bite; light machine gouge; light machine offset; medium chip marks; slight knife marks; very light mismatch.

(e) Standard “E” Manufacture admits: Very heavy torn grain; raised grain; very heavy loosened grain; medium machine bite; machine gouge; medium machine offset; chip marks; knife marks; light wavy dressing; light mismatch.

(f) Standard “F” Manufacture admits: Very heavy torn grain; raised grain; very heavy loosened grain; heavy machine bite; machine gouge; heavy machine offset; chip marks; knife marks; medium wavy dressing; medium mismatch.

724. MOISTURE CONTENT – The weight of the water in wood expressed in percentage of the weight of the oven-dry wood.

726. OCCASIONAL PIECES – Means not more than
DEFINITIONS

10% of the pieces in a parcel or shipment.

728. PITCH – Is an accumulation of resinous material.
   (a) Light pitch is the light but evident presence of pitch.
   (b) Medium pitch is a somewhat more evident presence of pitch than is the light.
   (c) Heavy pitch is a very evident accumulation of pitch showing by its color and consistency.
   (d) Massed pitch is a clearly defined accumulation of solid pitch in a body by itself.

730. PITCH STREAK – Is a well-defined accumulation of pitch in the wood cells in a streak. Pitch streaks are described as follows, with equivalent areas being permissible:
   (a) Very small pitch streak 3/8” in width and 15” in length.
   (b) Small pitch streak 1/12 the width and 1/6 the length of the piece.
   (c) Medium pitch streak 1/6 the width and 1/3 the length of the piece.
   (d) A large pitch streak is not over 1/4 the width by 1/2 the length of the piece.
   (e) A very large pitch streak is over 1/4 the width by 1/2 the length of the piece.
   (f) A pitch seam is a shake or check which contains pitch.

732. PITH – Is the small soft core in the structural center of a log.
   (a) Very small pith is not over 1/8” wide and occupies on face surface not over 1/4 square inch (1/8” wide by 2” long, or 1/16” by 4”).
   (b) Small pith occupies not over 3/4 square inch (1/4” by 3”, 3/16” by 4”, 1/8” by 6”, or 1/16” by 12”).
   (c) Free of pith means that pith on or within the body of the piece is prohibited.

734. POCKET - A well-defined opening between the rings of annual growth which develops during the growth of the tree. It usually contains pitch or bark. Pockets are described
as follows with equivalent areas being permissible:

(a) Very small pocket – 1/16” in width and 3” in length, or 1/8” in width and 2” in length.

(b) Small pocket – 1/16” in width and 6” in length, or 1/8” in width and 4” in length, or 1/4” in width and 2” in length.

(c) Medium pocket – 1/16” in width and 12” in length, or 1/8” in width and 8” in length, or 3/8” in width and 4” in length.

(d) A large pocket is not over 4 square inches in area.

(e) A very large pocket is over 4 square inches in area.

(f) A closed pocket has an opening on one surface only.

(g) A through or open pocket has an opening on opposite surfaces, and the through opening is considered the same as a through hole of equal size.

736. PLUGS AND FILLERS – Wood plugs and fillers are inserted into pieces of lumber to improve their appearance and usefulness. Lumber containing plugs and fillers shall only be shipped when the order, acknowledgment and invoice carry reference to the inserts. Quality of the inserts and workmanship must be in keeping with the quality of the grade. In dimension and other lumber graded for strength, inserts are limited to the same size and location as knots.

738. SAPWOOD – Outer layers of growth between the bark and the heartwood which contain the sap.

(a) Bright sapwood shows no stain and is not limited in any grade unless specifically stated in the grade description.

(b) Sapwood restrictions waived means that any restrictions in a rule on the amount of sapwood permitted in pieces graded under that rule are not to apply.

(c) Bright sapwood no defect (BSND) means that bright sapwood is permitted in each piece in any amount.

739. SAW-SIZED lumber is uniformly sawn to the net size for surfaced lumber, for uses requiring a rough texture. A slight variation in sawing of not more than 1/32” under in
20% of the pieces, and 1/8” over is permitted.

739-A. SIZED FRAMING lumber, 2” to 4” thick, 2” and wider – Sized Framing lumber is uniformly manufactured to the net surfaced sizes. Sized lumber may be rough, surfaced or partially surfaced on one or more faces. When opposing rough faces occur in the manufacture of Sized Framing, a variation in size of 1/32” under in 20% of the pieces and 1/32” over in No. 2 & Better and Standard & Better grades shall be permitted. Stud, Utility, and No. 3 grades shall permit a variation of 1/16” in twenty percent of the pieces over or under the standard surfaced size on opposing rough faces.

The appropriate skip provisions on surfaced faces shall apply. Sized Framing lumber shall meet all other grade provisions of the Rules. When Sized Framing is grade stamped, material shall be stamped as such.

740. SHAKE – A lengthwise separation of the wood which occurs between or through the rings of annual growth.

(a) A light shake is not over 1/32” wide.
(b) A medium shake is not over 1/8” wide.
(c) A surface shake occurs on only one surface of a piece.
(d) A through shake extends from one surface of a piece to the opposite or to an adjoining surface.
(e) A pith shake (or heart shake or heart check) extends through the growth rings from or through the pith towards the surface of a piece, and is distinguished from a season check by the fact that its greatest width is nearest the pith, whereas the greatest width of a season check in a pith-centered piece is farthest from the pith.
(f) A ring shake occurs between the growth rings to partially or wholly encircle the pith.

742. SPLITS – A separation of the wood through the piece to the opposite surface or to an adjoining surface due to the tearing apart of the wood cells.

(a) A very short split is equal in length to 1/2 the width of the piece.
(b) A short split is equal in length to the width of the
DEFINITIONS

piece and in no case exceeds 1/6 the length.
(c) A medium split is equal in length to twice the width of the piece and in no case exceeds 1/6 the length.
(d) A long split is longer than a medium split.

744. STAINED WOOD.

(a) Stained Heartwood and Firm Red Heart – Stained Heartwood or Firm Red Heart is a marked variation from the natural color. NOTE: It ranges from pink to brown. It is not to be confused with natural red heart. Natural color is usually uniformly distributed through certain annual rings, whereas stains are usually in irregular patches. In grades where it is permitted, it has no more effect on the intended use of the piece than other characteristics permitted in the grade.

(b) Stained Sapwood - Stained Sapwood similarly has no effect on the intended use of the pieces in which it is permitted but affects appearance in varying degrees.
   (1) Light stained sapwood is so slightly discolored that it does not affect natural finishes difference in coloring.
   (2) Medium stained sapwood has a pronounced difference in coloring. NOTE: Sometimes the usefulness for natural finishes but not for paint finishes is affected.
   (3) Heavy stained sapwood has so pronounced a difference in color as to obscure the grain of the wood but the lumber containing it is acceptable for paint finishes.

(c) Discoloration through exposure to the elements is admitted in all grades of framing and sheathing lumber.

746. STRESS GRADES – Lumber grades having assigned working stress and modulus of elasticity values in accordance with accepted basic principles of strength grading, and the provisions of sections 6.3.2.1 and 6.3.2.2 of Voluntary Product Standard 20-15.
DEFINITIONS

748. TRIM

(a) Trimming of lumber is the act of crosscutting a piece to a given length.

(b) Double end trimmed (DET) NOTE: It is intended that DET lumber be trimmed square on both ends. Tolerances are found in certified grading rules.

(c) Precision end trimmed (PET) lumber is trimmed square on both ends to uniform lengths with a manufacturing tolerance of 1/16” over or under in length in 20% of the pieces.

(d) Square end trimmed lumber is trimmed square having a manufacturing tolerance of 1/64” for each nominal 2” of thickness or width.

750. WANE – Bark or lack of wood from any cause, except eased edges, on the edge or corner of a piece of lumber.

Wane away from ends extending partially or completely across any face is permitted for one foot if no more serious than skips in dressing allowed or across a narrow face if no more damaging than the knot hole allowed (not to exceed in length twice the diameter of the maximum knot hole allowed in the grade) and is limited to one occurrence in each piece. These variations shall not be allowed in more than 5% of the pieces. (This provision applies only to the National Grading Rule for Dimension Lumber.)

752. WARP – Any deviation from a true or plane surface, including bow, crook, cup and twist or any combination thereof. Warp restrictions are based on the average form of warp as it occurs normally, and any variation from this average form, such as short kinks, shall be appraised according to its equivalent effect. Pieces containing two or more forms shall be appraised according to the combined effect in determining the amount permissible. In these rules warp is classified as very light, light, medium and heavy, and applied to each width and length as set forth in the various grades in accordance with the following provisions and tables:

(a) Bow is a deviation flatwise from a straight line drawn from end to end of a piece. It is measured at the point of greatest distance from the straight line. The maximum amount of bow allowed in a grade is as follows: If under 2” thick, three times as much as crook for 2” faces. If 2” thick and under 3”, twice
as much as crook for 2” faces. If 3” thick and over, the same as the amount of crook for that thickness.

(b) Crook is a deviation edgewise from a straight line drawn from end to end of a piece. It is measured at the point of greatest distance from the straight line. The maximum amount of crook allowed shall be that shown in the table below.

<table>
<thead>
<tr>
<th>Length in feet</th>
<th>Description</th>
<th>Width of Piece</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2”</td>
<td>3”</td>
</tr>
<tr>
<td>4 &amp; 6</td>
<td>Very Light</td>
<td>1/8</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3/8</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>1/2</td>
</tr>
<tr>
<td>8</td>
<td>Very Light</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>1/2</td>
</tr>
<tr>
<td>10</td>
<td>Very Light</td>
<td>3/8</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>3/4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>1-3/8</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>1-3/4</td>
</tr>
<tr>
<td>12</td>
<td>Very Light</td>
<td>1/2</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>1-1/2</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>Very Light</td>
<td>5/8</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>1-1/4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>2-3/4</td>
</tr>
<tr>
<td>16</td>
<td>Very Light</td>
<td>3/4</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>1-5/8</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>2-1/2</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>3-1/4</td>
</tr>
<tr>
<td>18</td>
<td>Very Light</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>Very Light</td>
<td>1-1/8</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>2-1/4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3-3/8</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>4-1/2</td>
</tr>
<tr>
<td>22</td>
<td>Very Light</td>
<td>1-1/4</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>2-1/2</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3-3/4</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>5</td>
</tr>
<tr>
<td>24</td>
<td>Very Light</td>
<td>1-1/2</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>4-1/2</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>6</td>
</tr>
</tbody>
</table>
Maximum crook is limited to the amount shown in the preceding table for the appropriate length, width and grade. Pieces differing in length and width from these basic sizes may have crook in proportion to the amounts shown. Maximum crook is limited to occasional pieces of any item.

(c) Cup is a deviation in the face of a piece from a straight line drawn from edge to edge of a piece. It is measured at the point of greatest distance from the straight line. The maximum amount of cup shall be that shown in the Cup Table.

**CUP TABLE**

<table>
<thead>
<tr>
<th>Description</th>
<th>2&quot; &amp; 3&quot;</th>
<th>4&quot;</th>
<th>5&quot; &amp; 6&quot;</th>
<th>8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Light</td>
<td>1/32</td>
<td>1/32</td>
<td>1/32</td>
<td>1/16</td>
</tr>
<tr>
<td>Light</td>
<td>1/32</td>
<td>1/32</td>
<td>1/16</td>
<td>1/8</td>
</tr>
<tr>
<td>Medium</td>
<td>1/32</td>
<td>1/16</td>
<td>1/8</td>
<td>3/16</td>
</tr>
<tr>
<td>Heavy</td>
<td>1/16</td>
<td>1/8</td>
<td>3/16</td>
<td>1/4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>10&quot;</th>
<th>12&quot;</th>
<th>14&quot; and Wider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Light</td>
<td>3/32</td>
<td>1/8</td>
<td>Proportionately More</td>
</tr>
<tr>
<td>Light</td>
<td>3/16</td>
<td>1/4</td>
<td>&quot;</td>
</tr>
<tr>
<td>Medium</td>
<td>1/4</td>
<td>3/8</td>
<td>&quot;</td>
</tr>
<tr>
<td>Heavy</td>
<td>3/8</td>
<td>1/2</td>
<td>&quot;</td>
</tr>
</tbody>
</table>
(d) Twist is a deviation flatwise, or a combination of flatwise and edgewise, in the form of a curl or spiral, and the amount is the distance an edge of a piece at one end is raised above a flat surface against which both edges at the opposite end are resting snugly. The maximum amount of twist allowed shall be that shown in the Table below.

### TWIST TABLE

<table>
<thead>
<tr>
<th>Length in feet</th>
<th>Description</th>
<th>FACE WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Very Light</td>
<td>1/16</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>1/8</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3/16</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>1/4</td>
</tr>
<tr>
<td>6</td>
<td>Very Light</td>
<td>3/32</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>3/16</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>9/32</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>3/8</td>
</tr>
<tr>
<td>8</td>
<td>Very Light</td>
<td>1/8</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3/8</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>1/2</td>
</tr>
<tr>
<td>10</td>
<td>Very Light</td>
<td>5/32</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>5/16</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>1/2</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>5/8</td>
</tr>
<tr>
<td>12</td>
<td>Very Light</td>
<td>3/16</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>3/8</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>9/16</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>3/4</td>
</tr>
<tr>
<td>14</td>
<td>Very Light</td>
<td>7/32</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>7/16</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>5/8</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>7/8</td>
</tr>
<tr>
<td>16</td>
<td>Very Light</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>1/2</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3/4</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>Very Light</td>
<td>5/16</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>9/16</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>7/8</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>1-1/8</td>
</tr>
<tr>
<td>20 and longer</td>
<td>Very Light</td>
<td>5/16</td>
</tr>
<tr>
<td></td>
<td>Light</td>
<td>5/8</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>1-1/4</td>
</tr>
</tbody>
</table>

(e) Boards graded under Paragraph 118w. Alternate Board Grades shall use the following table for determining the maximum allowable crook.
## ALTERNATE BOARD GRADES-PARA. 118-W CROOK TABLE

<table>
<thead>
<tr>
<th>Length in feet</th>
<th>Grade</th>
<th>4”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
<th>12”</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>2 &amp; Btr. Com.</td>
<td>1/2</td>
<td>7/16</td>
<td>3/8</td>
<td>5/16</td>
<td>1/4</td>
</tr>
<tr>
<td></td>
<td>3 Com.</td>
<td>13/16</td>
<td>3/4</td>
<td>11/16</td>
<td>5/8</td>
<td>1/2</td>
</tr>
<tr>
<td></td>
<td>4 Com.</td>
<td>1</td>
<td>15/16</td>
<td>7/8</td>
<td>13/16</td>
<td>3/4</td>
</tr>
<tr>
<td>10</td>
<td>2 &amp; Btr. Com.</td>
<td>13/16</td>
<td>11/16</td>
<td>9/16</td>
<td>1/2</td>
<td>3/8</td>
</tr>
<tr>
<td></td>
<td>3 Com.</td>
<td>1-1/4</td>
<td>1-3/16</td>
<td>1-1/16</td>
<td>1</td>
<td>13/16</td>
</tr>
<tr>
<td></td>
<td>4 Com.</td>
<td>1-9/16</td>
<td>1-7/16</td>
<td>1-3/8</td>
<td>1-1/4</td>
<td>1-3/16</td>
</tr>
<tr>
<td>12</td>
<td>2 &amp; Btr. Com.</td>
<td>1-1/8</td>
<td>1</td>
<td>7/8</td>
<td>11/16</td>
<td>9/16</td>
</tr>
<tr>
<td></td>
<td>3 Com.</td>
<td>1-13/16</td>
<td>1-11/16</td>
<td>1-9/16</td>
<td>1-7/16</td>
<td>1-1/8</td>
</tr>
<tr>
<td></td>
<td>4 Com.</td>
<td>2-1/4</td>
<td>2-1/8</td>
<td>2</td>
<td>1-13/16</td>
<td>1-11/16</td>
</tr>
<tr>
<td>14</td>
<td>2 &amp; Btr. Com.</td>
<td>1-9/16</td>
<td>1-5/16</td>
<td>1-1/8</td>
<td>15/16</td>
<td>3/4</td>
</tr>
<tr>
<td></td>
<td>3 Com.</td>
<td>2-1/2</td>
<td>2-5/16</td>
<td>2-1/8</td>
<td>1-15/16</td>
<td>1-9/16</td>
</tr>
<tr>
<td></td>
<td>4 Com.</td>
<td>3-1/16</td>
<td>2-7/8</td>
<td>2-11/16</td>
<td>2-1/2</td>
<td>2-5/16</td>
</tr>
<tr>
<td>16</td>
<td>2 &amp; Btr. Com.</td>
<td>2</td>
<td>1-3/4</td>
<td>1-1/2</td>
<td>1-1/4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3 Com.</td>
<td>3-1/4</td>
<td>3</td>
<td>2-3/4</td>
<td>2-1/2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4 Com.</td>
<td>4</td>
<td>3-3/4</td>
<td>3-1/2</td>
<td>3-1/4</td>
<td>3</td>
</tr>
</tbody>
</table>
DEFINITIONS

754. COMBINATION GRADES - Product Standard PS20 permits grouping the highest two grades in a grade category, and grade marking the combination as an “& Better” grade. The combined grade is assigned the allowable property values of the lower grade unless allowable property values have been assigned to the combination. In the case of “No. 1 & Better”, data collected for Douglas fir, Larch, Douglas fir-Larch, and Hem-Fir, during the U.S. In-grade testing program permits development of allowable property values specific to the combination grade. When the “No. 1 & Better” grade combination is assigned specific allowable properties, as for Douglas fir, Larch, Douglas fir-Larch, and Hem-Fir, the material is required to be stamped with a “No. 1 & Better” grade stamp. If the lumber is grade stamped as “Select Structural” and “No. 1” rather than “No. 1 & Better”, the values assigned to the individual species apply.