NATIONAL LUMBER GRADES AUTHORITY

Standard Grading Rules for Canadian Lumber

2025
EDITION

STANDARD GRADING RULES
for
CANADIAN LUMBER

Effective September 1, 2025

(Supersedes all previous Editions, Revisions, and Supplements)

Approved by:
Canadian Lumber Standards Accreditation Board
and
American Lumber Standard Committee, Board of Review

PREFACE

The National Lumber Grades Authority (NLGA) was incorporated under Federal Charter on January 12, 1971, as a non-profit organization responsible for writing and maintaining Canadian lumber grading rules.

The membership of NLGA consists of the lumber manufacturers' associations and independent grading agencies operating in Canada that have been accredited by the Canadian Lumber Standards Accreditation Board (CLSAB) and the American Lumber Standard Committee, Incorporated (ALSC) Board of Review to certify grade-stamped lumber following the NLGA Standard Grading Rules for Canadian Lumber (NLGA Grading Rules).

The NLGA Grading Rules are approved and enforced by the CLSAB for use in Canada and by the ALSC Board of Review for lumber used in the U.S. This approval enables acceptance of NLGA grade-stamped lumber under Canadian and U.S. building codes.

The NLGA Grading Rules conform to the provisions of the National Grading Rule for Dimension Lumber (NGR) for the species listed in its rules. The NGR applies to all species of softwood dimension lumber, nominal 2 to 4 inches thick, which are covered by grading rules developed and approved under Voluntary Product Standard PS 20 – American Softwood Lumber Standard (PS 20). The NGR establishes standard dimension lumber grades and grade names, assuring users of uniform design and performance for all commercial species of dimension lumber.

Engineering design values are developed by NLGA for the structurally rated lumber products of Canadian-grown species and are tabled in these rules.

The NLGA Grading Rules express values in inch-pound (imperial) units. The equivalent SI (metric) values, where stated, are provided for information only. In case of a dispute, the values stated in imperial units shall take precedence.

When reference is made to a paragraph number (Para. #), it refers to paragraphs contained within these rules.

Supplements or errata to this version of the NLGA Grading Rules, when issued, will be posted on the NLGA website at **www.nlga.org**

This English version of the NLGA Grading Rules takes precedence over all other translated versions. Other language versions are translated for convenience only and in the case of a dispute and/or discrepancy, the English version shall take precedence.

Readers are requested to forward any noted errors or omissions to the attention of NLGA for correction in future editions.

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1. Scope

The purpose of these grading rules is to maintain a standard or measure of value between mills manufacturing the same or similar woods so that uniform qualities will be the result.

2. Interpretations

The interpretations of these rules are vested in the National Lumber Grades Authority (NLGA). Written interpretations of these rules have been established by NLGA in order to promote the uniform application of these rules and are included at the back of this grade rule book for information.

3. Lumber

Lumber is a manufactured product derived from a log in a sawmill or planing mill, which when rough shall have been sawed, edged, and trimmed at least to the extent of showing saw marks or other marks made in the conversion of logs to lumber on the four longitudinal surfaces of each piece for its overall length, and which has not been further manufactured other than by cross-cutting, ripping, resawing, joining crosswise and/or endwise in a flat plane, or surfacing with or without end matching and working.

4. Canadian and American Standard Lumber

Lumber manufactured and measured according to the provisions of these rules may be regarded as “Canadian Standard Lumber” and/or “American Standard Lumber” meeting the provisions of CSA O141 and/or PS 20, respectively, and may be so designated (commonly referred to as CLS and/or ALS Lumber).

5. Original Grading.

The grade of lumber, as determined by the grader, applies to the size, form, condition, or degree of seasoning at time of original grading.

6. Remanufacturing

Except in the case of such items as factory lumber, material supplied in accordance with these rules is not graded with the intent that it be suitable for remanufacturing to smaller sizes.

7. Species Covered

The provisions of the NLGA Grading Rules apply to the following softwood and hardwood species grown and manufactured in Canada:

Softwood Lumber Species

Commercial Name	Botanical Name	Grade Stamp Identification
Eastern White Cedar **or** Northern White Cedar	*Thuja occidentalis*	East White Cedar (N) **or** EW Cedar (N)
Western Red Cedar **or** Red Cedar	*Thuja plicata*	WR Cedar (N)
Yellow Cedar **or** Pacific Coast Yellow Cedar **or** Yellow Cypress	*Cupressus* **or** *Chamaecyparis nootkatensis*	Y Cedar (N)
Alpine Fir **or** Subalpine Fir	*Abies lasiocarpa*	Alpine Fir (N) **or** AP Fir (N)
Amabilis Fir **or** Pacific Silver Fir	*Abies amabilis*	AM Fir (N)
Balsam Fir	*Abies balsamea*	B Fir (N)
Grand Fir	*Abies grandis*	G Fir (N)
Eastern Hemlock	*Tsuga canadensis*	East Hemlock (N) **or** E Hem (N)
Western Hemlock	*Tsuga heterophylla*	W Hem (N)
Tamarack **or** Eastern Larch	*Larix laricina*	Tam (N)
Western Larch	*Larix occidentalis*	Larch (N)
Douglas-Fir	*Pseudotsuga menziesii*	D Fir (N)
Eastern White Pine	*Pinus strobus*	East White Pine (N) **or** EW Pine (N)
Jack Pine	*Pinus banksiana*	J Pine (N)
Lodgepole Pine	*Pinus contorta*	L Pine (N)
Ponderosa Pine **or** Yellow Pine	*Pinus ponderosa*	P Pine
Red Pine	*Pinus resinosa*	R Pine
Western White Pine **or** Idaho Pine	*Pinus monticola*	WW Pine
Whitebark Pine	*Pinus albicaulis*	WB Pine
Black Spruce	*Picea mariana*	B Spr (N)
Sitka Spruce **or** Coast Sitka Spruce	*Picea sitchensis*	C Sitka
Engelmann Spruce	*Picea engelmannii*	E Spr (N)
Norway Spruce	*Picea abies*	N Spr (N)
Red Spruce	*Picea rubens*	R Spr (N)
White Spruce	*Picea glauca*	W Spr (N)
Western White Spruce		WW Spr (N)

Hardwood Lumber Species

Commercial Name	Botanical Name	Grade Stamp Identification
Aspen **or** Aspen Poplar **or** Trembling Aspen	*Populus tremuloides*	Aspen (N)
Largetooth Aspen	*Populus grandidentata*	
Black Cottonwood	*Populus trichocarpa*	B Cot
Balsam Poplar	*Populus balsamifera*	B Pop
Red Alder **	*Alnus rubra*	Alder (N)
White Birch **	*Betula papyrifera*	W Birch

** Red Alder and White Birch do not have approved design values for structural lumber use in the U.S. For shipments to the U.S., these species shall not be intermingled with structural lumber of any species that have assigned design values, nor shall they be grade-stamped to any grade within the NLGA Grading Rules that have assigned U.S. design values.

7a. Species Groups

A number of Canadian timber species that are grown together and are jointly harvested, manufactured, and marketed, have similar performance properties which make them interchangeable in use. For the purposes of identification in the marketplace (because some species cannot be visually separated in lumber form) and standardization of assigned lumber design values, certain species are given a common grade stamp designation.

The species groups which may be grade-stamped with a common designation are listed in the following table:

Species Groups

Grouped Species	Commercial Designation	Grade Stamp Identification
Douglas-Fir Western Larch	Douglas Fir-Larch (North)	D Fir-L (N)
Western Hemlock Amabilis Fir	Hem-Fir (North)	Hem-Fir (N)
White Spruce Engelmann Spruce Black Spruce Red Spruce Lodgepole Pine Jack Pine Alpine Fir Balsam Fir	S-P-F **or** Spruce-Pine-Fir	S-P-F **or** Spruce-Pine-Fir
Any Canadian lumber species covered by the NLGA Grading Rules (see Para. 7) except for Red Alder & White Birch in the U.S.	Northern Species	North Species **or** N. Species
Eastern Hemlock Tamarack	Eastern Hemlock-Tamarack (North)	Hem-Tam (N)
Yellow Cedar Western Red Cedar	Western Cedars (North)	W Cedar (N)
Aspen Poplar Largetooth Aspen Balsam Poplar	Northern Aspen	N. Aspen
Douglas-Fir Western Larch Western Hemlock Amabilis Fir Coast Sitka Spruce	Coast Species	Coast Species

Since the composition of species in timber stands varies and there is no practical way to determine the species percentage that might be included in a particular shipment, lumber marked with a species group grade stamp may be all of any one species or some mixture of any of the species in the group.

7b. Structural Design Values

Engineering design values have been developed by NLGA for the visual grades of structurally rated lumber products of Canadian-grown species.

Grades of glued lumber qualified under Para. 129 of these rules and the applicable NLGA Special Products Standards are assigned the same design values as equivalent grades of solid-sawn dimension lumber.

For Use in Canada:

NLGA design values for use in Canada were approved by the CSA Technical Committee on Engineering Design in Wood. These design values are tabled in Paras. 851 to 857 and also published in CSA O86 - Engineering design in wood.

Canadian design values were established by the sampling and testing of four major species groups: S-P-F, D Fir-L (N), Hem-Fir (N) and North Species. All individual species listed in the NLGA grading rules are included in one of these groups. Refer to Paras. 7 and 7a.

Where grade stamps of structurally graded products show individual species, alone or in combination, other than those species named in S-P-F, D Fir-L (N), or Hem-Fir (N) groups, the design values of North Species shall apply.

For Use in the U.S.:

NLGA design values for use in the U.S. were approved by the ALSC Board of Review. U.S. design values for NLGA structural lumber grades are tabled in Paras. 902 to 909 and are also published in the American Wood Council (AWC) "National Design Specification (NDS) Supplement".

U.S. design values were established by the sampling and testing of four major species groups: S-P-F, D Fir-L (N), Hem-Fir (N), and North Species and other individual species as noted by structural product category below:

Dimension Lumber (Paras. 121, 122 and 124)

U.S. design values for dimension lumber are listed in NLGA Paras. 902 to 904 and published in Table 4A of the AWC NDS Supplement. In addition to the four main NLGA species groups (S-P-F, D Fir-L (N), Hem-Fir (N), and North Species), the individual species of Coast Sitka, Norway Spruce (N), and Yellow Cedar (N) have separate assigned design values.

Where individual species, other than those species named in S-P-F, D Fir-L (N) or Hem-Fir (N) groups or individual species of Coast Sitka, Norway Spruce (N), and Yellow Cedar (N), are grade-stamped alone or in combination, the design values of North Species shall apply.

Timbers (Paras. 130 and 131)

U.S. design values for timbers are listed in Paras. 907 and 908, and in Table 4D of the AWC NDS Supplement. In addition to the three main NLGA species groups of S-P-F, D Fir-L (N), and Hem-Fir (N), the following individual species or species groups also have separate assigned design values for timbers; Coast Sitka,

Hem-Tam (N), Ponderosa Pine, Red Pine, Western Cedars (N), Western Hemlock (N), and Western White Pine.

Note: *For use in the U.S., there are no assigned timber design values for the individual species of Norway Spruce (N), EW Pine (N), Black Cottonwood, Red Alder, and White Birch species or the species groups of Northern Species, Coast Species, and Northern Aspen.*

Decking (Para. 127)

U.S. design values for decking are tabled under Para. 906 and published in Table 4E of the AWC NDS Supplement.

Mills may separate individual species of structurally graded products for manufacturing or marketing purposes, although there is no advantage in such separation for design values.

Where shipments include species from two or more species groups, which are not separated, the lowest design values of these species groups shall apply.

8. Lumber Grade

A lumber grade is a minimum standard describing the extent and limitations of the characteristics permitted in a piece of lumber having regard to the end use for which the grade is intended.

Since no two pieces of lumber are identical, complete uniformity in grades or shipments is impossible. A shipment of a specific grade shall not be made up only of pieces containing characteristics of the maximum number or size permitted. It is recognized that grades or specifications may overlap and that producers of lumber may utilize other grading rules or specifications and may sort their lumber accordingly and therefore, nothing in these rules (unless otherwise specified) precludes or prohibits the selection of pieces of lumber meeting the requirements of more than one grade or specification for use in any of the grades or specifications for which it qualifies.

9. Freedom of Contract

The right to freedom of contract between buyer and seller is recognized and any of the provisions of these rules may be set aside by special agreement. However, if the lumber is grade stamped, it must still meet or exceed the minimum provisions of the grade as defined in the rules. "**Out of Contract**" situations are identified in Para. 410.3.

10. Inspection

The inspection of lumber is the visual analysis of lumber.

11. Grading

The grading of lumber is the application of a grading rule to lumber for the purpose of determining the grade of a piece of lumber based on inspection and/or on non-destructive mechanical methods.

12. Grade Checking

The grade checking of lumber is the inspection of lumber for the supervision control made by an Accredited Agency on its certified graders' performance.

13. Reinspection

The reinspection of lumber is the verification made upon a claim on a shipment or an item of a shipment (see Para. 400).

14. Faces Graded

Unless otherwise specified, the following standard procedures will apply to the following lumber categories:

Dimension lumber, timbers and similar items are graded for strength; characteristics on all four sides and both ends are considered in relation to their effect on the strength of the piece. The principal factors which govern the strength of a piece of lumber are the slope of grain, size of knots and their location. 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.

Boards and other yard lumber, when rough or surfaced, are graded from the face or best side unless otherwise specified. The reverse face may have characteristics approximately one grade lower than the face.

Factory lumber is graded from the poorer face.

15. Grade of Piece

The grade of each piece is determined by the application of the rule to the sum of all its characteristics.

Each grade description lists the major characteristics which may be acceptable and usually limits them as to location, type, area, size, or number.

16. Equivalent Characteristics

When characteristics are not described, they are appraised in relation to the characteristics permitted or limitations prescribed for the grade under consideration and are allowed if judged by the grader or inspector to be equivalent in effect to those described.

17. Maximum Combination of Characteristics

All or nearly all of the permissible characteristics of the grade are rarely present in maximum size or number in any one piece. However, any piece with an unusual combination of characteristics which seriously affects normal serviceability shall be excluded from the grade under consideration.

18. Variation in Grading

Each piece of lumber graded under the NLGA Grading Rules shall meet the grade specifications for the product and grade under these rules. It is recognized, however, that the grading of lumber cannot be considered an exact science because it is based on a visual inspection of each piece and the judgement of the grader. The provisions of the NLGA Grading Rules and the NGR are sufficiently explicit to establish a maximum of five percent difference of opinion as a reasonable variation between graders.

19. Percentage of Volume

Except as otherwise specified, all percentages referred to herein are applicable to volume (FBM).

20. Basic Size

The number and/or size of the characteristics permitted in a grade varies as the area of the piece increases or decreases in relation to basic size specified.

21. Basis for Rough Lumber

Characteristics permitted and limitations for rough lumber are the same as those for surfaced lumber of like kind and grade. In addition, such characteristics which are likely to disappear in surfacing rough lumber to standard sizes are allowed, however, when rough lumber is graded for shipment in the rough no such allowance is permitted unless otherwise specified.

22. Manufacture Classification

a) **Rough Lumber** - Lumber that has not been surfaced, but has been sawn, edged, and trimmed at least to the extent of showing saw marks or equivalent on the four longitudinal surfaces of each piece for its overall length.

b) **Surfaced Lumber** - Lumber that has been surfaced by a planing machine (for purposes of attaining smoothness of surface and uniformity of size) on one side (S1S), two sides (S2S), one edge (S1E), two edges (S2E), or a combination of sides and edges - S1S1E, S1S2E, S2S1E or S4S.

c) **Worked Lumber** - Lumber, which in addition to being surfaced has been matched, shiplapped or patterned.

   i) **Matched Lumber -** Lumber that has been worked with a tongue on one edge of each piece and a groove on the opposite edge to provide a close tongue & groove joint by fitting two pieces together. When end-matched, the tongue and groove are worked on the ends also.

   ii) **Shiplapped Lumber -** Lumber that has been worked or rabbeted on both edges of each piece to provide a close lapped joint by fitting two pieces together.

   iii) **Patterned Lumber -** Lumber that is shaped to a pattern or to a moulded form, in addition to being surfaced, matched or shiplapped, or any combination of these workings.

d) **Product of Lumber** - The term "Product of" denotes that a facility has ripped, resawn, or patterned the material from standard grades of lumber and,

   i) design values do not apply when using a "Product of" designation; and

   ii) lumber with "Product of" designation shall not be inter-mingled with lumber having design values.

23. Basis of Measurement

Board measure is the standard basis of measuring lumber under these rules. The board measurement of lumber, rough or surfaced, is based on the corresponding nominal dimension.

24. Unit of Measurement

Board foot is the unit of measurement for lumber. A board foot is the quantity of lumber contained in or derived by drying, surfacing, or working from a piece of rough green lumber, nominal 1 inch thick by nominal 1 foot wide by 1 foot long, or its equivalent volume in thicker, wider, narrower, or longer lumber.

25. Board Measure

The number of board feet in a piece of lumber is obtained by multiplying the nominal thickness in inches or fraction of an inch by nominal width in feet by the length in feet.

26. Thin Lumber

For lumber with a nominal thickness less than 1 inch, the number of board feet equals the product of the nominal width in feet by the length in feet.

27. Stick Tally

In lumber specified to be measured with a board rule stick on actual widths, pieces measuring to the even half-foot are alternately counted as of the next higher and lower foot count; fractions below the half-foot are dropped and fractions above the half-foot are counted as of the next higher foot.

28. Standard Sizes Tally

Standard lumber shall be tallied using board measure. The invoices for lumber of standard sizes shall show the number of pieces of each nominal size and length as well as the net thickness and width of such lumber.

29. Non-Standard Sizes Tally

Lumber finished to non-standard sizes shall be tallied using board measure as of either the rough or the nominal size necessarily used in its manufacture, and the actual thickness and width of such lumber shall be shown on the invoice.

30. Standard Surfaced Sizes

Standard thicknesses and widths are shown in Para. 820. The surfaced thickness and widths, as shown, are considered standard for corresponding nominal sizes as shown. Lumber of any size, rough or surfaced, is described by its nominal dimensions in customary use and in these rules.

31. Nominal and Actual Sizes

The use of “nominal” sizes in the language of these rules is for convenience purposes only and follows the practice of the industry. No inference should be drawn that the “nominal” sizes are actual sizes.

32. Rough Sizes

The minimum rough thickness of dry and green lumber 1 or more inches in nominal thickness shall be not less than 1/8" thicker than the corresponding minimum standard surfaced thickness, except that up to 20 percent of a shipment shall be not 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 width.

33. Resawn or Ripped Surfaced Lumber

When ripping or resawing surfaced lumber a maximum tolerance of 1/32" over or under in thickness or 1/16" over or under in width will be permitted in the occasional piece.

34. Average Width

There are two methods of calculating average width:

a) Standard Average Method - The average nominal width in inches of a shipment of lumber is computed by dividing the total board feet by the total length in feet and multiplying the result by 12; but if thicker than nominal 1 inch, the total board foot tally is first divided by the nominal thickness as expressed in inches.

b) Board Foot Method - The average nominal width of a shipment is computed by multiplying the board feet of each width by the width and dividing the total number of board feet times the width, by the total board feet.

35. Standard Lengths

Standard lengths are multiples of 1 foot, but some items are customarily shipped in multiples of 2 feet. In all items, longer lengths than those listed may be included at shipper's option.

36. Trimmed Length

Unless otherwise stated in the contract of purchase, lumber under these rules shall be trimmed for the removal of sniped, splintered, or uneven log lengths. It must be trimmed full to length specified and,

a) if nominal 2" thick or less - not more than 3" over length. For pieces over nominal 12" in width or over 20' in length, the overlength tolerance is 12".

b) nominal 3" and 4" in thickness - not more than 4" over length.

c) nominal 5" and thicker - not more than 6" over length.

37. Average Length

The average length in feet of a shipment of lumber is computed by dividing the total length in feet by the total number of pieces in the shipment.

38. Grade Stamped Lumber

Standard lumber (rough or surfaced) in the species covered by these rules may be available grade stamped under the direction of Agencies accredited by the CLSAB, or for the U.S. market, by the ALSC Board of Review.

39. Grade Stamps

A certified grade stamp is the buyer's assurance that the lumber involved has been inspected by a qualified grader who is regularly supervised for grading accuracy in accordance with the requirements of CSA O141 and/or PS 20, and that the lumber was graded under a grading rule or standard approved by the CLSAB and/or the ALSC Board of Review.

Each grade stamp shall display the following:

a) registered symbol of the accredited Agency,
b) mill and/or grader identity (usually by number),
c) grading rule used where applicable (Para. 40),
d) lumber grade,
e) species or species combination, and
f) seasoning state (Para. 44) at time of surfacing for boards and dimension lumber less than nominal 5 inches in thickness**.**

Further designations such as non-standard sizes, moisture content, NLGA Grading Rules paragraph number, and heat-treatment (HT) shall be added to the grade stamp where specified in these rules.

Grade stamps shall not be applied to structural lumber installed in a structure or to structural lumber that has been previously installed in a structure. If a letter of opinion is issued for structural lumber that was previously installed in a structure, the lumber shall be identified as "reclaimed" and shall state that published design values may not apply.

40. Grading Rule

When lumber is graded in accordance with the NLGA Grading Rules, grade stamps of an accredited Grading Agency shall contain the abbreviation "**NLGA**". If species or species groups not recognized by the NLGA Grading Rules (see Paras. 7 and 7a) are designated on the grade stamp, either singly or in combination with NLGA species, the "**NLGA**" designation shall not be included on the stamp.

41. Grade

The lumber grade is identified by the appropriate grade name or grade name abbreviation as shown in these rules.

Mixed grade stamping other than the two highest established grades for each grading rule category shall not be permitted. When the two highest established grades are grade stamped using a combination grade stamp, the design values for the lowest grade in the combination are applicable, except when specific values have been assigned to the mixed grade (see Para. 754).

The grade stamp for boards must show the paragraph number of the pertinent paragraph if the grade name is the same or similar to that used in any other board grade.

When grade-stamping boards whose surfaced thickness is in excess of 1–5/16", the grade stamps shall also include the word "**BOARD**" to indicate that the piece of lumber is a board and not stress graded dimension lumber.

42. Species

The species or species group is identified on the grade stamp by species name, by approved abbreviation, or by approved species group identification (see Paras. 7 and 7a).

43. Sizes

If lumber is surfaced to a size below minimum Canadian Standard Lumber or American Standard Lumber size requirements, the grade stamp shall show the actual size.

44. Moisture Content Standards

The moisture content of wood is the weight of water in wood expressed as a percentage of the weight of the wood from which all water has been removed (oven dry). Moisture is removed from lumber by air drying, by use of dry kilns, or by other artificial means.

Dry Lumber - is lumber which has been dried to a moisture content of 19% or less.

Green Lumber - is lumber having a moisture content of over 19%.

Rough lumber of any size does not require (but may include) a seasoning designation on the grade stamp. If so designated, rough lumber which has been dried to a moisture content of 19% or less may be stamped "**DRY**" or if kiln dried to a maximum moisture of 19% may be stamped "**KD**". Rough green lumber having a moisture content greater than 19% may be stamped "**GRN**".

Moisture content designations for surfaced lumber are as follows:

a) Boards and Dimension Lumber

Boards or dimension lumber (less than nominal 5" in thickness) surfaced at a moisture content of 19% or less shall be stamped "**S-DRY**", or if kiln dried to a maximum moisture content of 19%, lumber may be stamped "**KD**" at time of surfacing.

Grade stamps for boards or dimension lumber surfaced at a moisture content greater than 19% shall show "**S-GRN**" on the stamp

Except as otherwise provided, any boards or dimension lumber surfaced at a moisture content of 15% or less may be stamped "**MC15**", or if kiln dried to a maximum moisture content of 15%, lumber may be stamped "**KD15**" at time of surfacing. It is also permissible to stamp as "**S-DRY**" or "**KD**" if air-dried or kiln dried lumber, respectively, is surfaced at a moisture content of 15% or less. However, if such lumber is invoiced as "**MC15**" or "**KD15**", or some lesser moisture content, and reinspection is made, the invoice provisions shall prevail for purposes of reinspection.

b) Clears, Selects, Factory Lumber, and Moulding Stock

All grades nominal 2" or less in thickness sold as **DRY** shall be dried to 15% maximum moisture content. Stock greater than nominal 2" thick shall be dried to 19% maximum moisture content.

Orders for lumber with moisture content varying from the above shall be subject to special agreement.

c) Lumber Nominal 5" and Thicker

Moisture content of nominal 5" and thicker lumber shall be subject to special agreement.

All lumber shrinks and expands within narrow limits with changes in moisture content much as most other materials swell or shrink with changes in temperature.

Natural shrinkage or expansion in width and thickness may average approximately 4% from fibre saturation point (approximately 30% moisture content) to normal dry service conditions. Individual pieces may have more or less shrinkage.

When lumber is further dried after surfacing an allowance may be made of 1% (0.7% for Western Red and Eastern White Cedar) reduction in size for each 4% reduction in moisture content based on the actual moisture content of the dry items and on 30% moisture content for unseasoned items. The same tolerance will be applied to dry items subject to re-absorption.

Shrinkage or expansion percentages are average values. Shrinkage and expansion of individual pieces may vary. In large sizes, where it is impractical to establish the moisture content, any allowance for shrinkage or expansion must be left to the judgement of experienced personnel.

Note: *The range of shrinkage of individual pieces from experimental observation is from 2% to 7%. Variables that affect measurement and shrinkage of lumber are density, species, grain orientation and allowable grade characteristics. (See Forintek Canada Corp. - Jessome, A.P., 2000, SP-514 Report **or** the U.S. Forest Products Laboratory, Research Reports 15 and 30).*

45. Supplementary Provisions

All provisions outlined in the preceding paragraphs, where appropriate, supplement the specific provisions for the various items outlined in these rules.

46. Specified Species

All grades in these rules apply to all species or species groups listed in Paras. 7 and 7a unless otherwise specified. Although some paragraphs are identified with particular species, this does not preclude other species being graded under these paragraphs on request.

47. Other Grade Rules

NLGA acknowledges that the following paragraphs of its rules are derived from other Rules Writers' Grading Rules:

a) Paras. 112, 113, 151, 160, 161 and 162 are derived from WWPA rules,

b) Para. 195 is derived from PLIB (WCLIB) rules, and

c) Para. 164 is derived from NELMA rules.

NOTES

KD FINISH, V.G., F.G., and/or M.G.
ALL SPECIES (EXCEPT WR CEDAR)
Nominal 2" & Thinner and 2" & Wider

101. FINISH

Finish is customarily shipped kiln dried and surfaced four sides. Grade descriptions are based on a piece nominal 8" wide by 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

Pieces nominal 5" & narrower in width are graded from best wide face and both narrow faces; pieces nominal 6" & wider, from best wide face and one narrow face. There are two grades of Finish: "**C and Better**" and "**D**". If ordered V.G., face should have V.G. appearance.

101a. "C AND BETTER" FINISH

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

Checks	4 - small, scattered.
Cup	light, occasional pieces.
Heart Stain	firm.
Skips	occasional, very light on narrow faces and reverse face.
Splits	short, in 5% of the pieces.
Sap Stain	medium.
Torn or Raised Grain	light.
Warp	light in occasional pieces.
Knots	2 - sound, tight, small or 3 - equivalent smaller, or Pitch Streak: 1 - small, or Pockets: 4 - small.
Cutout	5% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer, provided such pieces are otherwise of a high type.

101b. "D" FINISH

Characteristics on reverse face may be 25% larger or more numerous.

Characteristics or their equivalent smaller which may appear on pieces in the grade and their limiting provisions are:

Checks	medium, scattered.
Cup	medium.
Pin Holes	limited.
Pitch Streak	medium.
Pockets	4 - medium.
Skips	2 - medium per 12', hit and miss on reverse face, approximately 1/8" scant in width if one narrow face is surfaced.
Splits	short.
Stained Wood	not limited.
Torn or Raised Grain	not limited.
Wane	1/8 width, 1/4 the length or equivalent, 1/4 the thickness; 50% more on reverse face.
Warp	medium.
White Specks	firm, 1/4 the width or equivalent.
Knots	4 - 1" fixed or 8 - equivalent smaller.
Cutout	10% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer.

KD CEILING AND SIDING, V.G., F.G. and/or M.G.
ALL SPECIES (EXCEPT WR CEDAR)
Nominal 1" & Thinner and 3", 4", 6", 8" & Wider

102. CEILING AND SIDING

Ceiling and Siding are customarily shipped kiln dried and surfaced two sides, tongued & grooved or shiplapped, and usually run to a pattern. The reverse face may be partially surfaced or hollow or scratched back. In occasional pieces of "**C and Better**" grade, the tongue or lap in Siding may be 1/16" narrow and in Ceiling with a tongue 1/8" or more in width is permissible.

Grade descriptions are based on a piece nominal 6" wide by 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. When V.G. is ordered, face must have V.G. appearance.

There are three grades of Ceiling and Siding: "**C and Better**", "**D**", and "**E**".

102a. "C AND BETTER" CEILING AND SIDING

Characteristics or their equivalent smaller which may appear on pieces in the grade and their limiting provisions are:

Checks	3 - small.
Heart Stain	firm.
Sap Stain	medium.
Skips	occasional, very light.
Torn or Raised Grain	light.
Warp	light, occasional pieces.
Knots	3 - sound, tight, small or 4 - equivalent smaller, or Pitch Streaks: 2 - small, or Pockets: 5 - small.
Cutout	5% of the pieces in a shipment may have a 3" cutout, 4' or more from either end, in pieces 12' & longer, provided such pieces are otherwise of a high type.

102b. "D" CEILING AND SIDING

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

Checks	not limited.
Holes	1 - 1" or equivalent smaller in pieces 8' to 14' long, and 2 - 1" or equivalent smaller in pieces 16' & longer.
Pin Holes	limited.
Pitch Streaks	large.
Pockets	5 - medium.
Skips	hit and miss on face or grooved edge.
Splits	medium.
Stained Wood	not limited.
Tongue or Lap	narrow, must be at least 1/16" in width.
Torn or Raised Grain	not limited.
Warp	medium.
White Specks	firm, 1/4 the width or equivalent.
Knots	4 - fixed, approximately 1" or 8 - equivalent smaller.
Cutout	10% of the pieces in a shipment may have a 3" cutout, 4' or more from either end, in pieces 12' & longer.

102c. "E" CEILING AND SIDING

Graded under provisions for "**E**" Flooring, Para. 104c.

KD CASING AND BASE, V.G., F.G., and/or M.G.
Nominal 1" Thickness and 2" or Wider

103. CASING AND BASE

Casing and Base are customarily shipped kiln dried and run to a pattern. The reverse face may be hollow or scratched back.

Grade descriptions are based on a piece nominal 4" wide by 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

In applying these rules, the best wide face and both narrow faces shall be considered in Casing, and best wide face and exposed narrow face in Base. When V.G. is ordered, face must have V.G. appearance.

There are three grades of Casing and Base: "**C and Better**", "**D**", and "**E**".

103a. "C AND BETTER" CASING AND BASE

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

Checks	small.
Heart Stain	firm.
Skips	occasional, very light on narrow faces and reverse face.
Splits	short, in 5% of the pieces.
Sap Stain	medium.
Torn or Raised Grain	light.
Warp	light in occasional pieces.
Knots	1 - sound, tight, small or 2 - equivalent smaller, or Pitch Streak: 1 - small, or Pockets: 2 - small.
Cutout	5% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer, provided such pieces are otherwise of a high type.

103b. "D" CASING AND BASE

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

Checks	medium, occasional 12".
Pin Holes	limited.
Pitch Streak	medium.
Pockets	2 - medium.
Skips	hit and miss either wide face; approximately 1/8" scant on narrow faces.
Splits	short.
Stained Wood	not limited.
Torn or Raised Grain	not limited.
Wane	1/8 the width, 1/4 the length or equivalent, 1/4 the thickness; 50% more on reverse face.
Warp	medium.
White Specks	firm, 1/4 the width or equivalent.
Knots	2 - fixed, approximately 1" or 4 - equivalent smaller.
Cutout	10% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer.

103c. "E" CASING AND BASE

Graded under provisions for "**E**" Flooring, Para. 104c.

KD FLOORING, V.G., F.G. and/or M.G.
Nominal 2" & Thinner and 3", 4", & 6" Wide

104. FLOORING

Flooring is customarily shipped kiln dried and surfaced two sides, tongued & grooved. The reverse face may be partially surfaced or hollow or scratched back.

Grade descriptions are based on a piece nominal 4" wide by 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

When V.G. Flooring is ordered, the face must present a V.G. appearance with an average of not less than 4 rings per inch at both ends.

There are three grades of Flooring: "**C and Better**", "**D**", and "**E**".

104a. "C AND BETTER" FLOORING

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

Checks	2 - small.
Heart Stain	firm.
Skips	very light, occasional piece.
Sap Stain	medium.
Tongue	1/16" narrow.
Torn or Raised Grain	light.
Warp	light in occasional pieces.
Knots	2 - sound, tight, small or 3 - equivalent smaller, or Pitch Streak: 1 - small, or Pockets: 3 - small.
Cutout	5% of the pieces in the shipment may have a 3" cutout, 4' or more from either end, in pieces 12' & longer, provided such pieces are otherwise of a high type.

104b. "D" FLOORING

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

Checks	not limited.
Holes	1 - 1" or equivalent smaller in 8' to 14' and 2 - 1" or equivalent smaller in 16' & longer.
Pin Holes	limited.
Pitch Streaks	large.
Pockets	4 - medium.
Skips	hit and miss on wide face or grooved edge.
Splits	medium.
Stained Wood	not limited.
Tongue	narrow, must be at least 1/16" in width.
Torn or Raised Grain	not limited.
Warp	medium.
White Specks	firm, 1/4 the width or equivalent.
Knots	4 - fixed, approximately 1" or 8 - equivalent smaller.
Cutout	10% of the pieces in the shipment may have a 3" cutout, 4' or more from either end, in pieces 12' & longer.

104c. "E" M.G. FLOORING

All characteristics which do not interfere with the 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 ends and provided also that 75% of such a piece can be used after cutting into two or three pieces. Pieces 6' & shorter must be usable full length.

KD STEPPING, V.G., F.G. and/or M.G.

105. STEPPING

Stepping is customarily shipped kiln dried, surfaced two sides, one edge and bull nosed on the opposite edge.

Grade descriptions are based on a piece nominal 12" wide by 12' long. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. Characteristics which appear in an area of about 1" on the face side of the riser edge are not considered.

There are two grades of Stepping: "**C and Better**" and "**D**".

105a. "C AND BETTER" STEPPING

When V.G. is ordered, the angle of grain should not be more than 45° from vertical for 1/2 the wide face from wearing edge.

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

Checks	small, none through.
Heart Stain	firm.
Skips	occasional, very light on face and reverse face, hit and miss on riser edge.
Sap Stain	medium.
Torn or Raised Grain	light.
Warp	light.
Knots	4 - sound, tight, and small, or 6 - equivalent smaller, or 2 - 1", or Pitch Streaks: 2 - small, or Pockets: 9 - small.
Cutout	5% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer, provided such pieces are otherwise of a high type.

105b. "D" STEPPING

When V.G. is ordered, the angle of grain should not be more than 60° from vertical for 1/2 the face from wearing edge.

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

Checks	not limited.
Pin Holes	limited.
Pitch Streaks	medium.
Pockets	6 - medium.
Skips	hit and miss; hit or miss on riser edge.
Splits	short.
Stained Wood	not limited.
Torn or Raised Grain	not limited.
White Specks	firm, 1/4 the width or equivalent.
Knots	6 - 3/4", or 4 - 1", or 2 - 1 1/2" in size or equivalent, fixed, smaller.
Cutout	10% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer.

CLEAR PANELLING
ALL SPECIES (EXCEPT WR CEDAR)

106. PANELLING

Panelling is graded under the provisions of "**Finish**" lumber (Para. 101), except that it is graded as a one-face grade.

WINDOW JAMB, DOOR JAMB,
DOOR SILL, WINDOW SILL, WINDOW STOOL

107. JAMBS AND SILLS

These patterns are graded under the provisions of "**Finish**" lumber (Para. 101), except that they are graded as a one-face grade.

ALL SPECIES (EXCEPT WR CEDAR)
V.G., F.G., and/or M.G., Rough or Surfaced
K.D., A.D., or Unseasoned
Nominal 2" & Thinner and 3" & Wider

108. INDUSTRIAL CLEARS (NOMINAL 2" & THINNER)

Industrial Clears, if ordered surfaced, are finished to the sizes shown in Para. 820c, unless otherwise specified. If ordered rough and/or unseasoned, the approximate tolerance in sawing under nominal is limited as per Para. 747. For seasoned thicknesses and widths refer to Para 32.

For further information on grading of Industrial Clears, see NLGA Interpretations 2.1 appended to these rules.

For Western red cedar industrial clears (nominal 2" & thinner), refer to Para. 202.

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

Pieces nominal 5" & narrower are graded from best wide face and both narrow faces; pieces nominal 6" & wider from best wide face and one narrow face.

There are three grades of Industrial Clears: "**B and Better**", "**C**", and "**D**".

108a. "B AND BETTER" INDUSTRIAL

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

Checks	4 - small. No limit in number if surface is rough.
Cup	light.
Pitch Streak	1 - small, or Pockets: 3 - very small, or Pin Holes: 3
Rate of Growth	average 6 rings per inch.
Sapwood	bright, 1/3 the width or equivalent.
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.

108b. "C" INDUSTRIAL

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

Checks	4 - small. No limit in number if surface is rough.
Cup	light in occasional pieces.
Heart Stain	firm.
Sap Stain	medium. 25% of face or equivalent greater area of light stain.
Skips	occasional, very light on best wide face. Light on narrow faces and on reverse face.
Slope of Grain	1 in 6.
Splits	short, in 5% of the pieces.
Torn or Raised Grain	light.
Warp	light in occasional pieces.
Knots	2 - sound, tight, small, or 3 - equivalent smaller, or Pitch Streak: 1 - small, or Pockets: 4 - small, or Pin Holes: 8.

108c. "D" INDUSTRIAL

Reverse face must be of a reasonably clear type, allowing characteristics 25% larger or more numerous.

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

Checks	not limited.
Cup	medium.
Holes/Slough Knots	1 - small or equivalent smaller on face, two - 1/2" or equivalent smaller on reverse face.
Pin Holes	limited.
Pitch Streaks	medium.
Pockets	4 - medium.
Skips	hit and miss; approximately 1/8" scant on narrow face, hit or miss on reverse face.
Slope of Grain	1 in 4
Splits	short.
Stained Wood	not limited.
Torn or Raised Grain	not limited.
Wane	1/8 the width, 1/4 the length or equivalent, 1/4 the thickness; 50% more on reverse face.
Warp	light.
White Specks	firm, 1/4 the width or equivalent.
Knots	4 - fixed, approximately 1" or 8 - equivalent smaller.
Cutout	10% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer.

ALL SPECIES (EXCEPT WR CEDAR)
V.G., F.G., and/or M.G., Rough or Surfaced
K.D., A.D., or Unseasoned
Nominal 2 ¼" & Thicker and 3" & Wider

109. INDUSTRIAL CLEARS (NOMINAL 2 ¼" & THICKER)

Industrial Clears, if ordered surfaced, are finished to the sizes shown in Para. 820c, unless otherwise specified. If ordered rough and/or unseasoned, the approximate tolerance in sawing is limited as per Para. 747. For seasoned thicknesses and widths, refer to Para. 32.

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

For Western red cedar industrial clears (nominal 2 ¼" & thicker), refer to Para. 203.

The grade is determined from the better wide face with the upper half of the narrow faces considered as part of the better wide face and lower half of the narrow faces 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**".

109a. "B AND BETTER" INDUSTRIAL

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

Checks	4 - small. No limit in number if surface is rough.
Pockets	3 - 4" in 2 1/4" thicknesses to 3 - 6" in 4" & thicker. or 1 - small Pitch Streak.
Rate of Growth	average 6 rings per inch.
Sapwood	bright, 1/3 the width or equivalent.
Skips	light on the reverse face in occasional pieces.
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.

109b. "C" INDUSTRIAL

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

Checks	4 - small. No limit in number if surface is rough.
Heart Stain	firm.
Skips	occasional very light on best wide face, light on narrow faces and reverse face.
Slope of Grain	1 in 6.
Splits	short, in 5% of the pieces.
Sap Stain	medium. 25% of best wide face or equivalent greater area of light stain.
Torn or Raised Grain	light.
Warp	light in occasional pieces.
Knots	4 - sound, tight 1" or 5 - equivalent smaller in 2 1/4" thicknesses, to 4 - 2" or 5 - equivalent smaller in 12" thicknesses, or Pitch Streak: 1 - medium, or Pockets: 4 - 6".

109c. "D" INDUSTRIAL

Reverse face must be of a reasonably clear type, allowing characteristics 25% larger or more numerous.

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

Checks	not limited.
Pin Holes	limited.
Pitch Streaks	medium.
Pockets	4 - medium, occasional pocket may be 25% larger.
Skips	hit and miss; approximately 1/8" scant on narrow face.
Splits	short.
Stained Wood	not limited.
Torn or Raised Grain	not limited.
Wane	1/8 the width, 1/4 the length or equivalent, 1/4 the thickness; 50% more on reverse face.
Warp	medium.
White Specks	1/4 the width or equivalent.
Knots	4 - fixed 1" or 7 - equivalent smaller in 2 1/4" thicknesses, to 4 - 2" or 7 - equivalent smaller in 12" thicknesses.
Cutout	10% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer.

BOARDS – SELECTS
Rough or Surfaced
All Widths and All Thicknesses

112. SELECTS

Grade descriptions for Selects are based on a piece of S4S nominal 1" x 8" by 12' long. The number and extent of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. Characteristics appearing on the edges of S2S or rough stock widths which will be removed in surfacing are not given the same consideration as characteristics in S4S lumber.

In random width shipments sold on board measure scale, the grade will be determined by the full width of the piece. For Standard sizes, see Para. 820e.

For further information on the grading of Selects, refer to the NLGA Interpretations 2.2 appended to these rules.

112a. SELECT GRADES

In Select board grades, all pieces are graded from the better wide face. The reverse face may be somewhat lower in quality with more restrictions placed on the reverse face of the higher grades.

There are three grades of Selects:

"**B & BETTER - 1 AND 2 CLEAR**" (SUPREME - WW PINE),

"**C SELECT**" (CHOICE - WW PINE) and

"**D SELECT**" (QUALITY - WW PINE).

112b. "B & BETTER - 1 AND 2 CLEAR" (SUPREME – WW PINE)

Lumber of this grade may be ordered when the ultimate in fine appearance is desired. This is the highest grade of Select lumber produced and many pieces are absolutely clear. Some pieces may have a few minor characteristics which do not detract from their appearance or high quality.

Characteristics and limiting provisions are:

Checks	seasoning, small, 1 on each end, or 3 or 4 if away from ends.
Crook	as shown in Para. 810a.
Cup	very light.
Skip	very light on one narrow face, light on reverse face.
Stained Wood	light in an occasional piece over not more than 10% of the face.
Torn Grain	very light, not more than 3" long.
Twist	7/4 and thinner, 1/2 of very light. 8/4 and thicker, 1/4 of very light. See Para. 810d.
Wane	on reverse face only, 1/4 the thickness, 1/6 the length in an occasional piece.
Knots	2 - sound, tight, pin knots, or slight traces of pitch, or a very small pocket, or equivalent.

112c. "C SELECT" (CHOICE - WWPINE)

Lumber of this grade is recommended for all finishing uses where fine appearance is essential. Because of its appearance and usability, it ranks only slightly less than **B & Better - 1 and 2 Clear** and it is one of the most sought-after products from the clear portion of the log. It is widely used for high quality interior trim and cabinet work with natural, stain, or enamel finishes.

Characteristics and limiting provisions are:

Checks	seasoning, small, well scattered on the surface.
Crook	as shown in Para. 810a.
Cup	very light.
Skip	light on one narrow face, 1 - medium, or 2 - light skips on the reverse face.
Stained Wood	medium in an occasional piece covering 1/3 the wide face, or a greater area of lighter stain when not in combination with other characteristics.
Torn or Raised Grain	very light.
Twist	7/4 and thinner, 1/2 of very light. 8/4 and thicker, 1/4 of very light. See Para. 810d.
Wane	on reverse face, 1/2 the thickness, 1/8 the width, 1/4 the length in an occasional piece.

With the above, one of the following characteristics are permitted:

Pitch	light over not more than 1/2 the face.
Pitch Streak	1 - small.
Pockets	2 - very small.
Knots	2 - small, sound, tight.
Equivalent characteristics	no more damaging than any of the above.

112d. "D SELECT" (QUALITY - WWPINE)

Lumber of this grade has many of the fine appearance features of **C Select** grade. Although generally less restrictive than the **C Select** grade, **D Select** is suitable where the requirements for finishing are less exacting.

This grade is between the higher finishing grades and the Board Common grades, as many pieces have a finish appearance on one face, the reverse face showing larger or more numerous characteristics.

Characteristics and limiting provisions are:

Checks	seasoning - small, scattered; medium on back.
Crook	as shown in Para. 810a.
Cup	very light.
Skip	1 - very light on best face; hit and miss on reverse face; one narrow face may be 1/16" scant for 1/2 the length in an occasional piece.
Split	short on one end or equivalent.
Stained Wood	medium, over entire face if otherwise high quality.
Torn or Raised Grain	light in scattered spots.
Twist	7/4 and thinner, very light. 8/4 and thicker, 1/2 of very light. See Para. 810d.
Wane	on reverse face, 3/4 the thickness, 1/4 the width, 1/4 the length.

With the above, one of the following characteristics are permitted:

Pitch	medium, over not more than 2/3 of face, less if heavy.
Pitch Streak	1 - medium.
Pockets	4 - small.
Knots	4 - small, fixed.
Equivalent characteristics	no more damaging than any of the above.

One 4" cutout is permitted in pieces of otherwise high appearance. Cutting must be directly on an end or more than 2' from an end. Cutouts are restricted to pieces 12' & longer and 10% of a shipment.

112e. STAINED SELECTS

Stained Selects are graded **D Select** or better in all characteristics except stain, admitting all degrees of stain.

BOARDS – COMMONS
Rough or Surfaced
All Widths and All Thicknesses

113. COMMONS

The five Common grades are:

"**1 COMMON**" (COLONIAL – WW PINE),

"**2 COMMON**" (STERLING – WW PINE),

"**3 COMMON**" (STANDARD – WW PINE),

"**4 COMMON**" (UTILITY – WW PINE), and

"**5 COMMON**" (INDUSTRIAL – WW PINE).

Grade stamps applied under this paragraph shall show "**Para. 113**" on the stamp to differentiate from Para. 118 board grades.

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 judgement 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 limitation 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 nominal 1" x 8" by 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 Para. 718. 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 the knot or knots have no more effect than the other knots permitted in an individual grade. For Standard sizes, see Para. 820e.

For further information on the grading of Commons, refer to the NLGA Interpretations 2.3 appended to these rules.

NOTES

113a. "1 COMMON" (COLONIAL – WW PINE)

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 seasoning, 4 - small on surface in a nominal 1" x 8" by 12' basic size.

Crook as shown in Para. 810b.

Cup very light.

Heart Pith firm, not more than 1/4" wide, 1/6 the length.

Knots sound, tight and smooth, red, limited as follows:

Nominal Face Width	Knot Size
2"	5/8"
3"	7/8"
4"	1 1/4"
6"	1 3/4"
8"	2 1/4"
10"	2 1/2"
12"	2 3/4"
14" & wider	3"

The knot sizes listed in the above table 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 (slough knot) on the narrow face, extending into the wide face not more than 1/2" and into not more than 1/2 the thickness.

Pitch light, over not more than 1/8 the face area.

Pockets 2 - very small, dry, well scattered in a nominal 1" x 8" by 12' or equivalent smaller.

Skips 3 - very light on narrow face or 2 - light on reverse face in a nominal 1" x 8" by 12' piece.

Splits very short, limited to 1 on each end.

Stain	light, over not more than 1/3 of face.
Torn or Raised Grain	very light.
Twist	7/4 & thinner, very light. 8/4 & thicker, 1/2 of very light. See Para. 810d.
Wane	on reverse face, 1/2 thickness, 1/8 width, 1/4 length in an occasional piece.

113b. "2 COMMON" (STERLING – WW PINE)

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, facia and other exterior uses.

Characteristics and limiting provisions are:

Checks seasoning, 2 - medium or equivalent smaller in a nominal 1" x 8" by 12' piece.

Crook as shown in Para. 810b.

Cup light.

Heart Pith firm, not more than 1/2" wide, 1/2 the length.

Knots limited as follows:

Nominal Face Width	Red Knots Sound & Tight	Black Knots Sound & Tight
2"	1"	⅜"
3"	1 ¼"	½"
4"	2"	¾"
6"	2 ½"	1"
8"	3"	1 ¼"
10"	3 ¼"	1 ⅜"
12"	3 ¾"	1 ½"
14" & wider	4"	1 ¾"

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.

An occasional piece may have the following: 2 small fixed knots or one angling 3/4" hole (slough knot) on the narrow face 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 1 in the 16' & 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	12 - scattered in a nominal 1" x 8" by 12' piece.
Pitch	streaks and patches of light to medium covering 1/2 of face or 2 - very small streaks of heavy pitch.
Pockets	3 - small, dry, well scattered, or equivalent smaller in a nominal 1" x 8" by 12' piece.
Roller checks	light on back, not more than 1/4 the length.
Shake	light, not over 1/6 in length.
Skip	medium on reverse face, limited to 1/4 of length; medium on narrow face, limited to 1/3 of length.
Splits	short, limited to 1 on each end.
Stained Wood	medium, over entire face on pieces of otherwise high quality.
Torn or Raised Grain	light.
Twist	7/4 and thinner, very light. 8/4 and thicker, 1/2 of very light. See Para. 810d.
Wane	on reverse face, 1/2 thickness, 1/6 width, 1/3 length or equivalent in an occasional piece.

113c. "3 COMMON" (STANDARD – WW PINE)

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 seasoning, medium.

Crook as shown in Para. 810b.

Cup medium.

Knots are limited as follows:

Nominal Face Width	Red Knots Sound & Tight	Unsound or Loose Knots, Knot Holes
2"	1 3/16"	⅜"
3"	1 ½"	⅝"
4"	2 ½"	¾"
6"	3"	1 ¼"
8"	3 ½"	1 ½"
10"	4"	1 ¾"
12"	4 ½"	2 ¼"
14" & wider	5"	2 ½"

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 may be 2/3 size of allowable red knots, 2 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 2 per 12' of length when not in serious combinations with other characteristics.

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

Unsound knots are not limited in number.

Pin or Small Holes	30 per square foot or 4 - small holes in a nominal 1" x 8" by 12' piece.
Pitch	heavy over 1/2 the face area or 2 small streaks of massed pitch.
Pockets	medium, well scattered.
Roller checks	1 - 3' light on best face; light to medium 2/3 length on reverse face.
Shake	light to medium, scattered full length in otherwise 2 Common type.
Skip	one medium on face, hit & miss on reverse face for 2/3 the length. One narrow face may be 1/8" scant for 1/2 the length or 1/16" scant full length.
Split	1/6 the length.
Stained Wood	medium to heavy over the entire face.
Torn Grain	medium.
Twist	7/4 & thinner, light. 8/4 & thicker, 1/2 of light. See Para. 810d.
Unsound Wood	similar to firm white speck; limited to 1/8 the face area.
Wane	on back, 2/3 thickness, 1/4 width, 1/2 length or equivalent in an occasional piece.

113d. "4 COMMON" (UTILITY – WW PINE)

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 seasoning, large.

Crook as shown in Para. 810b.

Cup heavy.

Knots are limited as follows:

Nominal Face Width	Fixed Knots, Firm & Tight Knots	Loose Knots & Knot Holes
2"	1 5/16"	¾"
3"	1 ¾"	1"
4"	3"	1 ½"
6"	3 ½"	2"
8"	2/3 width	2 ½"
10"	2/3 width	3"
12"	2/3 width	3 ½"
14" & wider	2/3 width	4"

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

Pin Holes or Small Holes not limited.

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

Pockets large.

Roller checks medium to heavy, full length on reverse face, light to medium 2/3 length on best face.

Shake medium to heavy full length.

Skip	hit & miss on best face, 1/16" scant full length if surfaced one side. One narrow face may be 1/4" scant for 1/2 length or 1/8" scant full length.
Split	1/3 length.
Stained Wood	heavy.
Torn Grain	heavy.
Twist	7/4 and thinner, medium. 8/4 and thicker, 1/2 of medium. See Para. 810d.
Unsound Wood or Honeycomb	not firm, scattered spots over 1/4 the face area.
White Speck & Honeycomb	firm.
Wane	1/2 thickness, 1/8 width, 1/6 length on best face; heavy on reverse face, but equivalent to knot holes if through thickness.

113e. "5 COMMON" (INDUSTRIAL – WW PINE)

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 – WW Pine) 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 use in economical construction where appearance and strength are not basic requirements.

BOARDS
SHEATHING AND FORM LUMBER
Rough or Surfaced
Shiplapped or Tongued & Grooved
Under Nominal 2" in Thickness and 2" & Wider

114. SHEATHING AND FORM LUMBER

Boards are graded from the better face. The reverse face may have characteristics approximately one grade lower than the face.

There are five grades of Boards:

"**Select Merchantable**",

"**Construction**",

"**Standard**",

"**Utility**", and

"**Economy**".

For further interpretation on the grading of Boards - Sheathing and Form Lumber, refer to NLGA Interpretations 2.4 appended to these rules.

114a. "SELECT MERCHANTABLE" BOARDS

Pieces are graded primarily for serviceability but are usually of fine appearance.

Characteristics and limiting provisions are:

Checks medium.

Heart Stain firm.

Knots sound, tight, and well scattered, approximately:

Nominal Face Width	Knot Size
2"	1"
3"	1 ¼"
4"	1 ½"
6"	2"
8"	2 ½"
10"	3"
12" & wider	3 ½"

Slough Knots one 1", not through, per 12' of length.

Spike Knots permitted, if judged equivalent in effect to other knots.

Pin Holes limited.

Pitch Streaks small.

Pockets medium, scattered.

Roller Checks totaling 1/2 of the length, on reverse face permitted if tight, none through.

Sap Stain medium.

Skips very light on best face, occasional light on narrow faces and reverse face.

Splits short.

Tongue or Lap 1/16" narrow.

Torn or Raised Grain medium.

Warp light.

S1S Boards may have tolerance of 1/32" over or under.

114b. "CONSTRUCTION" BOARDS

Characteristics and limiting provisions are:

Checks not limited.

Knots approximately:

Nominal Face Width	Firm & Tight	Unsound or Not Firmly Fixed Knots	Holes*
2"	1"	½"	½"
3"	1 ¼"	⅝"	⅝"
4"	1 ¾"	⅞"	⅞"
6"	2"	1"	1"
8"	2 ½"	1 ¼"	1 ¼"
10"	3"	1 ½"	1 ¼"
12"	3 ½"	1 ¾"	1 ¼"
Over 12"	4"	2"	1 ¼"

***** Two holes of maximum size or equivalent smaller are permitted per 12' of length.

Spike Knots permitted, if judged to be equivalent in effect to other knots.

Pin Holes not limited.

Pitch Streaks not limited.

Pockets medium.

Skips light on face, medium on narrow faces and reverse face.

Splits short.

Stained Wood not limited.

Tongue or Lap 1/16" narrow.

Torn or Raised Grain medium.

Wane 1/2 the thickness, 1/8 the width or equivalent.

Warp light.

S1S Boards may have tolerance of 1/32" over or under.

114c. "STANDARD" BOARDS

Characteristics and limiting provisions are:

Checks not limited.

Knots approximately:

Nominal Face Width	Firm & Tight	Unsound or Loose Knots or Holes*
2"	1 ¼"	¾"
3"	1 ½"	1"
4"	2 ½"	1 ¼"
6"	3"	1 ½"
8"	3 ½"	1 ¾"
10"	4"	2"
12"	4 ½"	2 ¼"
Over 12"	5"	2 ½"

***** Two holes, or their equivalent smaller, permitted for each 12' of length.

Spike Knots permitted, if judged to be equivalent in effect to other knots.

Pin Holes not limited.

Pitch Streaks not limited.

Pockets not limited.

Shake tight through, short separate shakes permitted full length or equivalent roller checks.

Skips medium on best face, hit and miss on narrow faces and reverse face.

Splits 1/6 length.

Stained Wood not limited.

Tongue or Lap 1/8" narrow.

Torn or Raised Grain heavy.

Wane 1/2 the thickness, 1/6 the width or equivalent.

Warp medium.

White Specks 1/3 face area.

S1S Boards may have tolerance of 1/32" over or under.

114d. "UTILITY" BOARDS

Characteristics and limiting provisions are:

Checks not limited.

Honeycomb firm.

Knots

Nominal Face Width	Firm & Tight	Unsound &/or Loose Knots & Holes *
2"	1 ¼"	1"
3"	2"	1 ¼"
4"	3"	1 ½"
6"	3 ½"	2"
8"	2/3 width	2 ½"
10"	2/3 width	3"
12"	2/3 width	3 ½"
Over 12"	2/3 width	4"

***** Maximum holes limited to 1 per lineal ft. or equivalent smaller. Serious distorted grain and burls not permitted.

Spike Knots permitted, if equivalent in effect to other knots.

Pin Holes and Pockets not limited.

Pitch Streaks not limited.

Shake not serious.

Skips hit and miss, or 1/16" scant if one side surfaced; 1/8" scant one narrow face if other narrow face is surfaced.

Splits approximately 1/4 the length.

Stained Wood not limited.

Tolerance in Sawing in rough stock is approximately 1/8" thicker and/or wider than standard surfaced size.

Tongue at least 1/8" wide.

Lap or Groove at least 3/16" wide.

Torn or Raised Grain not limited.

Unsound Wood spots or streaks well scattered.

Wane 1/4 the width if not extending into opposite face, except as equivalent to holes permitted.

Warp heavy.

White Specks not limited.

S1S Boards may have tolerance of 1/16" under or 1/32" over.

114e. "ECONOMY" BOARDS

Characteristics permitted and limiting provisions shall be:

Holes	75% of cross section.
Honeycomb	not limited.
Knots	75% of cross section.
Shake	not limited.
Splits	1/3 length.
Unsound Wood	75% of cross section.
Wane	1/2 width, full length of piece. If through the thickness, equivalent to the area of the hole allowed. Through portion not to exceed 2' in length. If across the face, 1/2 the width must not exceed 1/8" scant in thickness for 1/3 length or equivalent.
Waste	pieces over 6' in length may contain waste (areas where characteristics are larger than those permitted in the grade) which require removal by cross-cutting. The waste portions must not be located within 2' of either end of the piece and combined shall not exceed 25% of the total length of the board.
White Specks	not limited.

Pieces cannot be more than 1/4" scant in width or 1/8" scant in thickness based on the S4S size.

STRESS-RATED BOARDS
1 ½" & Thinner in Thickness and 2" & Wider
All Species

115. STRESS-RATED BOARDS

Stress-rated boards may be graded using the same provisions listed for dimension lumber in Paras. 121, 122, and 124 and the same design values may be assigned.

When Stress-rated boards are grade stamped, the stamp shall show the paragraph number of the dimension lumber grade used, the dimension lumber grade name, and "**SRB**" to identify it as a Stress-rated board, in addition to the normal grade stamping requirements listed in Para. 39.

NOTES

EASTERN WHITE AND RED PINE BOARDS
All Thicknesses and All Widths
Rough or Surfaced
Clears, Selects and Commons

Grade descriptions are based on a piece of S4S nominal 1" x 8" by 12' long. The number and extent of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. Characteristics appearing on the edges of S2S or rough stock widths which will be removed in surfacing are not given the same consideration as characteristics in S4S lumber. In random width shipments sold on board rule scale, the grade will be determined by the full width and thickness of the piece. Any piece showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade under consideration. All pieces are graded from the better face. The reverse face may be one grade lower in quality with more restriction placed on the reverse face of the higher grades. Compression wood in damaging form based on visual inspection (i.e., compression failure, warp, or other such damage) is excluded from B and Better, C Select, D Select, 1 Common, 2 Common and 3 Common. Due to the inherent nature of the species, allowable pitch for red pine is much greater.

Certain characteristics found in Board lumber are difficult to evaluate to an exact degree because of the nature of the log from which boards are produced. Some limiting characteristics must be evaluated by applying sound judgement and all 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 in 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 by 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. For standard sizes, see Para. 820b.

For further information on the grading of Eastern White and Red Pine Boards, refer to NLGA Interpretations 2.5 appended to these rules.

EASTERN WHITE AND RED PINE
CLEARS
All Thicknesses and All Widths
Rough or Surfaced

116. CLEARS

There is one grade of Clears for Eastern white and Red Pine boards:

"**B AND BETTER"**.

116a. "B AND BETTER" CLEARS

Some pieces may have a few minor characteristics which do not detract from their appearance or high quality.

Characteristics and limiting provisions are:

Checks	seasoning, small, 1 on each end or 3 or 4 if away from ends.
Knots	2 sound, tight, pin, or slight traces of pitch, or a very small pocket, or equivalent.
Length	8' and longer.
Manufacture	Standard "C" (see Para. 722) on occasional pieces.
Skip	very light on one narrow face, light on reverse face.
Stained Wood	light on occasional piece, not more than 10% of the face.
Torn Grain	very light, not more than 3" long.
Wane	on reverse face only of an occasional piece; 1/4 thickness, 1/16 the width, 1/6 the length.
Warp	very light (see Para. 752) on occasional pieces.

EASTERN WHITE AND RED PINE
SELECTS
All Thicknesses and All Widths
Rough or Surfaced

117. SELECTS

There are two grades of Selects for Eastern white and Red Pine boards: "**C SELECT**" and "**D SELECT**".

117a. "C SELECT"

Because of its appearance and usability, this grade ranks only slightly less than Para. 116a, **B and Better** clears - it is one of the most sought after products from the clear portion of the log.

It is widely used for high quality interior trim and cabinet work with natural, stain or enamel finishes.

Characteristics and limiting provisions are:

Checks	seasoning, small, well distributed on the surface, 6 in a nominal 1" x 8" by 12' piece.
Length	6' and longer (5% maximum FBM basis of 6' length allowed in each width).
Manufacture	Standard "C" (see Para. 722) on occasional pieces.
Skip	light on one narrow face, 1 medium or 2 light skips on the reverse face.
Stained Wood	light, on occasional pieces.
Wane	on reverse face, 1/2 the thickness, 1/8 the width, 1/4 the length on occasional pieces.
Warp	light (see Para. 752) on occasional pieces.

In addition to the above, one of the following characteristics:

Knots	2 - small, sound, and tight or equivalent smaller.
Pitch	light, not more than 1/2 the face area.
Pitch Streak	1 - small.
Pockets	2 - very small or equivalent.
Equivalent characteristics	no more damaging than any of the above.

117b. "D SELECT"

Lumber of this grade has many of the fine appearance features of the **C Select** grade. Although generally less restrictive than the **C Select** grade, **D Select** is suitable where the requirements for finishing are less exacting. The grade is between the higher finishing grades and the board grades, as many pieces have a finish appearance on one face, the reverse face showing larger or more numerous characteristics.

Characteristics and limiting provisions are:

Checks	seasoning, small, well distributed; medium on reverse face.
Length	6' and longer (5% maximum FBM basis of 6' length allowed in each width).
Manufacture	Standard "C" (see Para. 722) on occasional pieces.
Skip	1 - very light on face, hit and miss on reverse face; One narrow face may be 1/16" scant for 1/2 the length on an occasional piece.
Splits	1/16 the length on one end or equivalent.
Stained Wood	medium, on an occasional piece.
Wane	on reverse face, 3/4 the thickness, 1/4 the width, 1/4 the length on an occasional piece.
Warp	medium (see Para. 752) on an occasional piece.

In addition to the above, one of the following characteristics:

Knots	4 - small, fixed, or equivalent smaller.
Pitch	medium, not more than 2/3 of face area, less if heavy.
Pitch Streak	1 - medium.
Pockets	4 - small or equivalent smaller.
Shake	light on reverse face, well distributed.
Equivalent characteristics	no more damaging than any of the above.

117c. STAINED SELECTS

Stained Selects are graded **D Select** or Better in all characteristics except stain, admitting all degrees of stain.

EASTERN WHITE AND RED PINE
COMMONS
All Thicknesses and All Widths
Rough or Surfaced

118. COMMONS

There are five common grades and one plank wall grade:

"**1 COMMON**",
"**2 COMMON**",
"**3 COMMON**",
"**4 COMMON**",
"**PLANK WALL**", and
"**5 COMMON**".

Grade stamps applied under this paragraph shall show "**Para. 118**" on the grade stamp to differentiate from Para. 113 board grades.

For further information on the grading of Para. 118 Commons, refer to the NLGA Interpretations 2.6 appended to these rules.

118a. "1 COMMON"

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	seasoning, 4 - small, surface in a nominal 1" x 8" by 12' piece.
Heart Pith	firm; not more than 1/4" wide, 1/6 the length.
Knots	sound, tight and smooth, red, and black limited as follows:

Nominal Face Width	Red Knots	Black Knots
4"	1"	¾"
6"	1 ½"	1 ¼"
8"	2"	1 ½"
10"	2 ½"	2"
12"	3"	2 ½"

Black knots limited to 3 of maximum size and/or equivalent smaller for each 12' of length.

Smooth means free of heavy pitch and bark.

Spike knots permitted if judged to be equivalent in effect to other knots. Spike knots in 6/4 and thicker, two of limiting size, 1/3 the width and up to 1/2 the thickness.

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 listed.

An occasional piece may have one angling 1/2" hole (slough knot) on the narrow face, extending into the wide face not more than 1/2" and into not more than 1/2 thickness.

Length	6' or longer (8% maximum FBM basis of 6' length allowed in each width).
Manufacture	Standard “C” (see Para. 722) on an occasional piece.
Pitch	light, not more than 1/8 the face area.
Pitch Streak	2 - very small streaks of medium pitch in a nominal 1" x 8" by 12' piece.
Pockets	very small, 4 in a nominal 1" x 8" by 12' piece or equivalent smaller.
Shake	light surface, not over 1/8 the length.
Skip	3 - very light on one narrow face or 2 - light on reverse face in a nominal 1" x 8" by 12' piece.
Split	very short, limited to one on each end.
Stained Wood	light, not more than 1/3 the face area.
Wane	on reverse face, 1/2 the thickness, 1/8 the width, 1/4 the length on an occasional piece.
Warp	medium (see Para. 752) on an occasional piece.

118b. "2 COMMON"

Characteristics and limiting provisions are:

Checks seasoning, 2 - medium or equivalent smaller in a nominal 1" x 8" by 12' piece.

Heart Pith firm, not more than 1/2" wide by 1/2 length.

Holes 1 - medium hole or cavity, or 12 - pin holes scattered in a nominal 1" x 8" by 12' piece.

Knots limited as follows:

Nominal Face Width	Red Knots Sound & Tight	Black Knots Sound & Tight
4"	1 ¼"	1"
6"	1 ¾"	1 ½"
8"	2 ½"	1 ¾"
10"	3"	2 ¼"
12"	3 ½"	2 ¾"

Spike knots permitted if judged to be equivalent in effect to other knots. Spike knots in 6/4 and thicker, three of limiting size, 1/2 the width and up to 3/4 the thickness.

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 listed.

An occasional piece may have 2 - small, fixed knots or one angling 3/4" hole (slough knot) on the narrow face extending into the wide face not more than 1" and not over 2/3 the thickness of the piece.

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

Length 6' and longer (10% maximum FBM basis on 6' lengths allowed in each width).

Manufacture Standard "D" (see Para. 722) on an occasional piece.

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

Pockets 3 - small, well distributed or equivalent smaller in a nominal 1" x 8" by 12' piece.

Roller Checks	light on reverse face, no more than 1/4 length.
Shake	light, not over 1/6 the length.
Skip	medium on reverse face limited to 1/4 the length, medium on narrow face limited to 1/3 the length.
Split	short, limited to 1 on each end.
Stained Wood	light to medium over entire face on piece otherwise high quality.
Wane	on reverse face, 1/2 the thickness, 1/6 the width, 1/3 the length or equivalent on an occasional piece.
Warp	medium (see Para. 752) on an occasional piece.

118c. "3 COMMON"

Characteristics and limiting provisions are:

Checks seasoning, one 2' long on best face, 1/3 length on reverse face.

Holes pin, 15 per each square foot or 4 - medium holes in a nominal 1" x 8" by 12' piece.

Knots limited as follows:

Nominal Face Width	Red Knots Sound & Tight	Black Knots Sound, Tight and Fixed
4"	2"	1 ½"
6"	3"	2"
8"	4"	2 ¾"
10"	5"	3 ⅓"
12"	6"	4"

Spike knots permitted if judged to be equivalent in effect to other knots. Spike knots in 6/4 and thicker, four of limiting size, 2/3 the width and up to the full thickness.

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 1 or 2 angling knot holes (slough knots) in the narrow face, extending into the wide face not more than 1/3 the width and not more than 3/4 the thickness or equivalent smaller, or an unsound knot equal to the hole permitted.

Length 6' & longer (12% maximum FBM basis of 6' lengths allowed in each width).

Manufacture Standard "D" (see Para. 722) on an occasional piece.

Pitch heavy over 1/2 the face area; or 2 - small streaks of massed pitch.

Pockets medium, well distributed.

Roller Checks one 2' long on best face, 1/3 length on reverse face.

Shake	light to medium, well scattered over full length; through shake not to exceed 2' in length.
Skip	medium on face, hit & miss on reverse face. One narrow face may be 1/8" scant for 1/2 the length or 1/16" scant full length.
Split	10% of length.
Stained Wood	medium to heavy over the entire best face, maximum 1/3 of total shipment.
White Speck	firm, limited to 1/8 the area on reverse face, very small streak on best face.
Wane	on reverse face, 2/3 the thickness, 1/4 the width, 1/2 the length or equivalent on an occasional piece.
Warp	heavy (see Para. 752) on occasional pieces.

118d. "4 COMMON"

Characteristics and limiting provisions are:

Checks seasoning, large full length on reverse face.

Holes pin holes not limited; other holes limited to the equivalent of knot holes allowed.

Honeycomb or Unsound Wood 20% of one face or equivalent on both wide faces. Must not destroy the edges.

Knots limited as follows:

Nominal Face Width	Fixed Knots, Firm & Tight Knots	Unsound Knots, Loose Knots, Knot Holes
4"	3"	1/6 width
6"	3 ½"	1/6 width
8", 10", 12"	2/3 width	1/6 width

Unsound knots, **knot holes** and/or **loose knots** shall be limited to 3 maximum size or equivalent for each 12' of length.

Length 6' & longer (15% maximum FBM basis of 6' lengths allowed in each width).

Pitch heavy streaks and patches of massed pitch over 1/2 the face area on otherwise high quality pieces.

Pockets large.

Roller Checks medium full length on reverse face.

Shake through shake, well scattered, full length.

Skip hit and miss on best face, 1/16" scant full length of surface one face. One narrow face may be 1/4" scant for 1/2 the length or 1/8" scant full length.

Splits 15% of length.

Stained Wood heavy.

White Specks 60% of the face area or equivalent on both faces.

Wane	2/3 the thickness, 1/6 the width, 1/2 length.
Warp	heavy (see Para. 752) on an occasional piece.

118e. "PLANK WALL"

This grade permits characteristics such as stain, large knots, large holes, unsound wood, massed pitch, heavy shake, splits and wane in varying stages and degrees singly or in combinations but must have reasonably sound edges and ends for nailing.

118f. "5 COMMON"

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** grade while others will be at the opposite end of the grade level.

NATIONAL GRADING RULE FOR DIMENSION LUMBER
All Species

120. NATIONAL GRADING RULE (NGR)

The Canadian Lumber Standards Accreditation Board (CLSAB) Regulations provide that dimension lumber grading rules may only be certified as conforming to Canadian Standard Lumber (as defined by CSA O141) if the rules conform to the NGR.

Additionally, as per the American Softwood Lumber Standard - Product Standard 20 (PS 20), dimension lumber grading rules may only be certified as conforming to American Lumber Standard if the rules therein conform to the NGR.

The NLGA Grading Rules for dimension lumber as provided in Paras. 121, 122, and 124 incorporate and conform to the NGR. The NGR Interpretations, which provide additional information in the application of the NGR, are appended to these grading rules.

The following Paras. 120a to 120e are excerpted, with minor edits, from the NGR.

120a. NGR - INTRODUCTION

The NGR applies to all species (see Paras. 7 and 7a) of dimension lumber which are covered by the NLGA Grading Rules, developed and approved under CSA O141 and PS 20.

PS 20 stipulates that a NGR 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"*. NLGA is a participating member of the NGR Committee.

120b. NGR - SCOPE

For purposes of the NGR, "dimension" is limited to surfaced softwood lumber of nominal thicknesses from 2 inches 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. It does not apply to those grades that are segregated for special uses, but which are sometimes manufactured to the dimension lumber 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 NGR 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 NGR:

Crossarms
Factory & 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

When provisions are developed for segregating lumber based on rate of growth or specific gravity in accordance with the general provisions of ASTM D245 for a species, such provisions shall be included in grading rules applicable to that species. The provisions shall include the specific manner in which the specific gravity and/or rate of growth is to be determined.

120c. NGR - CLASSIFICATION

The NGR classifies dimension lumber into 3 width categories and 4 use categories. The following table provides the classifications of these categories:

Nominal Width Category	NGR Use Category
2 to 4 inches wide	Light Framing
	Structural Light Framing
2 inches and wider	Studs
5 inches and wider	Structural Joists & Planks

The following table provides the dimension lumber grade names by use category permitted under the NGR.

NGR Use Category	NGR Grade Names	Grade Name Abbreviation	NLGA Para. Reference
Light Framing	Construction Standard Utility	CONST STAND UTIL	122
Studs	Stud	STUD	121
Structural Light Framing and Joists & Planks	Select Structural NO. 1 NO. 2 NO. 3	SEL STR 1 2 3	124

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 the added restrictions on wane, skip and warp. Any NGR grade may be graded or ordered with "**Appearance**" limitations.

"**Appearance**" shall be designated by either the term "**Appearance**" or the abbreviation "**App**" on the grade stamp or by specifically identifying "**Appearance**" in the purchase and shipping documents.

Except as otherwise provided herein, the above grades shall constitute the dimension grades included in rule books of certified rule writing agencies and are the only dimension grades which shall be grade stamped as American Standard Lumber. Modification of these descriptions shall be made only by the NGR Committee.

120d. NGR - 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 judgement of the grader and/or on the results of a method of mechanically determining the strength characteristics of structural lumber. The NGR 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.

120e. NGR - MACHINE GRADED LUMBER

A basic description for machine graded lumber is included for those certified rules writing agencies which possess the necessary technical information on their species to include detailed machine grading provisions in their grading rules. This method for mechanical testing and marking of machine graded lumber shall be included in certified agency rules if they provide for machine graded lumber.

Grade descriptions and grade marking privileges shall be provided by the certified rules writing agencies for machine graded lumber when lumber is evaluated by mechanical means.

NATIONAL GRADING RULE
STUDS
Nominal 2" to 4" Thick and 2" & Wider

121. STUDS

For Studs, there is one NGR grade, "**STUD**" and one NLGA grade, "**ECONOMY STUD**".

The "**STUD**" grade is stress rated and assigned design values. The "**ECONOMY STUD**" grade is not stress rated and has no assigned design values.

121a. "STUD"

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 (see Para. 320b) or their equivalent displacement:

Nominal Width	At Edge Wide Face	Centreline Wide Face	Holes* (Any Cause)
2"	¾"	¾"	¾"
3"	1 ¼"	1 ¼"	1 ¼"
4"	1 ¾"	2 ½"	1 ½"
5"	2 ¼"	3"	1 ¾"
6"	2 ¾"	3 ¾"	2"
8"	3 ½"	4 ½"	2 ½"
10"	4 ½"	5 ½"	3"
12"	5 ½"	6 ½"	3 ½"
14"	6"	7"	4"

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

Manufacture Standard "F". See Para. 722f.

Pitch & 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. 720e and 720g.
Slope of Grain	1 in 4.
Splits	equal in length to twice the width of the piece.
Stain	stained sapwood. Firm heart stain or firm red heart.
Unsound Wood	in spots or streaks limited to 1/3 the cross section at any point along the length. Must not destroy nailing edge. See Para. 710e.
Wane	1/3 thickness and 1/2 the width full length, or equivalent on each face, provided that wane does 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 & Honeycomb	firm

121b. "ECONOMY STUD"

The "**Economy Stud**" grade is not a recognized grade under the NGR but is included here as an NLGA grade. Lumber graded under this grade is not stress rated and has no assigned design values.

Characteristics for lumber of this grade are so designed that each piece can be used full length.

Honeycomb	not limited.
Knots & Holes	75% of cross section.
Shake	not limited.
Splits	1/4 length.
Skips	maximum 1/4" scant of standard surfaced size.
Unsound Wood	75% of cross section away from ends.
Wane	3/4 of any face or as equivalent, 1/4 thickness across face full length, or 1/2 thickness up to 2' long.
Warp	heavy.
White Speck	not limited.

NATIONAL GRADING RULE
LIGHT FRAMING
Nominal 2" to 4" Thick and 2" to 4" Wide

122. LIGHT FRAMING

There are three NGR grades of Light Framing: "**CONSTRUCTION**", "**STANDARD**", and "**UTILITY**" and one NLGA grade: "**ECONOMY**".

The NGR grades are stress rated and assigned design values. The NLGA "**ECONOMY**" grade is not stress-rated and has no assigned design values.

122a. "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 (see Para. 320b) or their equivalent displacement:

Nominal Width	Anywhere on Wide Face	Unsound or Loose Knots and Holes* (Any Cause)
2"	¾"	⅝"
3"	1 ¼"	¾"
4"	1 ½"	1"

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

Manufacture Standard "E". See Para. 722e.

Pitch & 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. 720f.

Slope of Grain 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 does 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.

122b. "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 (see Para. 320b) or their equivalent displacement:

Nominal Width	Anywhere on Wide Face	Holes* (Any Cause)
2"	1"	¾"
3"	1 ½"	1"
4"	2"	1 ¼"

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

Manufacture Standard "F". See Para. 722f.

Pitch & 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 & miss, with a maximum of 5% of the pieces containing hit or miss or heavy skip 2' or less in length. See Paras. 720e, 720f, and 720g.

Slope of Grain 1 in 4.

Splits equal in length to 1 ½ times the width of the piece.

Stain stained sapwood. Firm heart stain or firm red heart not limited.

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 on the wide face; not to exceed maximum wane on the narrow face, 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 does 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.

122c. "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 (see Para. 320b) or their equivalent displacement:

Nominal Width	Anywhere on Wide Face	Holes* (Any Cause)
2"	1 ¼"	1"
3"	2"	1 ¼"
4"	2 ½"	1 ½"

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

Manufacture Standard "F". See Para. 722f.

Pitch & 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 Paras. 720e and 720g.

Slope of Grain 1 in 4.

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

Stain stained wood, not limited.

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

Wane 1/2 the thickness and 1/2 the width full length, or equivalent on each face, provided that wane does 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 & Honeycomb firm.

122d. "ECONOMY"

The "**Economy**" grade is not a recognized grade under the NGR but is included here as an NLGA grade. Lumber graded under this grade is not stress rated and has no assigned design values.

The characteristics of this grade may also be applied to the structural light framing and joists & planks "**Economy**" grade (see Para. 124e).

Characteristics permitted and limiting provisions shall be:

Holes (any cause)	size of a hole not to exceed 75% of cross-section. The through portion shall not exceed 2' in length.
Honeycomb & White Specks	firm, not limited.
Knots	75% of cross section.
Skips	1/4" scant in thickness &/or width. Not limited in length.
Shake	not limited.
Splits	1/3 length.
Unsound Wood	75% of cross-section. Not limited in length.
Wane	3/4 width, full length of piece. If through the edge, equivalent to the area of the hole permitted. Through portion not to exceed 2' in length. If across the face, 1/2 the width must not exceed 1/4" scant in thickness for 1/3 length or, as equivalent longer.
Waste	pieces 9' & longer in length may contain waste (areas where characteristics are larger than those permitted in the grade) which require removal by cross-cutting. The waste portions combined shall not exceed 25% of the length of the piece and must not be located within 2' of either end of the piece.

NOTES

NATIONAL GRADING RULE
STRUCTURAL LIGHT FRAMING
Nominal 2" to 4" Thick and 2" to 4" Wide
STRUCTURAL JOISTS & PLANKS
Nominal 2" to 4" Thick and 5" & Wider

124. STRUCTURAL LIGHT FRAMING AND STRUCTURAL JOISTS & PLANKS

There are four NGR grades of Structural Light Framing and Structural Joists & Planks: "**SELECT STRUCTURAL**", "**NO. 1**", "**NO. 2**", and "**NO. 3**" and one NLGA grade of "**ECONOMY**".

The NGR grades are stress rated and assigned design values. The NLGA grade of "**ECONOMY**" is not stress rated and has no assigned design values.

124a. "SELECT STRUCTURAL"

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 (see Para. 320b) not to exceed the following, or equivalent displacement:

Nominal Width	At Edge Wide Face	Centreline Wide Face	Unsound or Loose Knots and Holes* (Any Cause)
2"	⅜"	⅜"	⅜"
3"	½"	½"	½"
4"	¾"	⅞"	¾"
5"	1"	1 ½"	⅞"
6"	1 ⅛"	1 ⅞"	1"
8"	1 ½"	2 ¼"	1 ¼"
10"	1 ⅞"	2 ⅝"	1 ¼"
12"	2 ¼"	3"	1 ¼"
14"	2 ⅜"	3 ¼"	1 ¼"
16"	2 ⅜"	3 ⅜"	1 ¼"
18"	2 ½"	3 ½"	1 ¼"

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

Manufacture	Standard “E”. See Para. 722e.
Pitch & Pitch Streaks	not limited.
Pockets - pitch or bark	not limited.
Rate of Growth	limited to medium grain in Douglas fir and Western larch only. See Para. 350a.
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. 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 does 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.

124b. "NO. 1" STRUCTURAL

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 (see Para. 320b) not to exceed the following or equivalent displacement:

Nominal Width	At Edge Wide Face	Centreline Wide Face	Unsound or Loose Knots and Holes* (Any Cause)
2"	½"	½"	½"
3"	¾"	¾"	¾"
4"	1"	1 ½"	1"
5"	1 ¼"	1 ⅞"	1 ⅛"
6"	1 ½"	2 ¼"	1 ¼"
8"	2"	2 ¾"	1 ½"
10"	2 ½"	3 ¼"	1 ½"
12"	3"	3 ¾"	1 ½"
14"	3 ⅛"	4"	1 ½"
16"	3 ¼"	4 ½"	1 ½"
18"	3 ⅜"	4 ⅝"	1 ½"

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

Manufacture Standard "E". See Para. 722e.

Pitch & Pitch Streaks not limited.

Pockets - pitch or bark not limited.

Rate of Growth limited to medium grain in Douglas fir and Western larch only. See Para. 350a.

Shake if through at ends, limited as splits. Surface shakes up to 2' long.

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

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 does 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.

124c. "NO. 2" STRUCTURAL

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 (see Para. 320b) not to exceed the following or equivalent displacement:

Nominal Width	At Edge Wide Face	Centreline Wide Face	Holes* (Any Cause)
2"	5/8"	5/8"	5/8"
3"	7/8"	7/8"	7/8"
4"	1 1/4"	2"	1 1/4"
5"	1 5/8"	2 3/8"	1 3/8"
6"	1 7/8"	2 7/8"	1 1/2"
8"	2 1/2"	3 1/2"	2"
10"	3 1/4"	4 1/4"	2 1/2"
12"	3 3/4"	4 3/4"	3"
14"	4 1/8"	5 1/4"	3 1/2"
16"	4 1/4"	5 3/4"	4"
18"	4 3/8"	5 7/8"	4 1/2"

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

Manufacture Standard "F". See Para. 722f.

Pitch & Pitch Streaks not limited.

Pockets - pitch or bark not limited.

Rate of Growth limited to medium grain in Douglas fir and Western larch only. See Para. 350a.

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

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

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.

Slope of Grain 1 in 8.

Stain	stained sapwood. Firm heart stain or firm red heart not limited.
Unsound Wood (excluding white specks)	not permitted in thicknesses over nominal 2". Small spots or streaks of firm honeycomb or peck are limited to 1/6 the width. In nominal 2" lumber, any other unsound wood is limited to a spot 1/12 the width on the wide face; not to exceed maximum wane on the narrow face, 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 does 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.

124d. "NO. 3" STRUCTURAL

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 (see Para. 320b) or their equivalent displacement:

Nominal Width	At Edge Wide Face	Centreline Wide Face	Holes* (Any Cause)
2"	¾"	¾"	¾"
3"	1 ¼"	1 ¼"	1 ¼"
4"	1 ¾"	2 ½"	1 ¾"
5"	2 ¼"	3"	1 ⅞"
6"	2 ¾"	3 ¾"	2"
8"	3 ½"	4 ½"	2 ½"
10"	4 ½"	5 ½"	3"
12"	5 ½"	6 ½"	3 ½"
14"	6"	7"	4"
16"	6 ⅜"	8"	4 ½"
18"	6 ½"	8 ¼"	5"

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

Manufacture Standard "F". See Para. 722f.

Pitch & 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 Paras. 720e and 720g.

Slope of Grain 1 in 4.

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

Stain stained wood, not limited.

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

Wane	1/2 the thickness and 1/2 the width full length, or equivalent on each face, provided that wane does 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 & Honeycomb	firm.

124e. "ECONOMY"

Graded under the provisions of Para. 122d.

NATIONAL GRADING RULE
APPEARANCE

125. APPEARANCE (APP)

The "**Appearance**" designation conforms to all provisions of the applicable NGR grade. In addition, the following limiting provisions shall apply:

Manufacture	Standard "E". See Para. 722e.
Skip	hit and miss skips in a maximum of 10% of pieces. See Para. 720f.
Wane	1/4 the thickness and 1/6 the width by 1/4 the length. Paras. 750b and 750c shall not be applied.
Warp	1/2 of medium. See Para. 752.

Appearance shall be designated by either the term "**Appearance**" or the abbreviation "**App**" on the grade stamp or by specifically identifying "**Appearance**" in the purchase and shipping documents.

EXTERIOR PATIO DECKING
Rough or Surfaced – KD, AD or Unseasoned
Nominal 5/4 to 2" Thick and 4" & Wider
For Flat-Wise Load Applications
Where Spans Are Not to Exceed 16" on Centre

126. EXTERIOR PATIO DECKING

Exterior Patio Decking is produced to standard sizes (see Para. 820b) with the option of radius edges per buyer's specification. Unsound wood or decay is not permitted on any face.

There are two grades of Exterior Patio Decking: "**SELECT PATIO**" and "**COMMERCIAL PATIO**".

126a. "SELECT PATIO"

Unless otherwise specified, characteristics on the reverse face may be one grade lower ("**Commercial Patio**").

Characteristics permitted and limiting provisions shall be:

Checks	medium
Compression Wood	shall be limited in effect to other appearance or strength reducing characteristics permitted in the grade.
Heart Stain	firm.
Holes	pin to small in size, equivalent to chipped knots.
Knots	sound and tight are permitted in the following sizes. Measurements as per Para. 320a.

Nominal Face Width	Knot Size
4"	1 ½"
5"	2"
6"	2 ½"
8"	3"
10"	3 ½"
12"	4"

Spike & Narrow Face Knots limited to equivalent displacement. Measurements as per Para. 320b.

Chipped Knots not to exceed 1/3 thickness, 2 per 12' of length.

Manufacture	Standard “D”. See Para. 722d.
Peck (Cedar)	reverse face, small spots or streaks limited to 1/6 the width.
Pin Holes	limited.
Pitch	light.
Pitch Streak	1 - small.
Pockets - bark	medium.
Pockets - pitch	small.
Sapstain	medium.
Shake	light - several along length, none through. If through at ends, limited to splits.
Skip	very light, 1 per 12' of length. Light on reverse face and edges.
Slope of Grain	1 in 8.
Splits	short.
Wane	reverse face only, 1/2 the thickness and 1/3 the width.
Warp	light.

126b. "COMMERCIAL PATIO"

Unless otherwise specified, characteristics on the reverse face may be 25% larger or more numerous than those permitted on the face.

Characteristics permitted and limiting provisions shall be:

Checks not limited.

Compression Wood limited in effect to other appearance or strength reducing characteristics permitted in the grade.

Grub/Teredo Holes permitted, as per NLGA Interpretations 1.3 appended to these rules.

Honeycomb reverse face: firm, small spots or streaks limited to 1/6 the width.

Knots permitted in the following sizes. Measurements as per Para. 320a.

Nominal Face Width	Sound & Tight Knots	Unsound & Loose Knots, Holes *
4"	2"	¾"
5"	2 ½"	1"
6"	3"	1 ¼"
8"	3 ½"	1 ½"
10"	4"	1 ¾"
12"	4 ½"	2"

* One hole or equivalent smaller holes per 12' of length.

Spike & Narrow Face Knots limited to equivalent displacement. Measurements as per Para. 320b.

Manufacture Standard "F". See Para 722f.

Peck (Cedar) reverse face in spots or streaks limited to 1/3 the width.

Pin Holes not limited.

Pitch not limited.

Pitch Streaks not limited.

Pockets - bark large.

Pockets - pitch medium.

Shake medium, 1/4 length, none through. If through at ends, limited to splits.

Skip	light on face, 2 per 12' of length. Hit and miss 1/32" on reverse face. Medium on edges.
Slope of Grain	1 in 8 for nominal 4" wide lumber and 1 in 6 for wider widths up to nominal 12".
Splits	medium.
Stained Wood	firm.
Wane	reverse face only, 1/2 thickness and 1/3 width or equivalent on each face, provided that wane does not exceed 2/3 thickness or 1/2 width for up to 1/4 the length.
Warp	medium.
White Speck	firm, 1/3 volume. Reverse face, firm.

DECKING
Nominal 2" to 4" Thick and 4" & Wider

127. DECKING

Decking is widely used for walls or roofs where appearance and load-bearing features are important. Moisture content is subject to special agreement.

Orders may specify "Square End Trim" as per Para. 749.

Decking is usually surfaced with a single tongue and groove pattern in nominal 2" thicknesses and a double tongue and groove pattern in nominal 3" & 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 Decking: "**SELECT DECKING**" and "**COMMERCIAL DECKING**".

127a. "SELECT DECKING"

Characteristics and limiting provisions are:

Checks medium.

Crook light, occasional piece.

Holes equivalent to chipped knots.

Knots sound and tight on exposed face, well-spaced. Measurements as per Para. 320a.

Nominal Face Width	Knot Size (both faces)	3x6 & 4x6 Knot Sizes
4"	1 ½"	-
6"	2 ⅜"	2 ½"
8"	3 ¼"	-
10"	4"	-
12"	5"	-

Spike & Narrow Face Knots

equivalent. In occasional pieces, firm and tight knots not exceeding 1 1/2" in diameter are permitted if not through the piece and limited to 2 per 12 lineal feet or equivalent smaller.

Pitch light, or equivalent, very small streak.

Pockets - Bark medium.

Pockets - Pitch	very small, dry.
Rate of Growth	medium grain in Douglas fir and Western larch only. See Para. 350a.
Skips	very light, maximum 10% of face in occasional pieces.
Slope of Grain	1 in 10.
Splits	short, occasional piece.
Stained Wood	medium.
Tongue	1/16" scant, occasional piece.
Torn or Raised Grain	medium.
Twist	very light, occasional piece.

May contain chipped knots or unsound spots of approximately 3/4" in diameter, not through, 2 per 12 lineal feet or equivalent smaller.

Reverse face and unexposed edges permit hit & miss skips and wane approximately 1/3 of the reverse face width and other characteristics which do not affect the intended end use.

In WR Cedar, peck is permitted on reverse face and unexposed edges in narrow streaks, well scattered which do not affect the strength more than other characteristics allowed.

127b. "COMMERCIAL DECKING"

Characteristics and limiting provisions are:

Checks not limited.

Crook medium on occasional piece.

Holes 1".

Knots well-spaced. Measurement as per Para. 320a.

Nominal Face Width	Knot Size (both faces)	3x6 & 4x6 Knot Sizes
4"	1 ¾"	-
6"	2 ⅞"	3"
8"	3 ¾"	-
10"	4 ⅞"	-
12"	6"	-

Spike or Narrow Face Knots
equivalent.

Chipped & Broken-out Knots
approximately 1 1/2" in diameter, not through.

Pitch streaks.

Pockets bark or pitch.

Rate of Growth medium grain in Douglas fir and Western larch only. See Para. 350a.

Shake if "through" at ends, treat equivalent as splits. Away from the ends, "through" shake can be 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 & miss.

Slope of Grain 1 in 8.

Splits 1/6 length.

Stained Wood not limited.

Torn Grain not limited.

Tongue 1/16" scant.

Twist very light on occasional piece.

Unsound Wood in small spots or streaks up to 1" wide on any face. In WR Cedar, spots or streaks of peck 1/3 width of any face.

Wane	1/6 face width.
White Specks	1/3 width or equivalent.

Reverse face and unexposed edges permit wane approximately 1/3 of the reverse face width and other characteristics not affecting intended end use

MACHINE GRADED LUMBER
Nominal 2" and Less in Thickness and Nominal 2" & Wider

128. MACHINE GRADED LUMBER – GENERAL

The grading of lumber by mechanical means is recognized as an acceptable method of grading. All grading equipment and operating procedures shall be approved by the CLSAB and ALSC Board of Review.

The NLGA Special Products Standard for Machine Graded Lumber (**NLGA SPS 2**) is the standard for the manufacture of machine graded lumber. The NLGA SPS 2 standard is separately approved by the CLSAB and also by the ALSC Board of Review as complying with the ALSC Machine Graded Lumber Policy.

There are three classifications of machine graded lumber:

"**MACHINE STRESS-RATED LUMBER**" (MSR),

"**MACHINE EVALUATED LUMBER**" (MEL), and

"**E-LAM LUMBER**", of which there are two categories:

"**E-RATED STRUCTURAL LAMINATION LUMBER**", and

"**MSR/MEL TENSION LAMINATION LUMBER**".

Grades of MSR, MEL and E-Rated Structural Lamination Lumber and their characteristic property values are referenced in NLGA SPS 2. Grades of MSR and MEL may be produced with alternate design value assignments when provided for in these rules and NLGA SPS 2. For use in Canada, grades and design values for machine graded lumber are developed by NLGA and approved by the CSA Technical Committee on Engineering Design in Wood. Grades and design values are provided in Paras. 857 and 858 and are also published in CSA O86.

For use in the U.S., grades of MSR and MEL and their allowable design values are approved by the ALSC Board of Review and are provided in Paras. 909d & 909e and are also published in Table 4C of the AWC NDS Supplement. Grades of MSR/MEL Tension Lamination lumber and their allowable design values are the same as MSR and/or MEL.

For use in the U.S., the assigned specific gravity (based on oven-dry weight and volume), horizontal shear (F_v), and compression perpendicular to grain ($F_{c\perp}$) design values for MSR and MEL are provided in Paras. 910a, 910b, and 910c, respectively.

When the specific gravity for a grade exceeds the value for the species average shown in Para. 910a and is controlled as part of the qualification and daily quality control program, the allowable stress for horizontal shear (F_v) and compression perpendicular to grain ($F_{c\perp}$), may be calculated using the formulas given in Paras. 910b and 910c, respectively.

When so qualified, the specific gravity value shall be included on the grade stamp indicating that this property exceeds the assigned value.

Note: *For the S-P-F species group, if a grade of 2.0 E is simultaneously sorted with a higher E grade or grades, then specific gravity must be quality controlled for the 2.0 E grade.*

Strength reducing characteristics larger than those listed in the following paragraphs for MSR and MEL are permitted provided the additional requirements outlined in the NLGA SPS 2 are followed and tension (F_t) qualification and daily quality control are performed. In such cases, the limiting size of the strength reducing characteristic shall be documented and included on the grade stamp.

When the grade stamp on Machine Graded Lumber includes the designation "**1W**", it signifies that the lumber has been visually graded to meet or exceed the optional "**1W**" wane limitations as described in Paras. 128b or 128c of these rules and Section 6 of NLGA SPS 2.

For further information on the visual grading restrictions of Machine Graded Lumber, refer to the NLGA Interpretations 2.7 appended to these rules.

128a. APPLYING VISUAL GRADES TO RESIDUAL LUMBER

Residual lumber is lumber which has passed through the machine grading process and was rejected from the minimum selection criteria of the machine grade being produced. Visual grading of residual lumber shall meet the following requirements:

a) Residual lumber from a machine grading process that requires bending strength quality control may be placed in the highest visual grade for which the piece qualifies, provided that the design values assigned to the visual grade meet both of the following conditions:

i) the appropriate size-adjusted design value in bending (F_b) assigned for the visual grade is less than the machine grade F_b value from which it was rejected; and

ii) the assigned visual grade modulus of elasticity (E) value is less than the process average grade E value from which it was rejected, or **alternatively**, that the residual lumber visual grade E value is verified to be greater than the assigned visual grade E value.

b) Residual lumber from a machine grading process that requires bending and tension strength quality control may be placed in the highest visual grade for which the piece qualifies, provided that the design values assigned to the visual grade meets both of the following conditions:

i) the appropriate size-adjusted design values in bending (F_b) and tension (F_t) assigned to the visual grade are less than the machine grade F_b and F_t from which it was rejected; and

ii) the assigned visual grade modulus of elasticity (E) value is less than the process average grade E value from which it was rejected, or **alternatively**, that the residual lumber visual grade E value is verified to be greater than the assigned visual grade E value.

See NLGA Interpretations 2.7.4 appended to these rules for examples of residual lumber grading scenarios.

128b. MACHINE STRESS-RATED (MSR) LUMBER

Machine stress-rated lumber is lumber that has been evaluated by mechanical stress rating equipment. MSR lumber is distinguished from visually graded lumber in that each piece is non-destructively tested and marked to indicate the grade modulus of elasticity (MOE) and the derived modulus of rupture (MOR). MSR lumber is also required to meet the visual requirements shown below.

A grade mark on machine stress-rated lumber indicates that the stress rating system used meets the requirements of the Grading Agency's certification and quality control procedures.

In addition to the grade stamp requirements of Para. 39, the grade mark shall show the phrase "**Machine Rated**" or "**MSR**" and the "F_b" and "**E**" rating for the grade. The "F_b" rating is the fibre stress in bending in pounds per square inch and the "**E**" rating is the rated modulus of elasticity in millions of pounds per square inch.

VISUAL RESTRICTIONS ON MSR LUMBER

Machine stress-rated lumber must be well manufactured and visually graded to limit certain characteristics even though the actual strength may not be affected. Characteristics permitted and limiting provisions shall be:

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

Manufacture Standard "F". See Para. 722f.

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' or 1/4 the length, whichever is greater.

Skips hit & miss, with a maximum of 5% of the pieces containing hit or miss or heavy skip, 2' or less in length. See Paras. 720e to 720g.

Slope of Grain

for grading machines [1] not evaluating slope of grain, the slope of grain shall be limited as follows:

Slope of Grain	Fb Designation
1 in 8	≤ 1450
1 in 10	1500 to 2050
1 in 12	≥ 2100

[1] machines which measure MOE by deflection indirectly evaluate slope of grain.

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

Unsound Wood (excluding White Specks)
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 on the wide face; not to exceed maximum wane on the narrow face, 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 does not exceed 2/3 thickness or 1/2 the width for up to 1/4 the length. See Para. 750.

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

Warp light. See tables in Paras. 752, 810c, and 810d.

White Specks firm, 1/3 the face or equivalent.

In addition to the visual limitations listed above; knots, knot holes, burls, or abnormal grain distortion, partially or wholly at edges of wide faces, shall not occupy more of the net cross-section than specified by the **Fb** designation category as shown below:

Edge Displacement	Fb Designation
1/2	≤ 900
1/3	950 to 1450
1/4	1500 to 2050
1/6	≥ 2100

The **ends of the lumber** not tested by the stress-rating equipment shall be limited as follows:

Edge Knots as limited in the above table.

Knots other than Edge Knots
equal to the largest knot tested in the tested portion of the piece or the edge knot permitted in the next lower **Fb** designation, whichever is greater.

Cross-Section Knots
the size or displacement of all knots in the same cross-section shall not exceed the size of the permitted largest knot as described for "Knots other than Edge Knots" above.

Slope of Grain

general slope of grain is limited based on the **Fb** designation assigned to the grade as shown in the following table:

Slope of Grain	Fb Designation
1 in 8	≤ 1450
1 in 10	1500 to 2050
1 in 12	≥ 2100

Other strength reducing characteristics, such as knot holes, burls, or abnormal grain distortion, shall be considered the same as knots.

128c. MACHINE EVALUATED LUMBER (MEL)

Machine Evaluated Lumber (MEL) is lumber that has been non-destructively evaluated by CLSAB and ALSC approved grading machines to predict certain mechanical properties. The MEL machine evaluates each piece and shall be capable of sorting and marking the material into mechanical properties.

MEL shall meet the MSR requirements with the exception of the minimum modulus of elasticity specification and shall meet the following requirements:

- tension (F_t) qualification and daily quality control is a mandatory requirement; and
- the process lower fifth percentile of edge bending MOE (E_{5th}) shall equal or exceed 0.75 times the characteristic mean MOE value for the grade E.

MEL is also required to meet certain visual requirements as shown below.

The grade stamp on Machine Evaluated Lumber indicates the stress rating system used meets requirements of the Grading Agency's certification and quality control procedures.

In addition to the grade stamp requirements of Para. 39, the grade stamp shall show the term "**MACHINE EVALUATED**" or "**MEL**" and a "**MEL grade**" code.

The MEL grade code represents a specific combination of allowable design values for fibre stress in bending (F_b), tension (F_t), average modulus of elasticity (E), and, if applicable, specific gravity as specified in NLGA SPS 2, Table 3.

VISUAL RESTRICTIONS ON MEL

MEL must be well manufactured and visually graded to limit certain characteristics even though the actual strength may not be affected. Characteristics permitted and limiting provisions shall be:

Checks	seasoning checks not limited; through checks at ends limited as splits.
Manufacture	Standard "F". See Para. 722f.
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.
Skip	hit & miss, with a maximum of 5% of the pieces containing hit or miss or heavy skip 2' or less in length. See Paras. 720e to 720g.

Slope of Grain for grading machines [1] not evaluating slope of grain, the slope of grain shall be limited as follows:

Slope of Grain	Fb Designation
1 in 8	≤ 1450
1 in 10	1500 to 2050
1 in 12	≥ 2100

[1] machines which measure MOE by deflection indirectly evaluate slope of grain.

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

Unsound Wood (excluding White Specks)
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 on the wide face; not to exceed maximum wane on the narrow face 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 does not exceed 2/3 thickness or 1/2 the width for up to 1/4 the length. See Para. 750.

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

Warp light. See tables in Paras. 752, 810c, and 810d.

White Specks firm, 1/3 the face or equivalent

In addition to the visual limitations listed above; knots, knot holes, burls, or abnormal grain distortion, partially or wholly at edges of wide faces, shall not occupy more of the net cross-section than specified by the **Fb** designation category as shown below:

Edge Displacement	Fb Designation
1/2	≤ 900
1/3	950 to 1450
1/4	1500 to 2050
1/6	≥ 2100

The **ends of the lumber** not tested by the grading machine shall be limited as follows:

Edge Knots as limited above.

Knots other than Edge Knots

equal to the largest knot tested in the tested portion of the piece or the edge knot permitted in the next lower F_b class, whichever is greater.

Cross-Section Knots

the size or displacement of all knots in the same cross-section shall not exceed the size of the permitted largest knot as described for knots, other than edge knots listed above.

Slope of Grain

general slope of grain is limited based on the **Fb** designation assigned to the grade as shown in the following table:

Slope of Grain	Fb Designation
1 in 8	≤ 1450
1 in 10	1500 to 2050
1 in 12	≥ 2100

Other strength reducing characteristics such as knot holes, burls, abnormal grain distortion shall be considered the same as knots.

128d. E-RATED STRUCTURAL LAMINATION LUMBER

E-Rated Structural Lamination lumber is lumber that has been non-destructively evaluated by CLSAB and ALSC approved grading machines.

E-Rated Structural Lamination lumber is distinguished from visually graded lumber in that each piece is non-destructively tested and marked to indicate the long-span flat-wise grade E (**LS E**) classification.

E-Rated Structural Lamination lumber shall meet the visual requirements as shown below.

Moisture content of E-Rated Structural Lamination lumber is subject to special agreement.

A grade stamp on E-Rated Structural Lamination lumber indicates the stress rated system used meets the requirements of the Grading Agency's certification and quality control procedures.

In addition to the grade stamp requirements of Para. 39, the grade stamp shall show the "**LS E**" designation followed by the term "**LAM**".

The "**LS E**" designation shall be the average "**flat-wise**" long span "**E**" of the grade as determined by qualification testing and maintained by quality control. The grade stamp may also indicate the applicable MSR or MEL grade in accordance with the preceding sections of Para. 128.

If a more restrictive visual quality level is qualified, then the grade stamp shall include the visual quality level (VQL). For example, if a VQL of 1/3 cross-section is qualified for a grade of 1.9 E-LAM, the grade stamp for this product would read: 1.9E LAM-3 in which the "-3" signifies the denominator of the allowable VQL.

VISUAL RESTRICTIONS ON E-RATED STRUCTURAL LAMINATION LUMBER

E-Rated Structural Lamination lumber shall be well manufactured and visually graded to limit defined characteristics even though the actual strength may not be affected. Characteristics permitted and limiting provisions shall be:

Checks	seasoning checks not limited. Through checks on ends are limited as splits.
Knots	may be sound, unsound or not firmly fixed. A knot or knots shall not occupy more than 1/2 the cross section. A knot of the permitted size may be anywhere on the piece.

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

Manufacture Standard "C". See Para. 722c.

Pitch or Bark Pockets medium, scattered.

Pitch Streaks not to exceed 1/6 the width.

Shake & Splits permitted if extending from wide faces into the thickness at an angle of 45 degrees or more from the wide face. Other restrictions are subject to special agreement.

Skips – Face hit & miss, with a maximum of 5% of the pieces containing hit or miss.

Skips – Edge hit & miss, with a maximum of 5% of the pieces containing hit or miss or heavy skip 2' in length or less (see Paras. 720e to 720g) unless a more restrictive requirement is specified.

Slope of Grain for machines not evaluating slope of grain, the edge knot displacement limits the slope of grain as follows:

Slope of Grain	Edge Knot Displacement
1 in 10	≥ 1/3
1 in 12	≤ 1/4

Stain medium stained sapwood. Firm heart stain.

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

Wane not to exceed 1/4" on the wide face by 1/4" deep or equivalent on the edge unless a more restrictive requirement is specified.

Warp light.

White Specks firm. A combination of white speck and a knot in the same cross section shall not occupy more than 1/2 the width or equivalent.

128e. MSR / MEL TENSION LAMINATION LUMBER

MSR/MEL Tension Lamination lumber is lumber that has been non-destructively evaluated by ALSC and CLSAB approved grading machines.

MSR/MEL Tension Lamination lumber shall meet all the requirements of MSR or MEL, as applicable, including mandatory Ultimate Tensile Strength (UTS) qualification and daily quality control.

Qualification and subsequent quality control are required for each of the following properties:

- edge modulus of elasticity (E),
- long-span flat-wise modulus of elasticity (LS E),
- bending strength (F_b) and
- tensile strength (F_t).

For MSR/MEL Tension Lamination lumber, moisture content is subject to special agreement.

In addition to the grade stamp requirements of Paras. 39 and 128d, a grade stamp on MSR/MEL Tension Lamination lumber shall include the applicable MSR or MEL grade stamp information.

VISUAL RESTRICTIONS ON MSR / MEL TENSION LAMINATION LUMBER

The visual requirements listed in Para. 128d shall apply to MSR/MEL Tension Lamination lumber with the following exceptions:

a) Strength reducing characteristics such as knots, knot holes, burls, abnormal grain distortion or decay partially or wholly at the edges of wide faces, shall not occupy more of the net cross-section than specified by the **Fb** designation category as shown below:

Edge Displacement	Fb Designation
1/2	≤ 900
1/3	950 to 1450
1/4	1500 to 2050
1/6	≥ 2100

b) The ends of the lumber not tested by the grading machine shall be limited as follows:

Edge Knots as limited above in **a)** above.

Knots other than Edge Knots

equal to the largest knot in the tested portion of the piece or the edge knot permitted in the next lower F_b class, whichever is greater.

Cross Section Knots

the size or displacement of all knots in the same cross-section shall not exceed the size of the permitted largest knot as described for knots other than edge knots listed above.

Slope of Grain

general slope of grain is limited based on the **Fb** designation category assigned to the grade as shown in the following table:

Slope of Grain	Fb Designation
1 in 8	≤ 1450
1 in 10	1500 to 2050
1 in 12	≥ 2100

Other strength reducing characteristics such as knot holes, burls or abnormal grain distortion shall be considered the same as knots.

NOTES

GLUED LUMBER
Nominal 2" & Less in Thickness and Nominal 2" & Wider

129. GLUED LUMBER - GENERAL

The provisions of the NLGA structural glued lumber special products standards and Para. 129 shall be applied when glued lumber is grade stamped to the structural lumber grades and species covered in the NLGA Grading Rules.

The following NLGA Special Products Standards are applicable to grade stamped structural fingerjoined lumber:

NLGA SPS 1 Special Products Standard for Fingerjoined Structural Lumber,

NLGA SPS 3 Special Products Standard for Fingerjoined "Vertical Stud Use Only" Lumber, and

NLGA SPS 4 Special Products Standard for Fingerjoined Machine Graded Lumber (FJ-MGL).

The following NLGA Special Product Standards are applicable to grade stamped structural face-glued lumber:

NLGA SPS 5 Special Products Standard for Structural Face-Glued Lumber "Vertical Use Only", and

NLGA SPS 6 Special Products Standard for Structural Face-Glued Lumber.

These glued lumber special products standards are separately approved by CLSAB for product used in Canada and by the ALSC Board of Review as complying with the ALSC Glued Lumber Policy for product used in the U.S.

Heat resistant adhesives used in the manufacture of glued lumber under these special products standards shall be approved by the CLSAB and ALSC Board of Review.

Glued lumber shall be grade stamped as follows:

a) All previously affixed grade stamps must be obliterated.

b) In addition to the required grade stamp information in Para. 39, the grade stamp shall include the following:

i) "**HRA**" or "**Non-HRA**", as applicable; and

ii) the grade stamp criteria identified in Paras. 129a or 129b, as applicable.

Note: *The designation "HRA" on a grade stamp indicates the adhesive used is qualified as a "Heat Resistant Adhesive" in accordance with the CLSAB Regulations and the ALSC Glued Lumber Policy.*

129a. STRUCTURAL FINGERJOINED LUMBER GRADE STAMP

In addition to the grade-stamp requirements of Para. 129 above, the structural fingerjoined lumber grade stamp shall also display the following:

a) For fingerjoined structural lumber meeting the requirements of NLGA SPS 1:

"**SPS 1**" and

"**CERT FGR JOINT**"

b) For fingerjoined structural lumber meeting the requirements of NLGA SPS 3:

"**SPS 3**" and

"**CERT FGR JOINT**" and

"**VERTICAL STUD USE ONLY**"

c) For fingerjoined structural lumber meeting the requirements of NLGA SPS 4:

"**SPS 4**" and

"**CERT FGR JOINT**"

or

"**SPS 4**" and

"**CERT FGR JOINT**" and

"**DRY USE ONLY**"

Note: *"DRY USE ONLY" to be added as specified in NLGA SPS 4.*

129b. STRUCTURAL FACE-GLUED LUMBER GRADE STAMP

In addition to the grade-stamp requirements of Para. 129 above, the structural face-glued lumber grade stamp shall also display the following:

a) For face-glued structural lumber meeting the requirements of NLGA SPS 5:

"**SPS 5**" and

"**CERT FACE GLUED**" and

"**VERTICAL STUD USE ONLY**"

b) For face-glued structural lumber meeting the requirements of NLGA SPS 6:

"**SPS 6**" and

"**CERT FACE GLUED**"

129c. NON-STRUCTURAL FINGERJOINED BOARDS

In fingerjoined boards, the grade limiting characteristics are the same as those on a solid sawn piece of lumber of the same board grade and size. The joint shall also be tight and of good appearance.

Non-structural fingerjoined boards shall be grade stamped as follows:

a) All previously affixed grade stamps must be obliterated, and

b) In addition to the required grade stamp information in Para. 39, the grade stamp shall include the following:

"**NON-STRUCTURAL GLUED LUMBER**"

NOTES

BEAMS AND STRINGERS
Rough or Surfaced
Nominal 5" & Thicker
(Rectangular Cross-section)
Nominal Width more than 2" greater than Nominal Thickness

130. BEAMS AND STRINGERS

There are five grades of Beams and Stringers:

"**SELECT STRUCTURAL**",

"**NO. 1**",

"**NO. 2**",

"**STANDARD**", and

"**UTILITY**".

Three of these grades, "**SELECT STRUCTURAL**", "**NO. 1**", and "**NO. 2**" are stress grades with assigned design values.

Along with the following specific provisions applicable to Beams & Stringers, the appropriate provisions in all other paragraphs in these rules apply.

Pieces are graded from all faces, and both ends.

For measurement of knots, shakes, checks, and splits refer to Paras. 320, 320b, 330 and 340, respectively. Knots appearing on the narrow faces are limited to the same displacement as knots at the edges of the wide faces. For measurement of slope of grain, refer to Para. 360.

Post & Timber sizes (nominal 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 are assigned design values equivalent to the Beam & Stringer grades. In addition to the grade stamping requirements of Para. 39, the grade stamp or accompanying grade certificate shall also show "**Para. 130**" to differentiate from the Para. they are normally graded under.

130a. "SELECT STRUCTURAL" BEAMS & STRINGERS

Characteristics and limiting provisions shall be:

Checks in areas at ends, single or opposite, with a total equal to approximately 1/4 the thickness.

Holes pin: limited.

grub and teredo: one for each 2' of length.

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

Nominal Width	At Edge of Wide Face	Centreline Wide Face
8"	1 7/8"	2"
10"	2"	2 5/8"
12"	2 1/8"	3 1/8"
14"	2 3/8"	3 1/4"
16"	2 1/2"	3 1/2"
18"	2 3/4"	3 1/2"

The size of the knots on the wide faces may be increased proportionately from the size permitted at the edge, to the size permitted at the centerline. Refer to Para. 320b (d).

In Cedar, characteristic soft knots 1/2 the size of the sound and tight knots are permitted.

Pitch Streaks not limited.

Pockets pitch or bark: medium.

Rate of Growth medium grain in Douglas fir and Western larch only. See Para. 350.

Shake 1/6 thickness on ends.

Skips occasional 1/16" x 2' in length or equivalent.

Slope of Grain 1 in 14.

Splits 1/2 width in length or equivalent end checks.

Stain stained sapwood, 10% firm heart stain.

Torn Grain heavy.

Wane 1/8 of any face or, as equivalent, 1/4 of any face for 1/4 length.

130b. "NO. 1" BEAMS AND STRINGERS

Characteristics and limiting provisions shall be:

Checks in areas at ends, single or opposite, with a total equal to approximately 1/4 the thickness.

Holes pin: limited.

grub and teredo: one for each 1' length.

in cedar: holes from any cause 1/2 the size of the allowable knots.

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

Nominal Width	At Edge of Wide Face	Centreline Wide Face
8"	2 5/8"	3"
10"	2 7/8"	3 3/4"
12"	3 1/4"	4 1/2"
14"	3 1/2"	5"
16"	3 3/4"	5 1/4"
18"	3 7/8"	5 5/8"

The size of the knots on the wide faces may be increased proportionately from the size permitted at the edge, to the size permitted at the centerline. Refer to Para. 320b (d).

In Cedar, characteristic soft knots half the size of the sound and tight knots are permitted.

Pitch Streaks not limited.

Pockets pitch or bark: not limited.

Rate of Growth medium in Douglas fir and Western larch only. See Para. 350.

Shake 1/6 thickness on ends.

Skips occasional 1/8" x 2' in length or equivalent.

Slope of Grain 1 in 10.

Splits short or equivalent end checks.

Stain stained sapwood, heart stain firm.

Torn Grain heavy.

Wane 1/4 of any face or, as equivalent, 1/3 of any face for 1/4 the length.

130c. "NO. 2" BEAMS AND STRINGERS

Characteristics and limiting provisions shall be:

Checks not limited.

Honeycomb or Peck

spots and streaks of firm honeycomb or peck are limited to 1/6 the width.

Knots sound, not firmly fixed, or holes, well-spaced and are permitted in sizes not to exceed the following or equivalent displacement:

Nominal Width	At Edge and Centreline of Wide Face
8"	4 ½"
10"	5 ⅝"
12"	6 ⅞"
14"	7 ½"
16"	8 ¼"
18"	8 ⅝"

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

Pitch Streaks not limited.

Pockets pitch or bark: not limited.

Slope of Grain 1 in 6

Skips 1/8" deep and 2' in length or 1/16" scant full length

Splits medium or equivalent end checks.

Stained Wood not limited.

Shake 1/2 length, 1/2 thickness. If through at ends, limited as splits.

Torn Grain not limited.

Unsound Wood small spots, well scattered, 1/6 the face width.

Wane 1/3 of any face or equivalent, 1/2 of any face for 1/4 the length.

White Specks firm, 1/3 volume.

130d. "STANDARD" BEAMS AND STRINGERS

Graded as per the provisions of Para. 131d.

130e. "UTILITY" BEAMS AND STRINGERS

Graded as per the provisions of Para. 131e.

NOTES

POSTS AND TIMBERS
Rough or Surfaced
Nominal 5" x 5" and Larger
("Square" Cross-section)
Nominal Width not more than 2" greater than Nominal Thickness

131. POSTS AND TIMBERS

There are five grades of Posts and Timbers:

"**SELECT STRUCTURAL**",

"**NO. 1**",

"**NO. 2**",

"**STANDARD**", and

"**UTILITY**".

Three of these grades, "**SELECT STRUCTURAL**", "**NO. 1**", and "**NO. 2**" are stress grades with assigned design values.

In addition to the following specific provisions applicable to Posts & Timbers, the appropriate provisions in all other paragraphs of these rules apply. Except as provided in the grade descriptions, knots appearing on narrow faces are limited to the same displacement as knots specified for the wide faces.

For measurement of knots, shakes, checks, and splits refer to Paras. 320, 320b, 330 and 340, respectively. For measurement of slope of grain, refer to Para. 360.

Pieces are graded from all faces, and both ends.

131a. "SELECT STRUCTURAL" POSTS AND TIMBERS

Characteristics and limiting provisions shall be:

Checks in areas at ends, single or opposite, with a total equal to approximately 1/4 the thickness.

Holes pin: limited.

grub and teredo: one for each 2' of length.

Knots sound, tight and well-spaced. May be present anywhere in the piece in the following sizes or their equivalent displacement:

Nominal Width	Knot Size
5"	1"
6"	1 ¼"
8"	1 ⅝"
10"	2"
12"	2 ⅜"
14"	2 ½"
16"	2 ¾"
18"	3"

Assigned stress values do not apply to pieces nominal 20" and wider or thicker; and/or 50' & longer. In pieces of this size or length, the knots may be proportionately larger.

In Cedar, characteristic soft knots 1/2 the size of the sound and tight knots are permitted.

Pitch Streaks not limited.

Pockets pitch or bark: medium.

Rate of Growth medium in Douglas Fir and Larch only. Refer to Para. 350.

Shake 1/3 thickness on ends.

Skips 1/16" x 2' in length or equivalent.

Slope of Grain 1 in 12.

Splits 3/4 thickness in length or equivalent end checks.

Stain stained sapwood; heart stain firm - 10% width or equivalent.

Torn Grain heavy.

Wane 1/8 any face or as equivalent 1/4 of any face for 1/4 the length.

131b. "NO. 1" POSTS AND TIMBERS

Characteristics and limiting provisions shall be:

Checks in areas at ends, single or opposite, with a total equal to approximately 1/2 the thickness.

Holes pin: limited.

grub and teredo: one for each 1' of length.

in cedar: holes from any cause 1/2 the size of the allowable knots.

Knots sound, tight and well-spaced. May be present anywhere in the piece in the following sizes or their equivalent displacement:

Nominal Width	Knot Size
5"	1 ½"
6"	1 ⅞"
8"	2 ½"
10"	3 ⅛"
12"	3 ¾"
14"	4"
16"	4 ¼"
18"	4 ½"

Assigned stress values do not apply to pieces nominal 20" & wider or thicker; and/or 50' & longer. In pieces of this size or length, the knots may be proportionately larger. In Cedar, characteristic soft knots 1/2 the size of the sound and tight knots are permitted.

Pitch Streaks not limited.

Pockets bark or pitch: not limited.

Rate of Growth medium in Douglas Fir and Larch only. Refer to Para. 350.

Shake 1/3 thickness on ends.

Skips 1/8" x 2' in length or equivalent.

Slope of Grain 1 in 10.

Splits short or equivalent end checks.

Stain stained sapwood, heart stain firm.

Torn Grain heavy.

Wane 1/4 any face or as equivalent 1/3 of any face for 1/4 length.

131c. "NO. 2" POSTS AND TIMBERS

Characteristics and limiting provisions shall be:

Checks not limited.

Honeycomb or Peck

spots and streaks of firm honeycomb or peck limited to 1/6 width.

Knots sound, not firmly fixed or holes, well-spaced. May be present anywhere in the piece in the following sizes or their equivalent displacement:

Nominal Width	Knot Size
5"	2 ½"
6"	3"
8"	3 ¾"
10"	5"
12"	6"
14"	6 ½"
16"	7"
18"	7 ½"

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

Pitch Streaks not limited.

Pockets pitch or bark: not limited.

Shake 1/2 length, 1/2 thickness. If through at ends, limited as splits.

Skips 1/8" deep and 2' in length or 1/16" scant, full length.

Slope of Grain 1 in 6.

Splits medium or equivalent end checks.

Stained Wood not limited.

Torn Grain not limited.

Unsound Wood small spots, well scattered, 1/6 the face width.

Wane 1/3 of any face or equivalent 1/2 the width for 1/4 length.

White Specks firm, 1/3 volume.

131d. "STANDARD" POSTS AND TIMBERS

Characteristics and limiting provisions shall be:

Checks	not limited.
Holes	1/2 width of face or equivalent
Honeycomb or Peck	spots and streaks of honeycomb or peck limited to 1/4 width.
Knots	1/2 width of face or equivalent.
Pitch Streaks	not limited.
Pockets	bark or pitch: not limited.
Shake	1/2 thickness, 1/2 length or equivalent, if through at end, limited as splits.
Skips	1/8" x 2' or 1/16" scant, full length.
Slope of grain	1 in 4
Splits	medium or equivalent end checks.
Stain	stained wood.
Torn Grain	not limited.
Unsound Wood	spots 1/4 the face width.
Wane	1/3 of any face or equivalent, 1/2 width for 1/4 the length.
White Specks	1/3 volume.

131e. "UTILITY" POSTS AND TIMBERS

Characteristics and limiting provisions shall be:

Checks	not limited.
Holes	3/4 width of face or equivalent.
Honeycomb or Peck	spots or streaks 1/2 the face width.
Knots	3/4 width of face or equivalent.
Pitch Streaks	not limited.
Pockets	bark or pitch: not limited.
Shake	not through, single shake permitted full length. Shake on ends limited to splits. Elsewhere, through shakes 1/2 length, scattered full length.
Skips	1/8" scant if surfaced; 1/2" off nominal if rough.
Slope of grain	1 in 4
Splits	1/4 length.
Stained wood	not limited.
Torn Grain	not limited.
Unsound Wood	spots or streaks 1/2 the face width.
Wane	1/3 of any face or equivalent, 1/2 width for 1/4 the length.
White Speck	not limited.

LADDER RAILS
Seasoned and Surfaced Four Sides

132. LADDER RAILS

Ladder Rails are customarily furnished in Douglas Fir, Western Hemlock, and Coast Sitka Spruce as ordered, but when specified, any other species may be used under these rules.

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 is readily identifiable by visual inspection.

Ladder Rails are dried to a maximum of 15% moisture content.

Grade descriptions are based on a piece nominal 3" wide. The number of characteristics in wider or narrower pieces may vary accordingly.

There are three grades of Ladder Rails: "**V.G. LADDER RAILS**", "**F.G. or M.G. LADDER RAILS**", and "**LADDER RAIL STOCK**".

In addition to the following specific provisions for Ladder Rails, the appropriate provisions in all other paragraphs in these rules apply.

132a. "V.G. LADDER RAILS"

Most pieces are entirely clear or have only minor or unimportant characteristics such as:

Burls	less than 1/2" in diameter.
Checks	small, one in any 3 lineal feet.
Compression Wood	a streak 1/2" wide or equivalent, narrower streak.
Pockets	very small, one in any 3 lineal ft.
Rate of Growth	average 6 rings per inch.
Slope of Grain	1 in 12.
Torn Grain	very light.

132b. "F.G. OR M.G. LADDER RAILS"

Pieces of this grade may be Vertical, Flat or Mixed Grain at shipper's option unless otherwise specified. Most pieces are clear or have only minor or unimportant characteristics such as:

Burls	less than 1/2" in diameter.
Checks	small, 1 in any 3 lineal feet.
Compression Wood	a streak 1/2" wide or equivalent, narrower streak.
Knots	pin, 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 1 in any 3 lineal ft.
Pockets	very small, 1 in any 3 lineal feet.
Rate of Growth	average 6 rings per inch.
Slope of Grain	1 in 12.
Torn Grain	very light.

132c. "LADDER RAIL STOCK" (V.G., F.G., OR M.G.)

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 or their equivalent smaller which may appear on pieces in this grade and their limiting provisions are:

Burls	less than 1/2" in diameter.
Checks	2 - 6" in any 3 lineal feet.
Compression Wood	narrow streaks, with the aggregate not to exceed 1/4 the volume of the piece.
Heart Stain	firm.
Knots	pin, 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 1 in any 3 lineal ft.
Pockets	small, 1 in any 3 lineal feet, or their equivalent smaller.
Sap Stain	medium.
Skips	very light on occasional pieces.
Slope of Grain	1 in 10.
Splits	short in 5% of the pieces.
Torn Grain	light.
Cutout	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".

GUTTER

133. GUTTER

Gutter is shipped in a number of patterns. Grade descriptions are based on a piece nominal 4" x 5" by 20'. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. Gutter must be watertight full length.

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

There are two grades of Gutter: "**CLEAR**" and "**SELECTED**".

133a. "CLEAR" GUTTER

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

Checks	medium, not through.
Knots	3 - sound, tight 1" or equivalent smaller.
Pitch Streaks	medium.
Pockets	4 - medium, none through.
Skips	very light on exposed faces, hit & miss on other faces.
Stained Sapwood	medium.
Torn or Raised Grain	heavy.

133b. "SELECTED" GUTTER

Must be medium grain, free from defective hearts. Other characteristics and limiting provisions are:

Checks	medium, not through.
Knots	sound, intergrown and well scattered, approximately 1" in nominal 3" widths to 1 3/4" in nominal 5" widths.
Spike Knots	equivalent.
Pitch Streaks	large.
Pockets	medium, none through.
Skips	very light on exposed faces, hit & miss on other faces.
Stained Sapwood	medium.
Torn or Raised Grain	heavy.

MAST, SPAR, AND BOAT LUMBER

134. MAST, SPAR, AND BOAT LUMBER

Mast, Spar and Boat Lumber F.G. and/or V.G. is well manufactured and FOHC.

Grade descriptions are based on a piece nominal width 8" by 12'.

In addition to the following specific provisions applicable to Mast, Spar, and Boat Lumber, the appropriate provisions in all other paragraphs in these rules apply.

134a. "NOMINAL ONE TO TWO INCH THICKNESS"

Characteristics and limiting provisions are:

Checks	4 - small.
Pockets	3 - very small, none through.
Rate of Growth	average 5 rings per inch.
Sapwood	bright, 1/3 width or equivalent.
Slope of Grain	1 in 10.
Splits	short, in 5% of the pieces.

And on reverse face:

Pockets	pitch or bark: 4 - small.
Knots	2 - small, sound and tight, or equivalent pin.

134b. "NOMINAL TWO 1/4" AND THICKER"

Characteristics and limiting provisions on wide face and corresponding half of narrow faces are the following or equivalent:

Checks	6 - small in nominal 2 1/4" thickness to 6 - medium in nominal 6" & thicker.
Pockets	3 - small in nominal 2 1/4" thickness to 4 in nominal 4" & thicker.
Rate of Growth	average 5 rings per inch.
Sapwood	bright, 1/3 width or equivalent.
Slope of Grain	1 in 10.
Splits	short in 5% of pieces.

And on reverse face and corresponding half of narrow faces:

Pockets	pitch or bark: 4 - medium.
Knots	3 - sound and tight, 1" in 2 1/4" thickness to 2" in 12" thicknesses.

FLITCHES FOR REMANUFACTURE

150. FLITCHES FOR REMANUFACTURE

Flitches as specified in these grades are particularly valued for the percentage of cuttings which may be obtained for use in joinery and factory work.

150a. FACTORY FLITCHES

Irregularities such as spike knots, knots, large soft knots, loose knots, knot holes or wane on corners which can be entirely removed in the process of resawing, ripping and/or cross-cutting will be allowed, provided that irregularities as heretofore mentioned are located in the flitch in such a way that each clear cutting resulting will not be less than 2' long, after allowing not more than 20% waste in a flitch. In each flitch or board 12' & longer at least half of required cuttings shall be 7' & longer.

150b. SHOP FLITCHES

Flitches of this grade give a lower return of clear cuttings than Factory Flitches but will be satisfactory for use in many areas where clear cuttings of shorter length are required. Each flitch must produce, on remanufacture, a minimum of 60% of clear cuttings 2' & longer.

MOULDING STOCK
All Thicknesses and Widths

151. MOULDING STOCK (A)

Moulding Stock (A) is stock of a type suitable for ripping into strips 1" and wider, 10' & longer. At least 2/3 of the area contains such rips of the grade permissible in standard Mouldings.

In 4/4 and 8/4 & thicker Moulding Stock, the grade of each rip is determined from the best face. In 5/4, 6/4, and 7/4 Moulding Stock the grade of each rip is determined from the poorest face.

Slope of grain is limited to 1 in 4 in 4/4 and 8/4 & thicker stock and 1 in 6 in 5/4, 6/4, and 7/4 stock.

Crook, regardless of the width of a piece, is limited to 1" in 10' & shorter pieces and 1 1/2" in 11' & longer pieces.

Up to 10% of the footage of any item may be 6' to 9' in length, provided each piece contains 2/3 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 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 5/4, 6/4, and 7/4 Moulding Stock shall be the same thickness as other grades of Selects (see Para. 820e of these rules). Rough 8/4 Moulding Stock shall be the same thickness as other grades of Selects (see Para. 820e of these rules), except that 5% of the material may contain a minimum thickness of 1 7/8". Moulding Stock thinner than these minimums shall be included and tallied as of the next lower thickness.

Massed pitch, shake, unsound wood and wane may render a portion of a piece unusable as Moulding Stock. If these characteristics create a total loss of 10% or more of the area of the piece, the excess unusable portion shall be scaled off to the nearest square foot, and the scale-off shall be marked on the piece. Pieces containing less than 10% waste shall not be scaled off to raise the grade. Pieces requiring more than 50% scale-off are not permitted.

151a. MOULDINGS

Standard Mouldings permit such characteristics as are acceptable in both interior and exterior trim. These may be light seasoning checks, very small pockets, light torn grain, pin-size and small knots, medium stain or a small amount of medium pitch. A serious combination of these is not admissible in any one piece. The number and extent of characteristics permitted varies as the area of the piece increases or diminishes.

Based on a 1" x 2" by 12' size, this grade will admit the following characteristics or the equivalent:

- **a)** A small spot of torn grain and 1' of medium pitch, light skip in dressing on reverse face; **or**
- **b)** One pocket 1/8" x 2" or equivalent; **or**
- **c)** Two pin knots or one small knot (knots may be increased in number on an equivalent basis as the size of the moulding increases, but may not be increased in size); **or**
- **d)** One small seasoning check and a light snipe at one end; **or**
- **e)** Medium stain covering 1/3 the face in an occasional piece, or a greater area of lighter stain when not in combination with other characteristics.

Characteristics that will not show when piece is laid are not given the same consideration as characteristics elsewhere.

In random length Mouldings, pieces requiring one cut, not to exceed 4" of waste to eliminate a characteristic too serious to go in the grade, is allowed in otherwise high line pieces. The cut must be more than 36" from each end of the piece. Not more than 10% of the cutting type is admissible in any one item.

Lengths shall be 3' to 20' in multiples of 1'. When random length shipments are ordered, no more than 15% under 8' in any one item and bundled separately shall be shipped. When shipments are ordered to be 6' & longer, no more than 10% under 8' is allowable in any one item.

- **a)** Casing and Stop patterns 7' in length are considered long lengths when figuring percentage of shorts.
- **b)** Cut to length window and door trim are graded as completely usable.

The above paragraphs also apply to all fingerjoined mouldings with the additional provision that medium stain is allowed.

Patching and filling are allowed in fingerjoined mouldings, providing a good paintable surface results.

152. MOULDING STOCK (B)

Moulding Stock (B) shall consist of lumber suitable for ripping into moulding strips 1" & wider, 8' & longer.

Each piece contains not less than 50% of rips of the grade permissible (See Para. 151a for grade characteristics). Up to 15% of stock 6' to 7' may be included, provided each piece contains 50% or more of full length moulding rips. Wane, stained wood, 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 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.

WINDOW STOCK (WS)
All Widths and up to 5" in Thickness

153. WINDOW STOCK

There are five grades of Window Stock: "**CLEAR**", "**A**", "**B**", "**C**", and "**SELECT**". These grades are designed to provide the window trade with a full width product where only cross-cutting is required for the manufacture of window components.

Window stock may be supplied green or dry, rough, surfaced or worked, vertical, flat or mixed grain as ordered.

Grades are based on the quality and percentage of cuttings available from each piece.

The poorer face shall determine the grade.

Cutting sizes must be full width and 3' & longer.

153a. GRADE OF CUTTINGS

The cuttings of "**CLEAR**", "**A**", "**B**", and "**C**" window stock shall permit:

Checks	In dry stock: one - 4" per cutting - no limit if rough. If ordered unseasoned and/or rough: not limited	
Mineral Streaks	2 per cutting on the occasional piece	
Rate of Growth	average 6 rings per inch.	
Slope of Grain	1 in 8	
Slough Knots	occasional piece may have one slough knot extending 1/2" into the wide face and not more than 1/2" deep in thickness.	
Wane	1/2" in thickness and width, full length on one corner only.	
Warp	Crook/Bow:	1/32" for each 1' of length.
	Twist:	1/2 of Crook/Bow allowance.

153b. "CLEAR" WINDOW STOCK (Clr-WS)

The entire length of the pieces in this grade shall conform to the grade of cuttings.

153c. "A" WINDOW STOCK (A-WS)

Pieces in this grade shall contain a minimum of 90% - 3' & longer cuttings.

153d. "B" WINDOW STOCK (B-WS)

Pieces in this grade shall contain a minimum of 70% - 3' & longer cuttings.

153e. "C" WINDOW STOCK (C-WS)

Pieces in this grade shall contain a minimum of 50% - 3' & longer cuttings.

153f. "SELECT" WINDOW STOCK (Sel-WS)

This grade is of the quality for use where high appearance is not required and is more suitable for paint finishes.

Pieces in this grade shall contain a minimum of 70% - 3' & longer cuttings. The cuttings of "**SELECT**" window stock shall permit:

Checks	In dry stock: one - 4" per cutting - no limit if rough. If ordered unseasoned and/or rough: not limited.	
Heart Stain	not limited.	
Knots	sound and tight pin knots.	
Mineral Streaks	not limited.	
Pockets	very small	
Rate of Growth	average 4 rings per inch.	
Sapstain	medium	
Slope of Grain	1 in 6	
Slough Knots	occasional piece may have one slough knot extending 1/2" into the wide face and not more than 1/2" deep in thickness.	
Wane	1/2" in thickness and width, full length, on one corner only.	
Warp	Crook/Bow:	1/32" for each 1 foot of length.
	Twist:	1/2 of Crook/Bow allowance.

FACTORY LUMBER AND DOOR STOCK

154. FACTORY LUMBER AND DOOR STOCK

Factory Lumber (Para. 155) and Door Stock (Para. 156) shall be measured for the percentage of cuttings (Para. 157) which can be obtained with the grade work carried to each cutting piece (Para. 158).

In addition to the following specific provisions applicable to Factory Lumber and Door Stock, the appropriate provisions in all other paragraphs in these rules apply.

155. FACTORY LUMBER 1" & 2" SHOP (All Species except WR Cedar)

Sizes:

Thickness	Finished Thickness S2S	Nominal Widths
1" cut full size	25/32" & 13/16"	5" and wider
2" cut full size	1 25/32"	5" and wider

Lengths: 4' & longer. Not to exceed 25% 8' & shorter, in multiples of 1'.

Scantness: Rough nominal 6" & narrower shall not be more than 1/8" scant in width when dry; nominal 8" & wider widths shall not be more than 1/4" scant when dry.

Size of Cuttings:

- **a)** 9 1/4" or wider, 18" or longer.
- **b)** 5" or wider, 3' or longer.
- **c)** If stock under 5" wide, cutting must be full width and 3' & longer.

155a. GRADE OF CUTTINGS

The grade is determined from the poorest face.

- **a)** Cuttings 9 1/4" or wider and 18" or longer shall be clear on both sides — bright sapwood admitted.
- **b)** All other cuttings other than sash shall have a face equal to "**B and Better**" Industrial as per Para. 108b.

c) Sash cuttings as per Para. 157d.

Panel stock cuttings to be graded under **a)** above and must be full to width ordered.

155b. "SELECT SHOP"

Each piece shall contain 70% or more of **a)** and/or **b)** cuttings.

155c. "NO. 1 SHOP"

Each piece shall contain 50% to 70% of **a)** and/or **b)** cuttings.

155d. "NO. 2 SHOP"

Each piece shall contain 33 1/3% to 50% of **a)** and/or **b)** cuttings.

155e. "NO. 3 SHOP"

NO. 3 Shop shall be of factory lumber type admitting all pieces below the grade of NO. 2 Shop that contain approximately 10% or more of mixed **a)** and/or **b)** cuttings and 30% or more of mixed sash cuttings or 50% of sash cuttings.

156. DOOR STOCK 1 ⅜" AND THICKER

Sizes:

Thickness	Finished Thickness S2S	Lengths
1 ⅜" cut full size	1 5/32"	6' & longer in multiples of 1'
1 ⅝" cut full size	1 13/32"	
2" cut full size	1 25/32"	
2 ½" cut full size	2 9/32"	
3" cut full size	2 ¾"	
4" cut full size	3 ¾"	

156a. SCANTNESS

Rough 4" to 6" widths shall not be more than 1/8" scant in width when dry; 8" and wider widths shall not be more than 1/4" scant when dry.

156b. DOOR CUTTINGS – Lengths and Widths

Stiles, for purposes of computing percentages of cuttings, shall be figured as 4" to 6" wide by 6'8" to 7'7", in multiples of 1" in length for 1 3/8" and 1 5/8" Door Stock and 6'9" to 8'1" for 2" & thicker Door Stock.

Top Rails, 4" to 6" wide and **Bottom Rails**, 8" to 12" wide, shall be figured in lengths from 23" to 37" in multiples of 1" for 1 3/8" and 1 5/8" Door Stock and 25" to 47" for 2" & thicker Door Stock.

Muntins, shall be 4" to 6" wide and 3'6" to 4' in length.

156c. DOOR CUTTINGS – Percentages

In determining the percentage of door cuttings in 1 3/8" & thicker stock, consideration must be given to the fact that stock is to be ripped full length before cross cutting, 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 and muntins or top rails, which can be obtained by ripping this crosscut stock, the door cuttings so obtained shall be figured in when determining percentages. Where cutout knots occur, the computation of cuttings shall commence 1" from nearest edge of knot. Imperfections, other than knots, which will machine out, are permissible.

Door Stock shows on both sides, hence the grade is determined from the poorer face.

157. GRADE OF CUTTINGS

Three grades of Door Cuttings only shall be recognized, "**NO. 1 Cuttings**", "**NO. 2 Cuttings**" and "**NO. 3 Cuttings**". Cuttings shall be V.G. unless otherwise specified.

157a. "NO. 1 CUTTINGS"

NO. 1 Cuttings will admit 1 - small pocket, not through. NO. 1 Cuttings must average at least 8 rings to the inch. Light pink colour admitted.

Slope of grain not to exceed 1 in 8.

157b. "NO. 2 CUTTINGS"

NO. 2 Cuttings must average at least 6 rings to the inch. Will admit firm stained wood and one of the following:

Pocket	1 - small, not through.
Pockets	2 - small, not through, in a stile if located within 20" of the ends.
Checks	1 or more, none through, with a combined length of not more than 6".
Torn Grain	very light on one side of a piece.
Pitch Streaks	not pronounced, or light pitch.
Slope of grain	not to exceed 1 in 8.

157c. "NO. 3 CUTTINGS"

NO. 3 Cuttings will permit stained wood and one of the following:

Pocket	1 - 6", not through, for each 20" of length, or equivalent of seasoning checks.
Pitch Streaks	medium.
Torn Grain	light.
Knot	1 - sound, tight, 5/8" per cutting
Pin Holes	a few scattered on one side.

157d. "SASH CUTTINGS"

NO. 2 Cuttings and Better are 2 1/2", 3 1/2" and 4 1/2" wide by 28" & longer in length.

158. GRADE OF PIECE FOR CUTTING

158a. "FACTORY SELECT"

Each piece shall contain 70% or more NO. 1 Door Cuttings. Sizes and grades of cuttings admissible in any combination are as follows:

4" to 6" widths: any number of NO. 1 Stiles; 1 only NO. 1 Top Rail.

8" to 12" widths: any number of NO. 1 Stiles and/or Bottom Rails are allowed; 1, NO. 1 Top Rail may be included.

In pieces requiring 3 Stiles to get the necessary percentage of cuttings, 1 - NO. 2 Stile is allowed. Muntins are not permitted in this grade.

158b. "NO. 1 SHOP" (Door Stock)

Each piece shall contain 50 to 70% or more NO. 1 Door Cuttings. Sizes and grades of cuttings admissible in any combination are as follows:

a) Any number of NO. 1 Stiles.

b) Any number of NO. 1 Rails - 8" to 12" wide.

c) 2 only, NO. 1 Muntins or Top Rails.

d) 1 only, NO. 2 Stile. Each 4" to 6" piece in this grade must contain at least 1 Stile.

158c. "NO. 2 SHOP" (Door Stock)

Each piece shall contain not less than 25% NO. 1 Door Cuttings, or 40% NO. 2 Door Cuttings, or 60% of NO. 3 Door Cuttings, or 33 1/3% of NO. 1 and NO. 2 Door Cuttings combined.

Any combination of Stiles, Rails or Muntins is admissible except NO. 1 Top Rails shall be figured as NO. 2.

158d. "NO. 3 SHOP" (Door Stock) or "SASH"

NO. 3 Shop shall be of factory lumber type admitting all pieces below the grade of NO. 2 Shop which contain approximately 10% or more of mixed Door Cuttings and 30% or more of mixed Sash Cuttings, or 50% of Sash Cuttings, or 40% NO. 3 Cuttings.

158e. "CUT DOOR STOCK" K.D.

Sizes: thicknesses, lengths and widths as follows:

Thickness	Finished Thickness S2S
1 3/8"	1 5/32"
1 5/8"	1 13/32"
2"	1 25/32"

Door Stock	Lengths	Widths
Stiles	6'7" to 8'1"	4" to 6"
Bottom Rails	23" to 48"	8" to 12"
Top Rails	23" to 48"	4" to 6"
Muntins	36" to 4'	4" to 6"

Rough 4" to 6" widths shall not be more than 1/8" scant in width when dry; 8" and wider shall not be more than 1/4" scant when dry.

Imperfections on face and edges that will dress, tenon or sand out are permitted.

Door Stock shows on two sides, therefore the grade must be determined from the poorer face.

GRADES - Stiles, Rails, Top Rails, Narrow Lock Rails and Muntins

158f. "NO. 1"

NO. 1 will permit:

Torn Grain very light.

Pocket 1 - 3", not through thickness or into edge.

Note: *In Top and Narrow Lock Rails, and Muntins, no pitch pockets are permitted.*

158g. "NO. 2"

NO. 2 will permit:

Torn Grain	very light.

And one of the following or equivalent:

Stained Wood	light, not over 50% of one side of piece.
Checks	1 or more, with a combined length of not more than 8".
Pockets	2 - 4", none through thickness or into edge.
Pitch Streak	small, light.
Knots	1 - sound, tight, not over 5/8" in diameter.

158h. "NO. 3"

NO. 3 will permit:

Torn Grain	light.

And one of the following or equivalent:

Stained Wood	not limited.
Checks	1 or more, with a combined length of not more than 8".
Pockets	2, none over 6" in length.
Pitch	light.
Knots	sound, tight, none over 1".
Pin Holes	a few scattered on one side.

ALTERNATE RULES FOR FACTORY LUMBER

159. BOX LUMBER – 4/4 and Thicker, All Widths

Box lumber may be of any thickness, 4/4 and thicker. It is considered strictly Factory lumber graded for box cutting value, and no comparison with any Yard grade shall be made.

Shipments ordered "hit or miss" to larger than standard sizes will contain all stock that will surface cleanly to standard size.

On orders of special widths or thicknesses, all stock sawn for the orders will be shipped.

Docking for scale, or so-called "pencil trimming", is permissible if the scale-off is clearly indicated on each piece so trimmed. The descriptions following are intended to define the low limits of the grades, and shipments of box lumber will generally be found to contain a large portion of stock of higher box cutting value.

Short Box includes lumber 12" to 48" long, inclusive, 3" & wider of **NO. 4 Common** grade and better.

159a. "NO. 1 BOX"

Sound red knots up to 4" in diameter and medium black knots are admissible, and no limit is placed on the number appearing in any one piece.

Larger knots, knot holes, and other serious characteristics are permitted when the waste from these characteristics does not exceed 15% of the piece.

Other characteristics admissible in this grade are:

- **a)** Light to medium blue stain, over the entire face of one side or its equivalent on both sides.
- **b)** Heavy blue stain, over not more than 25% of one side or its equivalent on both sides.
- **c)** Light to medium pitch, evenly distributed throughout the piece.
- **d)** Heavy pitch or massed pitch streaks, over not more than 15% of the area, in pieces of otherwise good quality.
- **e)** Large seasoning checks, splits, heart shake, or a combination of these characteristics, over not more than 1/2 the length on one side or its equivalent on both sides, in pieces containing no other serious characteristics.

f) Wane, equivalent to 1/4 the width, 1/2 the thickness and 1/4 the length, if not in combination with other serious characteristics

g) Fine seasoning checks, full length of a piece or their equivalent in light heart shake, a few worm holes, heart pith, light skips in dressing, or medium red heart stain, in pieces of otherwise good quality.

A serious combination of the above characteristics is not admissible in any one piece.

159b. "NO. 2 BOX"

The characteristics found in this grade are heavy and massed pitch, rot, numerous worm holes and heavy stain. Other types contain excessive heart shake, splits and seasoning checks, heavy skips in dressing and all other characteristics too serious to go into NO. 1 Box. No one piece shall contain less than 75% sound wood of usable quality.

160. SHOP LUMBER

Shop lumber is graded with reference to its use for sash and doors, or on the basis of characteristics affecting its use for general cut-up purposes, or on the basis of size of cutting. The grade of shop lumber is determined by the percentage of the area of each piece available in cuttings of specified or of given minimum sizes and qualities. Slope of grain is limited to 1 in 4 in all Shop grades.

Surfaced Shop lumber may be up to 1/64" full in thickness and still be considered on size. No minus tolerance in thickness is allowed.

Standard Shop Thicknesses:

Nominal Thickness	Surfaced Thickness S2S
4/4	¾"
5/4	1 5/32"
6/4	1 13/32"
7/4	1 19/32"
8/4	1 13/16"
9/4	2 3/32"
10/4	2 ⅜"
11/4	2 9/16"
12/4	2 ¾"
16/4	3 ¾"

The grades of Factory lumber 5/4 and thicker are determined from the poorer side of the piece.

Massed pitch, shake, unsound wood and wane may render a portion of a piece unusable for millwork.

If these characteristics create a total loss of 5% or more of the area of the piece, the excess unusable portion shall be scaled off to the nearest square foot, and the scale-off shall be marked on the piece.

Pieces containing less than 5% waste shall not be scaled off to raise the grade. Pieces requiring more than 50% scale-off are not permitted.

In determining the percentage of door cuttings in 5/4 & thicker Shop lumber, consideration must be given to the fact that usually pieces are to be ripped full length before cross cutting in such a manner as will yield the highest grade and largest percentage of door cuttings, subject to the following exceptions:

a) In such cases where pieces will yield a higher value by first being 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 shall be figured in when determining percentages.

b) Pieces in which stiles only are computed for the required percentage may be crosscut first.

In 4/4 Shop, each cutting is figured without regard to whether the lumber will be ripped before cross-cutting.

5/4 AND THICKER SHOP GRADES

160a. "FACTORY SELECT" (NO. 3 CLEAR)

Each piece of Factory Select contains 70% or more of NO. 1 Door Cuttings, except that pieces containing one NO. 1 stile, or two or more NO. 1 Door Cuttings will admit one NO. 2 stile. Not over two muntins are included in any piece. No piece contains muntins only.

160b. "NO. 1 SHOP"

Each piece of NO. 1 Shop contains from 50% to 70% of NO. 1 Door Cuttings, except that pieces containing one or more NO. 1 Door Cuttings will admit one NO. 2 stile. Not over two muntins are included in any piece.

160c. "NO. 2 SHOP"

Each piece of NO. 2 Shop contains one of the following percentages of Door Cuttings: 25% NO. 1 cuttings; 33 1/3% mixed NO. 1 and NO. 2 cuttings; 40% NO. 2 cuttings.

160d. "NO. 3 SHOP"

The grade of NO. 3 Shop 5/4 and thicker is Factory lumber type admitting all pieces below the grade of NO. 2 Shop that contain not less than 30% of the area of any combination of the following cuttings: NO. 1 and NO. 2 door cuttings, sash cuttings, moulding rips, jamb and sill cuttings. Sash cuttings are of NO. 1 quality.

Moulding rips are 2" and wider and 10' & longer. Jambs and sills are 5" and wider and 3' and longer and of NO. 1 cutting quality on one face except that barely perceptible light brown stain is admitted.

The backs of jamb and sill cuttings may contain pin knots, seasoning checks, medium pitch pockets, light stain, medium pitch, skips in dressing and other characteristics of equivalent nature. No consideration is given to edge or end characteristics that will be removed in milling.

Not more than 5% of stock narrower than 5" is admissible in any shipment of NO. 3 Shop.

161. 4/4 SHOP GRADES

161a. "FACTORY SELECT" (NO. 3 CLEAR)

The grade of 4/4 Factory Select is determined by the percentage in each piece of cuttings suitable for general millwork in the sizes and qualities hereinafter specified.

Cuttings are 9 1/4" wide or wider and 18" long or longer; or 5" wide or wider and 3' long or longer.

Cuttings 9 1/4" wide or wider and less than 3' in length are free from characteristics on both sides.

Cuttings 5" wide or wider and 3' long or longer will grade C Select, or better.

Each piece of 4/4 Factory Select contains 70% or more of any one cutting or combination of cuttings described in the foregoing rules.

161b. "NO. 1 SHOP"

The grade of 4/4 No. 1 Shop is determined by the percentage in each piece of cuttings suitable for general millwork in the sizes and qualities hereinafter specified.

Cuttings are 9 1/4" wide or wider and 18" long or longer; or 4" wide or wider and 3' long or longer.

Cuttings 9 1/4" wide or wider and less than 3' in length are free from characteristics on both sides. Cuttings 4" wide or wider and 3' long or longer will grade C Select, or better.

The grade of 4/4 NO. 1 Shop may be 4" and wider. Each piece contains from 50% to 70% of any one cutting or combination of cuttings of the quality described in the foregoing rules.

161c. "NO. 2 SHOP"

The grade of 4/4 NO. 2 Shop consists of Shop type of pieces which do not have the required percent of cuttings necessary for 4/4 NO. 1 Shop. This grade contains not less than 33 1/3% of cuttings of the size and quality permissible in 4/4 NO. 1 Shop.

162. CUT SASH AND DOOR STOCK

All sash and door cuttings are graded from the poor side of the piece. "Cut Sash" and "Door Stock" shall be graded as completely usable.

Less consideration is given to edge or end characteristics that will surface off in milling than to defects elsewhere in the piece.

A deviation of bow or crook is permissible as shown for the following basic lengths:

Length	Bow or Crook
28" to 48"	1/32"
60"	1/16"
70"	3/32"
80" and longer	1/8"

Lengths falling between the basic lengths may have a proportionate amount of bow and crook on the same curvature.

Surfaced stock may be up to 1/64" full in thickness, but no minus tolerance is allowed. Width variation may be 1/8" over or 1/32" under the specified width.

Sash cuttings are 2 1/2" & wider in width by 28" & longer in length.

162a. "SASH CUTTINGS"

"**NO. 1**" Sash Cuttings are free from characteristics on both sides, except that light brown stain or one barely perceptible bark or pitch blemish is admissible.

"**NO. 2**" Sash Cuttings proportioned to their size, will admit the same characteristics permitted in NO. 2 cuttings of door stock.

162b. "DOOR CUTTINGS"

Two grades of door cuttings are recognized, "**NO. 1**" and "**NO. 2**".

"**NO. 1 Cuttings**" are free from characteristics on both sides, except that light brown stain or one barely perceptible bark or pitch blemish is admissible.

"**NO. 2 Cuttings**" will admit any one of the following characteristics:

- **a)** A small knot of sound character not exceeding 5/8" in diameter.
- **b)** Light blue stain and/or medium brown stain.
- **c)** One bark pocket 1/8" by 1" in size or several when proportionately smaller or less pronounced.
- **d)** One or more small seasoning checks, the combined length not exceeding 8".
- **e)** One very small pitch pocket, showing on one side only.
- **f)** Light pitch or pitch streaks that do not form a pronounced defect.
- **g)** Slight skip or torn grain.

162c. CUTTING SIZES

Stiles are 5" and 6" wide by from 6'8" to 7'6" long. They may be either NO. 1 or NO. 2 in quality.

Bottom rails are 9" and 10" wide by 2'4" to 3' long. They may be either NO. 1 or NO. 2 in quality.

Muntins are 5" and 6" wide by from 3'6" to 4' long. They may be either NO. 1 or NO. 2 in quality.

Top rails are 5" and 6" wide by from 2'4" to 3' long. They must be of NO. 1 quality but are considered as NO. 2 cuttings.

In computing the area of door cuttings in Factory lumber 5/4 & thicker, the sizes and corresponding rounded values listed below shall be used.

STILES

Width x Length	Area (square feet)	Rounded Area (square feet)
5" x 6'8"	2.78	3
5" x 6'10"	2.85	
5" x 7'	2.92	
5" x 7'2"	2.99	
5" x 7'4"	3.06	
5" x 7'6"	3.13	
6" x 6'8"	3.33	3 ¼
6" x 6'10"	3.42	3 ½
6" x 7'	3.50	
6" x 7'2"	3.58	
6" x 7'4"	3.67	3 ¾
6" x 7'6"	3.75	

BOTTOM RAILS

Width x Length	Area (square feet)	Rounded Area (square feet)
9" x 2'4"	1.75	1 ¾
9" x 2'6"	1.875	
9" x 2'8"	2.00	2
9" x 2'10"	2.125	
9" x 3'0"	2.25	2 ¼
10" x 2'4"	1.94	2
10" x 2'6"	2.08	
10" x 2'8"	2.22	2 ¼
10" x 2'10"	2.36	
10" x 3'0"	2.50	2 ½

MUNTINS

Width x Length	Area (square feet)	Rounded Area (square feet)
5" x 3'6"	1.46	1 ½
5" x 3'8"	1.53	
5" x 3'10"	1.60	
5" x 4'0"	1.67	1 ¾
6" x 3'6"	1.75	
6" x 3'8"	1.83	
6" x 3'10"	1.92	2
6" x 4'0"	2.00	

TOP RAILS

Width x Length	Area (square feet)	Rounded Area (square feet)
5" x 2'4"	0.97	1
5" x 2'6"	1.04	
5" x 2'8"	1.11	
5" x 2'10"	1.18	1 ¼
5" x 3'0"	1.25	
6" x 2'4"	1.17	
6" x 2'6"	1.25	
6" x 2'8"	1.33	
6" x 2'10"	1.42	1 ½
6" x 3'0"	1.50	

163. CUT GRADES

Cut grades are used for cutting-up qualities only and are not to be confused either in quality or value with grades outlined elsewhere in the NLGA Grading Rules.

Cut grades are "**NO. 1**", "**NO. 2**", and "**NO. 3**" but generally marketed as NO. 1 & NO. 2, or NO. 1, NO. 2 & NO. 3 together.

These grades will not permit shake in a cutting but will permit a small amount of light surface stain. Bright sap no defect.

Cuts are composed of units. One unit is 1" x 1' surface measure or the equivalent in square inches.

To determine the number of units in the White Pine cut grades, use the following table:

For:	91 2/3%	(11/12)	- Multiply surface measure by 11.
	83 1/3%	(10/12)	- Multiply surface measure by 10.
	66 2/3%	(8/12)	- Multiply surface measure by 8.
	50%	(6/12)	- Multiply surface measure by 6.
	33 1/3%	(4/12)	- Multiply surface measure by 4.

163a. "NO. 1 CUTS"

This grade is used for pattern stock, sash, doors, panel work. Will admit:

All thicknesses.

Widths - 6" & wider.

Lengths - 8' to 16' long.

A board placing within this grade must be capable of being cut to contain one cutting of at least 36 units with each additional cutting to contain 28 units. The total of all the clear cutting units in each board to be at least 66 2/3% of the surface area.

Cuttings to be not less than 6" in width. 1/8" sound knot allowed in cuttings - one knot per each 12 units.

Will also admit clear 6" and 7" wide boards, 8' - 12' long, 91 2/3% clear, in not more than two cuttings, full width of the piece.

163b. "NO. 2 CUTS"

Same as NO. 1 Cuts, but in smaller dimensions. Will admit:

All thicknesses.

Widths - 6" & wider.

Lengths - 8' to 16' long.

A board placing within this grade must be capable of being cut to contain one cutting of at least 28 units with each additional cutting to contain not less than 20 units. The total of all clear cutting units in each board to be at least 50% of the surface area.

Cuttings to be not less than 5 1/2" in width. 1/8" sound knot allowed in cuttings at the rate of one knot per each 12 units.

Will also admit pieces 6" and 7" wide, 8' to 12' long, 83 1/3% clear in not more than two cuttings, full width of the piece.

163c. "NO. 3 CUTS"

Small pattern work, paint doors, sash and toy manufacturing stock. Will admit:

All thicknesses.

Width - 5" & wider.

Lengths - 6' to 16' long.

A board placing within this grade must be capable of being cut to contain one or more cuttings of at least 20 units. The total of all the clear cutting units in each board to be at least 33 1/3% of the surface area.

Cuttings to be not less than 5" wide. 1/8" sound knot allowed in cuttings at the rate of one knot per each 9 units.

PINE FURNITURE GRADES
4/4 to 12/4 in Thickness and 4" & Wider
4' to 16' Lengths Including Not Over 5% of 4' and 5'

164. PINE FURNITURE

There are two grades for pine furniture available: "**NO. 1 FURNITURE**" and "**NO. 2 FURNITURE**". Furniture grade pine is selected stock having well distributed sound, completely intergrown red knots that will provide sound cuttings on a fixed percentage of the good face.

Characteristics and limiting provisions of cuttings are:

Face:

a) One sound, completely intergrown red knot is required per cutting with a minimum of one for each 3 lineal feet of length.

b) One sound, tight, black knot up to 1/4" in diameter or equivalent smaller is allowed in cuttings 6 lineal feet or over in length.

c) Not permitted: black knots, pith, checks, shake, splits, warp, wane, pitch pockets, worm holes, rot, stain, or other defects that seriously weaken the cutting.

Reverse Face: Sound, allowing no rot, shake, wane, unsound knots, or other defects that seriously weaken the cutting.

164a. "NO. 1 FURNITURE"

Minimum sizes of cuttings are 4" by 2' or 3" by 3'.

The allowable number of cuttings is calculated by adding 1 to the surface measure of the piece, dividing by 3, and dropping any fraction:

Surface Measure	Number of Cuttings
2' - 4'	1
5' - 7'	2
8' - 10'	3
11' - 13'	4
14' & over	5

This grade requires sound cuttings of 66 2/3% or better on the face and 33 1/3% or better on the reverse face of any piece.

Pieces producing 75% or better sound face cuttings are allowed one additional cutting.

164b. "NO. 2 FURNITURE"

Minimum size of cuttings is 3" by 2'. The allowable number of cuttings is calculated by dividing the surface measure of the piece by 2 and dropping any fractions:

Surface Measure	Number of Cuttings
2' - 3'	1
4' - 5'	2
6' - 7'	3
8' - 9'	4
10' - 11'	5
12' - 13'	6
14' & over	7

This grade requires sound cuttings of 50% or better on the face.

Pieces producing 66 2/3% or better sound face are allowed 1 additional cutting.

RAILWAY CAR FRAMING
1" to 2" Thick
Unseasoned, V.G. and/or F.G

170. 1" AND 2" RAILWAY CAR FRAMING

There are two grades of 1" to 2" Car Framing: "**B & BETTER**" and "**C**".

If A.D. or K.D. required, must be so specified. Grade descriptions based on a piece 6" wide by 12' long.

170a. "B & BETTER"

Characteristics and limiting provisions are:

Sapwood	bright, 1/3 of face unless K.D., A.D. or treated with anti-stain solution.
Torn Grain	very light.

With the above, one of the following or equivalent:

Checks	3 - small.
Knots	3 - pin, sound, intergrown.
Pockets	3 - small, none through.

If specified S2S, occasional light skips on reverse face permitted.

170b. "C"

Characteristics and limiting provisions are:

Sapwood	stained, medium, 25% of face.
Torn Grain	light.

With the above, one of the following or equivalent:

Checks	small.
Knots	3 - sound, tight, 1" or equivalent smaller.
Pitch Streak	small.
Pockets	5 - small.

If specified, S2S, occasional light skips on reverse face permitted.

RAILWAY CAR FRAMING
2 ½" and Thicker
Unseasoned, V.G. and/or F.G

171. 2 ½" AND THICKER RAILWAY CAR FRAMING

There are two grades of 2 ½" & thicker Car Framing: "**B & BETTER**" and "**C**".

If A.D. or K.D. required, must be so specified. Grade descriptions based on a piece 6" wide by 12' long.

171a. "B & BETTER"

Characteristics and limiting provisions are:

Sapwood	bright, 1/3 of face unless K.D., A.D. or treated with anti-stain solution.
Torn Grain	light.

With the above, on best face and corresponding half of narrow faces, one of the following or equivalent:

Checks	3 - small.
Knots	3 - small, sound, tight.
Pockets	3 - 6" or equivalent smaller.

If specified S2S, occasional light skips on reverse face permitted.

171b. "C"

Characteristics and limiting provisions are:

Sap Stain	medium, 25% of face.
Torn Grain	light.

With the above, on best face and corresponding half of narrow faces, one of the following or equivalent:

Checks	small.
Knots	3 - 1 1/2" sound, tight or equivalent smaller.
Pitch Streak	medium.
Pockets	5 - 6" or equivalent smaller.

If specified S2S, occasional light skips on reverse face permitted.

RAILWAY CAR FRAMING
Under 7" in Thickness
Rough or Surfaced

172. RAILWAY CAR FRAMING

There are three grades of Car Framing: "**SELECT STRUCTURAL**", "**SELECTED**" and "**NO. 1**".

172a. "SELECT STRUCTURAL"

Shall be sound wood, close grain, free from wane. Characteristics and limiting provisions are:

Checks not limited.

Knots sound, tight, not in clusters:

Face Width	Maximum Knot Size
3" & 4"	1"
6"	1 ¼"
8"	1 ½"
10"	1 ¾"
12"	2"
Greater than 12"	2 ½"

Pockets medium.

Sap Stain medium, approximately 10% of face area.

Skips occasional, light on face and narrow faces, not opposite each other.

Slope of grain 1 in 15.

Spike Knots equivalent.

Torn Grain medium.

172b. "SELECTED"

Shall be sound wood, free from wane. Characteristics and limiting provisions are:

Checks not limited.

Knots sound, tight, not in clusters, approximately:

Face Width	Maximum Knot Size
3" & 4"	1"
6"	1 ¼"
8"	1 ½"
10"	1 ¾"
12"	2"
Greater than 12"	2 ½"

Pockets medium.
Sap Stain medium, 25% of face area.
Skips occasional, light on face and narrow faces, not opposite each other.
Spike Knots equivalent.
Torn Grain medium.

172c. "NO. 1"

Shall be sound wood. Characteristics and limiting provisions are:
Checks not limited.
Heart Stain approximately 10% of face area.
Knots sound, tight, not in clusters:

Face Width	Maximum Knot Size
3" & 4"	1 ½"
6"	1 ¾"
8"	2"
10"	2 ½"
12"	3"
Greater than 12"	3 ½"

Pockets permitted.
Sap Stain medium.
Skips occasional, light on face and narrow faces, not opposite each other.
Spike Knots equivalent.
Splits short.
Torn Grain not limited.
Wane 1/8 of any face for 1/4 length.

CLEAR RAILWAY CAR DECKING
1 ½" to 4" in Thickness and 4" to 12" in Width
Rough or Surfaced

173. CLEAR RAILWAY CAR DECKING

There are two grades of Clear Car Decking: "**B & BETTER**" and "**C**".
Surfaced sizes and patterns are subject to special contract.
Grade descriptions are based on a piece 1 ½" x 6" by 9'.

173a. "B & BETTER", V.G. and/or F.G.

Characteristics and limiting provisions are:

Heart Stain firm.
Sap Stain light.
Torn Grain light.

With the above, one of the following or equivalent:

Checks 3 - small, none through.
Pockets 3 - small or 1 - medium, none through.

If specified S2S, occasional light skips on back permitted.

173b. "C", V.G. and/or F.G.

Characteristics and limiting provisions are:

Heart Stain firm.
Sap Stain medium.
Skips very light.
Torn Grain medium.

With the above, one of the following or equivalent:

Checks small, allowing some 8", none through.
Knots 4 - small, sound, intergrown.
Pockets 5 - small, none through.

If specified S2S, occasional light skips on reverse face permitted.

RAILWAY CAR DECKING AND GRAIN DOOR MATERIAL

174. RAILWAY CAR DECKING AND GRAIN DOOR MATERIAL

There are two grades of common (Grain Tight) Car Decking and Grain Door material, "**SELECTED**" and "**NO. 1**".

Surfaced sizes and patterns are subject to special contract.

174a. "SELECTED", (GRAIN TIGHT)

Characteristics and limiting provisions are:

Checks	not limited.
Knots	sound, intergrown, maximum 1 1/2".
Pockets	medium, none through.
Skips	very light.
Stained Wood	not limited.
Torn Grain	medium.

If specified S2S, occasional light skips on reverse face permitted.

174b. "NO. 1"

Characteristics and limiting provisions are:

Checks	not limited.
Knots	sound, tight, approximately 1/3 width of piece.
Pockets	large, none through.
Skips	very light.
Stained Wood	not limited.
Torn Grain	heavy.

If specified S2S, occasional light skips on reverse face permitted.

RAILWAY CAR LINING AND ROOFING
V.G. and/or F.G.

175. RAILWAY CAR LINING AND ROOFING

There are three grades of Car Lining and Roofing: "**B & BETTER**", "**C**" and "**SELECTED**".

If A.D. or K.D. required, must be so specified.

Grade descriptions are based on a piece 4" wide by 12' long.

175a. "B & BETTER"

Characteristics and limiting provisions are:

Crook 3/4" in 4" widths, 5/8" in 6" widths.
Heart Stain firm.
Sap Stain light.
Torn Grain light.

With the above, one of the following or equivalent:

Checks 4 - small, none through.
Knots 3 - pin, sound, intergrown.
Pockets 4 - small, none through.

If specified S2S, occasional light skips on reverse face permitted.

175b. "C"

Characteristics and limiting provisions are:

Crook 3/4" in 4" widths, 5/8" in 6" widths.
Heart Stain firm.
Sap Stain medium.
Skips very light.
Torn Grain medium.

With the above, one of the following or equivalent:

Checks small.
Knots 3 - small, sound, intergrown, or equivalent pin.
Pockets 5 - medium, none open through.

If specified S2S, occasional light skips on reverse face permitted.

175c. "SELECTED" (GRAIN TIGHT)

Characteristics and limiting provisions are:

Checks not limited.
Crook 3/4" in 4" widths, 5/8" in 6" widths
Knots sound, intergrown, approximately 1" in 4" widths and 1-1/2" in 6" widths.
Pockets medium, none open through.
Skips very light.
Stained Wood not limited.
Torn Grain not limited.

If specified S2S, occasional light skips on reverse face permitted.

HORIZONTAL RAILWAY CAR SHEATHING
V.G. and/or F.G.

176. HORIZONTAL RAILWAY CAR SHEATHING

There are three grades of Horizontal Car Sheathing: "**B & BETTER**", "**C**" and "**SELECTED**".

If A.D. or K.D. required, must be so specified. Grade descriptions are based on a piece 2" x 6" by 18'.

176a. "B & BETTER"

Characteristics and limiting provisions are:

Crook 1/2".
Heart Stain firm.
Sap Stain light.
Torn Grain light.

With the above, one of the following or equivalent:

Checks 5 - small, none through.
Knots 2 - small, sound, intergrown, if located away from edges.
Pitch Streak very small.
Pockets 5 - small, none through.

On reverse face:

Pockets slightly larger than above.

If specified S2S, occasional light skips on reverse face permitted.

176b. "C"

Characteristics and limiting provisions are:

Crook	1/2".
Heart Stain	firm.
Sap Stain	medium.
Skips	very light.
Torn Grain	medium.

With the above, one of the following or equivalent:

Checks	small, none through.
Knots	8 - small, sound, intergrown.
Pitch Streaks	2 - medium.
Pockets	8 - small, none open through.

If specified S2S, occasional light skips on reverse face permitted.

176c. "SELECTED" (GRAIN TIGHT)

Characteristics and limiting provisions are:

Checks	not limited.
Crook	1/2".
Knots	sound, intergrown, approximately 1" in 4" widths, 1 1/2" in 6" widths.
Pockets	medium, none open through.
Skips	very light.
Stained Wood	not limited.
Torn Grain	not limited.

If specified S2S, occasional light skips on reverse face permitted.

RAILWAY CAR SIDING
V.G. and/or F.G.

177. RAILWAY CAR SIDING

There are three grades of Car Siding: "**B & BETTER**", "**C**" and "**SELECTED**". Grade descriptions are based on a piece 1" x 4" by 9'.

177a. "B & BETTER"

Characteristics and limiting provisions are:

Crook 1/2" in 4" widths, 3/8" in 6" widths.
Heart Stain firm.
Sap Stain light.
Torn Grain very light.

With the above, one of the following or equivalent:

Checks 3 - small, none through.
Knots 3 - pin, sound, intergrown.
Pockets 3 - small, none through.

If specified S2S, occasional light skips on reverse face permitted.

177b. "C"

Characteristics and limiting provisions are:

Crook 1/2" in 4" widths, 3/8" in 6" widths.
Heart Stain firm.
Sap Stain medium.
Skips very light.
Torn Grain light.

With the above, one of the following or equivalent:

Checks small, none through.
Knots 3 - pin, sound, intergrown.
Pockets 5 - small, none open through.

If specified S2S, occasional light skips on reverse face permitted.

177c. "SELECTED" (GRAIN TIGHT)

Characteristics and limiting provisions are:

Checks not limited.
Crooks 3/4" in 4" widths, 5/8" in 6" widths.
Knots sound, intergrown, approximately 1" in 4" widths and 1 1/2" in 6" widths.
Pockets medium, none open through.
Skips very light.
Stained Wood not limited.
Torn Grain not limited.

If specified S2S, occasional light skips on reverse face permitted.

RUNNING BOARDS
V.G. and/or F.G.

178. RUNNING BOARDS

There are two grades of Running Boards: "**B & BETTER**" and "**C**". If specified V.G., angle of grain is not more than 60 degrees from vertical.

Running Boards are usually shipped unseasoned. If A.D. or K.D. required, must be so specified.

Grade descriptions are based on a piece 6" wide and 12' long.

Running Boards ordered S1S are graded from the rough face.

178a. "B & BETTER"

Characteristics and limiting provisions are:

Sapwood bright, 25% of face, unless A.D., K.D. or treated with anti-stain solution.

With the above, one of the following or equivalent:

Checks 3 - small.
Pockets 3 - small.

178b. "C"

Characteristics and limiting provisions are:

Heart Stain firm.
Sap Stain medium.

With the above, one of the following or equivalent:

Checks 3 - small.
Knots 3 - 1", sound, tight, if located away from edges.
Pockets 5 - small.

SAWN RAILROAD TIES

179. RAILROAD TIES

There is only one grade of sawn railroad ties. The NO. 1, NO. 2 and NO. 3 designations refer to "use" and these are predicated by the amount of wane permitted. Sizes and species may be specified by purchaser.

All ties shall be manufactured from sound, live, straight timber and are free from decay, unsound knots, shake, bark seams and worm holes, except pin worm holes (Ambrosia beetle) and all other imperfections that would impair the strength or durability of the tie. Ties shall be clean and peeled but an occasional strip of inner bark 1" wide by 10" long may be permitted. All four faces must be sawn and opposite faces parallel.

Characteristics and limiting provisions are:

Bow 1/2" in 6" thicknesses, 1" in 7" thicknesses.

Crook 1" in 8" widths, 1 1/2" in 9" widths.

Checks medium, not through.

Knots sound and tight, 1/4 the width. Knots are measured using the average diameter method. See Para. 320a.

Pith exposed heart not permitted in species other than Douglas Fir.

Pockets permitted.

Size Tolerances 1" over in length and 1/8" under and 1/2" over in width and thickness.

Wane restrictions are applied 8" to 28" from either end. Maximum on one edge 1 1/2".

NO. 1 Ties (7x9) minimum face of 7" is permitted if wane on one wide face only. If wane on both wide faces, minimum face width is 8".

NO. 2 Ties (6x8) minimum face of 6" is permitted if wane on one wide face only. If wane on both wide faces, minimum face width is 7".

NO. 3 Ties (6x8) minimum face 5" on one or both wide faces.

"**Flatted**" ties, when ordered, are covered by special contract.

SCAFFOLD PLANK
Nominal 1 ¼" & Thicker and Nominal 8" & Wider
All Species Except Cedars

180. SCAFFOLD PLANK

Scaffold Plank is well manufactured.

The grade is determined from the poorer face.

Wide face knot sizes shall be determined from the face showing the largest knot dimensions. The resultant average of the maximum dimensions of the end section of the knot shall be used in determining the knot size.

The measurement of wide face knots overlapping an edge (3-face knots) shall be determined in accordance with –the NGR Interpretations 1.9.3, Figures 5a and 5b, appended to these rules, except that four-face knots are not permitted.

Narrow face (spike) knots are permitted provided their cross-sectional area displacement does not exceed that of the knot size permitted for the wide face. Narrow face knots shall not be spiked across the piece for more than 1/2 the width.

Pieces containing spike knots in the same cross-section are not permitted.

Knot Spacing: When two or more knots appear in the same cross-section, the combined total sum of their sizes and/or displacement must not exceed the specified knot size or displacement for that width of piece under consideration.

The term "cross-section" is defined as the area across the width of a piece equal to the diameter of the largest knot present. See: NGR Interpretations 1.9.5b, Figure 11, appended to these rules.

Pieces shall be FOHC (side cut). See Para. 714c.

There is only one grade: "**SELECT STRUCTURAL**". The grade stamp identification for this grade is "**SEL SCAFFOLD**".

In addition to the following specific provisions applicable to Scaffold Plank, the appropriate provisions in all other paragraphs of these rules apply.

180a. "SELECT STRUCTURAL" – SCAFFOLD PLANK

Characteristics and their limiting provisions shall be:

Checks surface only. If through at ends, equivalent to splits.

Knots sound, tight and well-spaced, may be present in the following sizes:

Nominal Face Width	Knot Size
8"	1 5/8"
9"	1 3/4"
10"	1 7/8"
12"	2 3/8"
14"	2 1/2"
16"	2 5/8"

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.

Pitch Streaks medium.

Pockets medium.

Rate of Growth close grain.

Sap Stain medium.

Slope of Grain 1 in 12.

Splits very short.

STRUCTURAL LAMINATIONS
2" & Thinner and 3" & Wider
Rough or Surfaced

181. STRUCTURAL LAMINATIONS

The grades of Structural Laminations in this section are intended for use in members manufactured to CSA O122 - Structural glued-laminated timber. There are four grades of Structural laminations: "**B-F LAMINATING**", "**B LAMINATING**", "**C LAMINATING**" and "**D LAMINATING**".

Structural laminations for use in members manufactured to ANSI/AITC specifications shall be graded under Para. 195.

181a. GENERAL REQUIREMENTS

The following general requirements apply to all laminating grades:

Moisture content subject to special agreement. When ordered surfaced, must be well manufactured.

Laminating stock must be of sound wood and shall be graded from the worst wide face and based on the full length of the piece.

Knots shall be measured between lines enclosing the knot and parallel to the edges of the wide faces. If two or more knots are in line, i.e., partially, or completely enclosed by the same parallel lines and separated lengthwise by less than 8 inches, the effective width of the knots shall be the distance between two parallel lines which enclose the knots.

Two or more knots of maximum size will be permitted if they are separated in a lengthwise direction a distance, measured centre to centre of the knots, at least equal to the width of the piece.

When two or more knots appear in the same cross-section of a piece (opposite each other on a face or narrow face), the sum of their sizes shall not exceed the maximum permitted knot size.

Maximum cup permitted:

Nominal Thickness	Nominal Width		
	4" or less	6"	8" & Wider
1"	1/32"	1/16"	1/8"
2"	none	1/32"	1/16"

181b. "B-F LAMINATING"

In addition to the requirements for "**B Laminating**", the following provisions shall apply for "**B-F Laminating**": knots, knot holes and local deviations of slope of grain exceeding 1 in 16 shall not be permitted within one half inch of both edges of one wide face.

This face shall also be free from torn grain.

181c. "B LAMINATING"

In addition to the General Requirements, the following provisions shall apply to the "**B Laminating**" grade:

Checks approximately 1/4 the length.

Crook 1/4" in 12' of length.

Cup as per table in Para. 181.

Knots sound, tight, loose or knot holes. approximately:

Nominal Face Width	Knot Size
4"	7/8"
6"	1 3/8"
8"	1 3/4"
10"	2 1/4"
12"	2 3/4"

Machine Marks occasional knife marks or machine burns permitted.

Pitch Streaks 1/8" wide, equal to the width of the piece.

Pockets 1/8" wide, equal to the width of the piece.

Rate of Growth close grain - Douglas Fir only. See Para. 350b.

Shake approximately 1/4 the length.

Skips hit or miss on narrow face, occasional roughness in dressing on wide face.

Slope of Grain 1 in 16.

Spike Knots equivalent.

Splits approximately 1/4 the length.

Stained Wood firm.

Torn Grain light on wide faces, heavy on narrow faces.

Twist or Bow 1/2" in 12' of length.

Wane 3/16" may go through thickness.

Worm Holes pin, scattered; small, occasional.

181d. "C LAMINATING"

In addition to the General Requirements, the following provisions shall apply to the "**C Laminating**" grade:

Checks approximately 1/4 the length.

Crook 1/4" in 12' of length.

Cup as per table in Para. 181.

Knots sound, tight, loose or knot holes, approximately:

Nominal Face Width	Knot Size
4"	1 ¼"
6"	2 ⅛"
8"	2 ¾"
10"	3 ⅝"
12"	4 ⅜"

Machine Marks occasional knife marks or machine burns permitted.

Pitch Streaks 1/8" wide equal to the width of the piece.

Pockets 1/8" wide equal to the width of the piece.

Rate of Growth medium - Douglas Fir only. See Para. 350b.

Shake approximately 1/4 the length.

Skips hit or miss on narrow face, occasional roughness in dressing on wide face.

Slope of Grain 1 in 12.

Spike Knots equivalent

Splits approximately 1/4 the length.

Stained Wood firm.

Torn Grain light on wide faces, heavy on narrow faces.

Twist or Bow 1/2" in 12' of length.

Wane 3/16" may go through thickness.

Worm Holes pin, scattered; small, occasional.

181e. "D LAMINATING"

In addition to the General Requirements, the following provisions shall apply to the "**D Laminating**" grade:

Checks approximately 1/4 the length.

Crook 1/4" in 12' of length.

Cup as per table in Para. 181.

Knots sound, tight, loose or knot holes, approximately:

Nominal Face Width	Knot Size
4"	1 ⅝"
6"	2 ⅝"
8"	3 ½"
10"	4 ½"
12"	5 ½"

Machine Marks occasional knife marks or machine burns permitted.

Pitch Streaks 1/8" wide equal to the width of the piece.

Pockets 1/8" wide equal to the width of the piece.

Rate of Growth medium - Douglas Fir only. See Para. 350b.

Shake approximately 1/4 the length.

Skips hit or miss on narrow face, occasional roughness in dressing on wide face.

Slope of Grain 1 in 8.

Splits approximately 1/4 the length.

Stained Wood firm.

Torn Grain light on wide faces, heavy on edges.

Twist or Bow 1/2" in 12' of length.

Wane 3/16" may go through thickness.

Worm Holes pin, scattered; small, occasional.

PICKETS
K.D. or Unseasoned

182. PICKETS

There are two grades of Pickets: "**NO. 1**" and "**NO. 2**".

Standard sizes of Pickets are:

Nominal 1 ¼" square	S4S to 1 1/32" x 1 1/32"
Nominal 1 ½" square	S4S to 1 9/32" x 1 9/32"
Nominal 1" x 3" flat	S4S to 1 1/16" x 2 1/2"

Grades are based on a piece 1" x 3" by 4'.

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

182a. "NO. 1"

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

Checks	small.
Knots	1 - small, sound, tight or its equivalent.
Skips	occasional very light.
Torn Grain	light.

182b. "NO. 2"

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.

Pieces may contain characteristics which have no important effect on the utility of the piece, such as:

Checks	not limited.
Knots	2 - approximately 1", or their equivalent.
Pin Holes	limited.
Skips	light.
Torn Grain	not limited.

LATH
1 ½" or 1 ⅝" in Width
3 Pieces for Each 1" in Thickness

183. LATH

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**".

183a. "NO. 1" LATH

Pieces of this grade are entirely clear or may have one of the following or equivalent:

Holes	pin, limited.
Knots	pin.
Pockets	small.
Stained Wood	not limited.

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

Dry pieces may be scant in thickness, but not more than 1/16" for three pieces.

All pieces are within 1/4" of full length.

183b. "NO. 2" LATH

Pieces of this grade are either so scant in size or contain characteristics of such number or size that they cannot be included in "**NO. 1**" grade.

Pieces may contain the following or equivalent:

Holes	small.
Knots	not limited.
Pockets	not limited.
Stained Wood	not limited.
Wane	not through.

Pieces are not over 1/4" scant in width or 3/4" scant in length. Each piece is at least 1/4" thick.

INDUSTRIAL WOOD LATH

184. INDUSTRIAL WOOD LATH

There are three grades of industrial wood lath: "**NO. 1**", "**NO. 2**", and "**NO. 3**".

The lath grades in the species covered in the NLGA rules are intended for the manufacture of snow fence, base for plaster finish and for kiln strips.

The lath is usually rough but may be dressed if specified.

Length	32", 36", 42", 48", 60" or 72" as specified.
Thickness	⅜" or ½".
Width	1 ½".

Other thicknesses, widths and lengths may be specified.

184a. "NO. 1" WOOD LATH

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

Knots	3/4" intergrown, one per 12" of length. 1/4" or smaller to be disregarded. No knots on edges.
Pith	not permitted.
Slope of Grain	1 in 32.
Wane	1/3 thickness and 1/3 width.
White Speck	15%.

Variation in Size:

Length:	1/2" short in 10% of shipment.
Width:	1/8" over - 3/16" under.
Thickness:	1/16" over - 3/32" under.

184b. "NO. 2" WOOD LATH

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

Holes	1/2" per 2' of length.
Knots	1" sound, one per lineal foot.
	3/4" not firmly fixed, one per lineal foot.
Pith	permitted.
Slope of Grain	1 in 20.
Split	medium.
Wane	1/2 thickness and 1/2 width.
White Speck	30%.

Variation in Size:

Length:	3/4" short in 20% of shipment.
Width:	3/16" over - 1/4" under.
Thickness:	1/8" over - 1/8" under.

184c. "NO. 3" WOOD LATH

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

Wane	1/2 the width and full thickness. Taper or wedges at one or both ends for 6" is permitted, provided length of lath is not reduced.

All other characteristics which do not interfere with the use of the lath, full length, are permitted in this grade.

Variation in Size

Length:	2" short in 20% of shipment.
Width:	3/8" over or under.
Thickness:	1/4" over or under.

Note: *Experience has shown that the combination of heartwood and sapwood in a lath may cause excessive distortion. If there is no distortion, such combination is not considered a defect in the grading of lath.*

PIPE STAVE STOCK
(DOUGLAS FIR)
Rough, Unseasoned, F.G. and/or V.G.

185. PIPE STAVE STOCK

There is only one grade: "**PIPE STAVE STOCK**". Pipe stave stock is well manufactured. Edges must not contain imperfections which will prevent a watertight joint when worked.

185a. "PIPE STAVE STOCK"

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

Knots	sound tight, none through.
Pockets	small, none through.
Sapwood	bright, not more than half the thickness.

SILO STAVES
(DOUGLAS FIR)

186. SILO STAVES

Silo Staves are used in the construction of silos for the curing and storage of ensilage. There are two grades of Silo Staves: "**CLEAR**" and "**SELECTED**". Grade descriptions are based on a piece 6" wide by 12' long. Lengths are in multiples of 1'. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

Silo staves shall be graded from the inside or narrower wide face as this is the use side. The outside, or wider wide face, can be approximately one grade lower.

Finished - Seasoned Thickness	Finished - Unseasoned Thickness	Finished - Face Width
1 5/8"	1 5/8"	5" outside
		4 7/8" inside

186a. "CLEAR" SILO

Must be watertight full length of piece. Characteristics which may appear on pieces in this grade and their limiting provisions are:

Sapwood	bright or medium stained - 1/2 the thickness from outside wide face.
Torn Grain	medium.

With the above, one of the following or equivalent:

Checks	none through.
Crook	approximately 1/4" in 12'.
Knots	5 - small, sound, tight.
Pitch Pockets	4 - small, none through.

186b. "SELECTED" SILO

Must be watertight full length of piece. Characteristics and limiting provisions are:

Checks	medium.
Crook	very light.
Heart Stain	firm - 25%.
Knots	medium, sound, tight.
Pockets	not exceeding 6" in length, none through.
Sapwood	bright or medium stained - 1/2 the thickness from outside wide face.

MINE GUIDES (DOUGLAS FIR)

189. MINE GUIDES

There are two grades of Mine Guides: "**CLEAR**" and "**SELECTED**". Mine Guides shall be well manufactured, close grain, square edged, with a slope of grain not greater than 1" in 12" and with measurable warp not permitted.

In addition to the following specific provisions applicable to Mine Guides, the applicable provisions of all other paragraphs in these rules apply.

Knots are measured using the "average diameter" method. See Para. 320a.

Characteristics and limiting provisions are:

189a. "CLEAR"

Checks single or opposite each other, with a summed total equal to approximately 1/4 the thickness.

Knots free from knots on the best face and both narrow faces.

Pitch Pockets 4 - medium based on 12 lineal feet.

Skips occasional light.

Torn Grain light.

189b. "SELECTED"

Stained Sapwood not limited.

Checks medium.

Knots on the best wide face and both narrow faces: sound, tight, well scattered, approximately:

Nominal Width or Thickness	Knot Size
3" & 4"	1"
6"	1 ¼"
8"	1 ½"
10"	1 ¾"

Pitch Pockets medium.

Pitch Streaks not limited.

Skips occasional medium.

Torn Grain medium.

CROSSARMS
(DOUGLAS FIR, WESTERN HEMLOCK, AND YELLOW CEDAR)
Rough or Surfaced

190. CROSSARMS

There are two grades of crossarms: "**CLEAR**" and "**SELECTED**". Rough stock must be sawn full to sizes ordered.

Grade descriptions are based on 3" x 4" by 8' to 4" x 6" 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. Stock must be FOHC.

Knots are measured using the "lines parallel" method as per Para. 320b.

190a. "CLEAR" CROSSARMS

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

Checks	small on top of arm, medium on other faces.
Crook or Bow	medium.
Knots	2 - 1" or equivalent smaller, sound, tight on top of arm, 3/8" or less not considered. 4 - 1 1/4" or equivalent smaller, sound, tight or not firmly fixed, well scattered, on other faces. Occasional pieces may have 1 additional knot, and knots may be 25% larger.
Pin Holes	scattered.
Pitch Streak	medium.
Pockets	4 - small on top of arm; 5 - medium on other faces.
Rate of Growth	close grain.
Sap Stain	medium.
Skips	1 - light, approximately 12" long.
Slope of Grain	not to exceed 1 in 12, although an occasional piece may have a slope of grain not to exceed 1 in 10.
Torn Grain	medium.
Wane	1 1/4" within 12" of the ends, centre of length 3/4", when measured across the corner.

Minor surface characteristics permitted, provided they do not exceed 1/3 size of permissible knots.

Occasional cutouts permitted in pieces 13' and longer, provided resulting pieces 6' & longer meet the above specification. Limit of waste is 2 lineal feet.

190b. "SELECTED" CROSSARMS

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

Checks	small on top of arm, medium on other faces.
Crook or Bow	medium.
Heart Centres	permitted if not more than 1/8" from any face.
Knots	sound, tight, approximately 1" in 4" to 6" widths and 1 1/4" in wider widths.
Pin Holes	scattered.
Pitch Streaks	medium.
Pockets	medium.
Rate of Growth	medium grain.
Sap Stain	not limited.
Skip	occasional, light.
Slope of Grain	1 in 12, occasional 1 in 10.
Torn Grain	medium.
Wane	1 1/2" within 12" of the ends, centre of length 3/4", when measured across the corner.

10% of the pieces in the shipment may have cutouts 3' or more from either end, providing resulting pieces meet the above specifications. Limit of waste is 1 lineal foot.

TANK STOCK
(DOUGLAS FIR, WESTERN RED CEDAR, AND YELLOW CEDAR)
Rough, Unseasoned, F.G. and/or V.G.

191. TANK STOCK

There are two grades: "**Tank Stock - Two Inch to Three Inch**" and "**Tank Stock - Four Inch and Thicker**".

Grade characteristics are based on 6" by 12'. The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece. Must be well manufactured and full sawn. Narrow faces must be watertight when worked.

191a. "TANK STOCK - TWO INCH TO THREE INCH"

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

Checks	medium, none through.
Knots	2 - small, sound, tight, none through. One additional pocket and/or knot for each 2 additional inches in width.
Pockets	2 - small, none through.
Rate of Growth	8 rings per inch.
Sapwood	bright, approximately 25% of the face and 1/2 the thickness.
Slope of Grain	1 in 8.

191b. "TANK STOCK - FOUR INCH AND THICKER"

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

Checks	medium, none through.
Knots	3 - sound and tight, 1" in 4" thickness to 4 - 2" in 12" thickness. One additional pocket and/or knot for each 2 additional inches in width.
Pockets	3 - medium, none through.
Rate of Growth	8 rings per inch.
Sapwood	bright, approximately 25% of the face and 1/2 the thickness.

Slope of Grain	1 in 8.

Reverse face and corresponding half of narrow face may have:

Knots	4 - 1" in 4" thickness to 4 - 2" in 12" thickness.
Pockets	4 - medium.

STADIUM PLANK
(YELLOW CEDAR)
1 ¼" & Thicker and 3" & Wider

192. STADIUM PLANK

Stadium Plank is well manufactured. Except for strength determining factors, the pieces are graded from the best wide face and best narrow face and this should be so indicated. If air dried or kiln dried, the moisture content covered by special contract.

In dry stock, blanked or run to pattern, loose knots, knot holes or their equivalent may be replaced by wood plugs. These plugs must not be larger than the permitted knot size and located only within the centre half of the width. Reasonable care should be taken in matching colour and grain. Some smaller defects may be filled with an approved filler.

If stock is to be used in areas of warm, humid climate, sapwood should be restricted to 10% by volume at buyer's request.

There are two grades: "**STADIUM PLANK SEATS**" and "**STADIUM PLANK WALK BOARDS**".

Characteristics and limiting provisions are:

192a. "STADIUM PLANK SEATS"

Checks medium.

Knots sound, tight and well scattered.

On Narrow Face		On Wide Face	
Thickness	**Knot Size**	**Nominal Width**	**Knot Size**
1 ¼"	none	3"	1"
1 ½"	½"	4"	1 ¼"
2"	¾"	6"	1 ½"
3"	1"	8"	1 ⅞"
		10"	2 ⅜"
		12"	2 ¾"
		14"	3"
		16"	3 ¼"

Characteristic Yellow cedar knots (black or black rimmed) permitted up to 3/4" if judged they will retain their position in the piece.

Knots not firmly fixed, loose, spike knots (unless small and completely intergrown), raised or chipped knots or knot holes only permitted on reverse face and back-facing narrow face.

Rate of Growth close grain.

Sap Stain medium.

Seams or Pockets medium.

Skips light on reverse face and back-facing narrow face.

Slope of Grain 1 in 10.

Splits very short.

Torn or Raised Grain light, heavy on reverse face and back-facing narrow face.

192b. "STADIUM PLANK WALK BOARDS"

Checks medium.

Knots sound tight and well scattered.

On Narrow Face		On Wide Face	
Thickness	Knot Size	Nominal Width	Knot Size
1 ¼"	none	3"	1"
1 ½"	½"	4"	1 ¼"
2"	¾"	6"	1 ½"
3"	1"	8"	1 ⅞"
		10"	2 ⅜"
		12"	2 ¾"
		14"	3"
		16"	3 ¼"

Spike Knots equivalent.

Chipped Knots 1/8" deep, occasional 1/4".

Characteristic Yellow cedar knots (black or black rimmed) permitted if judged they will retain their position in the piece.

Knots not firmly fixed, loose or raised knots, or knot holes only permitted on reverse face and edges.

Rate of Growth close grain.

Sap Stain medium.

Seams or Pockets medium.

Skips very light on face in occasional pieces. Hit & miss permitted on reverse face and narrow faces.

Slope of Grain 1 in 10.

Splits short.

Torn or Raised Grain heavy.

Wane 1/2" in thickness and 1" in width for 1/2 length permitted on reverse face only.

STRUCTURAL LAMINATIONS
(DOUGLAS FIR)
ROUGH OR SURFACED
2" Net or Thinner When Surfaced and 3" & Wider

195. STRUCTURAL LAMINATIONS

This paragraph refers to structural laminations for use in glulam members manufactured to ANSI/AITC specifications.

There are five grades of Douglas Fir used for laminating purposes: "**L1**" DENSE LAMINATING, "**L1C**" LAMINATING, "**L2D**" DENSE LAMINATING, "**L2**" LAMINATING and "**L3**" LAMINATING.

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

Checks seasoning.

Heart Stain firm.

Knots may be sound, unsound or not firmly fixed.

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

Knot Measurement: measured by the area of the cross section it occupies.

Knot Spacing: a knot of the permitted size may be anywhere on any face. Knots must be spaced in accordance with Para. 320b a).

Manufacture shall be well manufactured.

Moisture Content moisture content is subject to special agreement.

Pitch Pockets medium, scattered.

Pitch Streaks not exceeding 1/6 width.

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

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

Surfacing edges may be hit or miss when ordered surfaced.

Warp crook or twist, light.

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

195a. "L1" DENSE LAMINATING

Characteristics and limiting provisions are:

Grain dense material (see Para. 195f).

Knots sound, unsound or loose.

Nominal Width	Approximate Knot Size
4"	7/8"
6"	1 3/8"
8"	1 7/8"
10"	2 3/8"
12"	2 7/8"
14"	3 3/8"

Spike & Narrow Face Knots are permitted if judged to have no more effect on strength than other knots.

Slope of Grain not to exceed 1 in 14, full length of piece.

Stained Sapwood light.

195b. "L1C" LAMINATING

Characteristics and limiting provisions are:

Grain close.

Knots conform to provisions of Para. 195a.

Slope of Grain not to exceed 1 in 12, full length of piece.

Stained Sapwood light.

195c. "L2D" DENSE LAMINATING

Conforms to all the provisions of Para. 195d except that Dense material (see Para. 195f) is required.

195d. "L2" LAMINATING

Characteristics and limiting provisions are:

Grain medium

Knots sound, unsound or loose.

Nominal Width	Approximate Knot Size
4"	1 ⅛"
6"	1 ⅞"
8"	2 ⅜"
10"	3 ⅛"
12"	3 ¾"
14"	4 ⅜"

Spike and Narrow Face Knots are permitted if judged to have no more effect on strength than other knots.

Slope of Grain not to exceed 1 in 12 full length of piece.

Stained Sapwood medium.

Wane per purchaser's specifications.

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

195e. "L3" LAMINATING

Characteristics and limiting provisions are:

Grain medium.

Knots sound, unsound or loose.

Nominal Width	Approximate Knot Size
4"	1 ¾"
6"	2 ¾"
8"	3 ⅝"
10"	4 ⅝"
12"	5 ⅝"
14"	6 ⅝"

Spike and Narrow Face Knots are permitted if judged to have no more effect on strength than other knots.

Slope of Grain	not to exceed 1 in 8, full length of piece.
Stained Sapwood	medium.
Wane	per purchaser's specifications.
White Specks	firm. A combination of white speck and a knot in the same cross section shall occupy not more than 1/2 the width or equivalent.

195f. DENSE MATERIAL

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. 350c.

The contrast in colour 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.

STRUCTURAL LAMINATIONS
(HEM-FIR)
ROUGH OR SURFACED
2" Net or Thinner When Surfaced and 3" & Wider

H195. HEM-FIR STRUCTURAL LAMINATIONS

There are three grades of Hem-Fir used for laminating purposes: "**L1**" LAMINATING, "**L2**" LAMINATING, and "**L3**" LAMINATING.

The general restrictions and limiting provisions for Douglas Fir Structural Laminations, Para. 195, apply also to Hem-Fir Structural Laminations.

H195a. "L1" LAMINATING

Characteristics and limiting provisions are:

Grain	medium.
Knots	conform to Douglas Fir provisions, Para. 195a.
Slope of Grain	not to exceed 1 in 14 full length of the piece.
Stained Sapwood	light.

H195b. "L2" LAMINATING

Graded under the provisions for Douglas Fir, Para. 195d.

H195c. "L3" LAMINATING

Graded under the provisions for Douglas Fir, Para. 195e.

FINISH, PANELLING, CEILING, AND DROP SIDING, K.D. Nominal 2" & Thinner and Nominal 2" & Wider

200. WESTERN RED CEDAR FINISH, PANELLING, CEILING, AND DROP SIDING

Western red cedar (WRC) Finish is customarily shipped kiln dried and surfaced four sides.

Grade descriptions for Finish and Panelling are based on a piece nominal 8" wide by 12' long.

Grade descriptions for Ceiling and Drop Siding are based on a piece nominal 4" wide by 12' long.

The number of characteristics in larger or smaller pieces may vary in proportion to the size of the piece.

Pieces of Finish nominal 5" & narrower are graded from the best face and both narrow faces. Pieces nominal 6" & wider are graded from the best face and one narrow face.

Pieces of Panelling, Drop Siding and Ceiling run to pattern may be partially surfaced or hollow or scratched back.

"**Saw Texture**" is available in all grades of WRC and, as the name implies, is a rough finish put on the face of a piece to give it a textured finish. 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 three grades of WRC Finish, Panelling, Ceiling, and Drop Siding: "**CLEAR HEART**", "**A**", and "**B**".

If F.G. or V.G. only is desired, it must be so specified. Otherwise, mixed grain (M.G.) may be shipped at shipper's option.

In occasional pieces of "**A and Better**" the tongue or lap in panelling and siding may be 1/16" narrower and Ceiling with a tongue 1/8" or more in width is permissible.

200a. "CLEAR HEART"

This is the highest grade of Finish, Panelling, Ceiling, and Drop Siding produced. The exposed face shall be all heartwood with many pieces being clear. Some pieces may exhibit a few minor characteristics which do not detract from their high appearance and quality.

Characteristics and limiting provisions are:

Cup	very light.
Skips	very light on reverse face.
Torn or Raised Grain	very light.
Warp	very light.

200b. "A"

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:

Checks	small.
Cup	light.
Knots	2 - small, sound, tight or their equivalent.
Sapwood	not limited
Skips	occasional light on reverse and narrow faces.
Torn or Raised Grain	light.
Warp	light.

200c. "B"

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 or more numerous characteristics.

Characteristics and limiting provisions are:

Checks	not limited.
Cup	medium.
Knots	4 - approximately 1" or their equivalent.
Pin Holes	limited.
Sapwood	not limited

Skips	hit and miss on either face and grooved edge in patterned stock; approx. 1/8" scant on narrow face.
Splits	short.
Tongue or Lap	narrow, must be at least 1/16" in width.
Torn or Raised Grain	not limited.
Wane	1/8 width for 1/4 the length and 1/4 the thickness, or its equivalent, in an occasional piece.
Warp	medium.
Cutouts	a 3" cutout - 3' or more from either end of pieces 12' & longer is permissible in 10% of the shipment.

200d. GLUED-UP FINISH, PANELLING, CEILING & DROP SIDING

End-glued, edge-glued or a combination of end and edge-glued Finish, Panelling, Ceiling, and Drop Siding 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.

BEVEL SIDING, K.D.

201. WESTERN RED CEDAR (WRC) BEVEL SIDING

WRC 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 face with characteristics and limiting provisions enumerated in the grades applying to the exposed width. Grade descriptions are based on a piece nominal 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 grades of WRC Bevel Siding and as the name implies is a rough finish put on the face of a piece to give it a textured finish. 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 five grades of WRC Bevel Siding: "**CLEAR V.G. HEART**", "**A**", "**B**", "**RUSTIC**" and "**C**".

Special items, namely nominal 1/2" x 4" and 1/2" x 5" sizes, nominal 1/2" x 6" square edged, and nominal 3/4" x 6" rabbeted siding, are usually graded "**CLEAR V.G. 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:

Nominal Sizes		Dressed Sizes		
Thickness	Width	Thick Edge	Thin Edge	Width
½"	4"	15/32"	3/16"	3 ½"
	5"	15/32"	3/16"	4 ½"
	6"	15/32"	3/16"	5 ½"
	8"	15/32"	3/16"	7 ¼"
⅝"	8"	9/16"	3/16"	7 ¼"
	10"	9/16"	3/16"	9 ¼"
¾"	6"	3/4"	3/16"	5 ½"
	8"	3/4"	3/16"	7 ¼"
	10"	3/4"	3/16"	9 ¼"
	12"	3/4"	3/16"	11 ¼"

LENGTHS:

Lengths are 3' & longer in multiples of 1'.

NESTED BUNDLING (N.B.):

Bundles are 6' to 16' or longer. Bundles 10' and longer contain specified layers of 3' to 7' lengths.

FULL LENGTH BUNDLING (F.L.B.):

All pieces in the bundle correspond to length of the bundle. The length assortment is normally 6' to 16' or longer but may include a percentage of 3' to 5' bundles, as specified by the shipper.

SHORTS:

"**CLEAR V.G. HEART**" and "**A**" Grades:

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

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

"**B**" and "**RUSTIC**" Grades:

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

"**C**" Grade:

No percentage specified.

BUNDLING SCHEDULE:

Nominal Sizes	F.L.B. and N.B. Layers per Bundle	N.B. Only: Layers Nested in 10' & longer
¾" x 6" to 12"	6	2
½" x 5" to 8"	10	3
⅝" x 8" to 10"	10	3
½" x 4"	12	4

201a. "CLEAR V.G. HEART" BEVEL SIDING

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.

201b. "A" BEVEL SIDING

"**A**" Bevel Siding may be furnished in mixed grain. Characteristics and limiting provisions are:

Knots 1 - small, sound, tight or 2 - pin, sound, tight in occasional piece.

Skips very light on thick edge.

Torn or Raised Grain very light on face, light on thick edge.

201c. "B" BEVEL SIDING

"**B**" Bevel Siding may be furnished in mixed grain. Characteristics and limiting provisions are:

Knots 4 - small, sound, tight or equivalent smaller in occasional piece.

Pin Holes well scattered in occasional piece.

Skips very light, light on thick edge in occasional piece.

Torn or Raised Grain light, medium on thick edge in 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' & longer. The minimum length of the piece of each segment after cutting must not be less than 18".

201d. "RUSTIC" BEVEL SIDING

Pieces are graded from the re-sawn side. Thick edge may be rough or surfaced. The grade may include pieces too thin to dress to standard size, but not more than 1/16" scant thickness. Lengths are random, with percentage as specified by the shipper.

Some pieces may contain:

Holes	pin, well scattered.
Knots	4 - sound, tight, small.

201e. "C" BEVEL SIDING

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.

201f. FACTORY PRIMED BEVEL SIDING

Factory primed products shall be identified with a stamp or label by the producer.

201g. 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 with1-piece stock of a 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.

INDUSTRIAL CLEARS
V.G., F.G., and/or M.G.
Rough or Surfaced
K.D., A.D. or Unseasoned
Nominal 2" & Thinner, Nominal 3" & Wider

202. WESTERN RED CEDAR INDUSTRIAL CLEARS (NOMINAL 2" & THINNER)

There are three grades of Western Red Cedar (WRC) Industrial Clears: "**B and Better**", "**C**", and "**D**".

WRC Industrial Clears, if ordered surfaced and unless otherwise specified, are finished to the sizes shown in Para. 820c. If ordered rough unseasoned, see Para. 747 for permitted variation in size. For seasoned thicknesses and widths refer to Para. 32.

Grade descriptions are based on a piece nominal 8" wide by 12' long. The number and extent of characteristics may vary in proportion to the size of the piece being graded. Pieces nominal 5" & narrower are graded from best face and both narrow faces; pieces nominal 6" & wider from best face and one narrow face.

202a. "B AND BETTER" CEDAR INDUSTRIAL CLEARS

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

Checks	4 - small. No limit to number in rough stock.
Knots	on reverse face: 3 - small, sound, tight.
Rate of Growth	6 rings per inch.
Skips	on reverse face, occasional light.
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.

202b. "C" CEDAR INDUSTRIAL CLEARS

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

Checks	4 - small. No limit to number in rough stock.
Knots	3 - 1", sound, tight or 5 - equivalent smaller or 4 - not firmly fixed or unsound 1/2 the size of sound and tight.
Skips	occasional, very light on face, light on narrow faces and reverse face.
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.

In this grade, 10% of the pieces in a shipment may have a 3" cutout, 3' or more from either end, in pieces 12' & longer.

202c. "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 or their equivalent smaller which may appear on pieces in this grade and their limiting provisions are:

Checks	not limited.
Knots	4 - approximately 1", fixed or 8 - equivalent smaller.
Pin Holes	limited.
Skips	hit & miss; approximately 1/8" scant on narrow face.
Splits	short.
Sap Stain	not limited.
Torn or Raised Grain	not limited.
Wane	1/8 the width, 1/4 the thickness, 1/4 the length or equivalent; 50% more on reverse face.
White Specks	firm, 1/4 the width or equivalent.
Warp	medium.

In this grade, 20% of pieces in a shipment may have a 3" cutout, 3' or more from either end in pieces 12' & longer.

INDUSTRIAL CLEARS
V.G., F.G., and/or M.G.
Rough or Surfaced
K.D., A.D., or Unseasoned
Nominal 2 ¼" & Thicker, Nominal 3" & Wider

203. WESTERN RED CEDAR INDUSTRIAL CLEARS (2 ¼" & THICKER)

There are three grades of Western Red Cedar (WRC) Industrial Clears: "**B and BETTER**", "**C**", and "**D**".

WRC Industrial Clears, if ordered surfaced and unless otherwise specified, are finished to the sizes shown in Para. 820c. If ordered rough unseasoned, see Para. 747 for permitted variation in size. For seasoned thicknesses and widths refer to Para. 32.

Grade descriptions are based on a piece nominal 8" wide by 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 narrow faces considered as part of the face and lower half of the narrow faces as part of the reverse face, the reverse face being approximately one grade lower.

203a. "B AND BETTER" CEDAR INDUSTRIAL CLEARS

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

Checks	4 - small. No limit to number in rough stock.
Knots	on reverse face: sound, tight, 3 - 1" in nominal 2 1/4" thickness, to 3 - 2" in nominal 12" thicknesses.
Rate of Growth	6 rings per inch.
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.

203b. "C" CEDAR INDUSTRIAL CLEARS

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

Checks	4 - small. No limit to number in rough stock.
Knots	sound, tight, 4 - 1" or 5 - equivalent smaller in nominal 2 1/4" thickness, to 4 - 2" or 5 - equivalent smaller in nominal 12" thicknesses or 4 - not firmly fixed or unsound 1/2 the size of sound and tight knots.
Sap Stain	medium.
Skips	occasional, very light on face, light on reverse and narrow faces.
Slope of Grain	1 in 6.
Splits	short, in 5% of the pieces.
Torn or Raised Grain	light.
Warp	light in occasional pieces.

In this grade, 10% of pieces in a shipment may have a 3" cutout, 3' or more from either end in pieces 12' & longer.

203c. "D" CEDAR INDUSTRIAL CLEARS

Reverse face must be of a reasonably clear type, allowing characteristics approximately 25% larger or more numerous.

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

Checks	not limited.
Knots	fixed, 5 - 1" or 7 - equivalent smaller in nominal 2 1/4" thicknesses, to 5 - 2" or 7 - equivalent smaller in nominal 12" thicknesses.
Pin Holes	limited.
Sap Stain	not limited.
Skips	hit and miss; approximately 1/8" scant on narrow face.
Splits	short.
Torn or Raised Grain	not limited.
Wane	1/8 the width, 1/4 the thickness, 1/4 the length or equivalent; 50% more on reverse face.
Warp	medium.
White Specks	1/4 the width or equivalent.

In this grade, 20% of pieces in a shipment may have a 3" cutout, 3' or more from either end in pieces 12' & longer.

TIGHT KNOTTED STOCK
KNOTTY PANELLING AND SIDINGS
Rough or Surfaced
Nominal 1" & Thicker, Nominal 4" & Wider

204. WESTERN RED CEDAR TIGHT KNOTTED STOCK

There are two grades of Western red cedar (WRC) Tight Knotted Stock: "**SELECT KNOTTY**" and "**QUALITY KNOTTY**".

WRC Knotty Panelling and Sidings (rough or surfaced) stock may be shipped kiln dried, air dried, or green and shall be well manufactured. Knots and other natural markings shall form the major characteristics of these grades. WRC Knotty Panelling and Sidings are one face grades. Unless otherwise specified, characteristics which do not interfere with the intended use are permitted on the reverse face.

"**Saw Texture**" is available in all grades of WRC Knotty Panelling and Sidings and as the name implies is a rough finish put on the face of a piece to give it a textured finish. 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.

204a. "SELECT KNOTTY"

Characteristics and limiting provisions are:

Checks	small surface.
Knots	sound, tight; star checking and/or slight chipping permitted.
Skips	very light on reverse face.
Spike Knots	approximately 1/2 the width.
Splits	short in 5% of pieces.
Torn Grain	light.
Warp	very light.

204b. "QUALITY KNOTTY"

Characteristics and limiting provisions are:

Checks	medium surface, occasional through or equivalent shake.
Knots	sound, tight; star checked and/or chipped; occasional 1" not firmly fixed or unsound
Pin Holes	well scattered.
Skips	very light.
Spike Knots	equivalent.
Splits	short
Torn or Raised Grain	medium.
Warp	light.
Cutouts	in pieces 12' & longer, 20% of pieces in a shipment may contain a 3" cutout - 3' or more from either end.

KNOTTY BEVEL SIDING

205. WESTERN RED CEDAR KNOTTY BEVEL SIDING

Western red cedar (WRC) Knotty Bevel Siding may be K.D., A.D., or Green and is a type of siding especially selected for exterior exposed surfaces. Knots and other natural markings shall form the major characteristics of this product.

WRC Knotty Bevel Siding shall be well manufactured on face and edges but permitting imperfections which will be covered when laid. Minimum head lap of 1". Pieces shall have a minimum thickness of 3/16" in any exposed part.

There are two grades of WRC Knotty Bevel Siding: "**SELECT KNOTTY**" and "**QUALITY KNOTTY**".

"**Saw Texture**" is available in all grades of WRC Bevel Siding and as the name implies is a rough finish put on the face of a piece to give it a textured finish. 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 texture face.

205a. "SELECT KNOTTY"

Characteristics and limiting provisions are:

Checks surface.

Knots sound, tight. Approximately 2" in nominal 6" widths to 3 1/2" in nominal 12" widths. Star checking and slight chipping permitted.

Skips occasional light on exposed edge.

Spike Knots approximately 1/2 the width.

Splits occasional short.

Tolerance in Sawing occasional, not to exceed 1/16" in thickness.

Torn or Raised Grain medium.

Warp light.

205b. "QUALITY KNOTTY"

Characteristics and limiting provisions are:

Checks not limited.

Holes a few small, well scattered.

Knots sound, tight, star checked, chipped or torn.

Sap Stain not limited.

Shake tight, through.

Skips light on face, heavy on exposed edge.

Spike Knots not limited

Splits short

Tolerance in Sawing approximately 1/16" in thickness.

Torn or Raised Grain heavy

Warp medium.

Cutouts occasional pieces may contain cutouts which can be removed by wasting not more than 10% of the length of the piece. 1 cutout permitted in pieces 6' to 9' in length; 2 in 10' to 16'; and 3 in the lengths over 16'; the shortest cutting being 30".

FACTORY LUMBER SHOP

206. WESTERN RED CEDAR FACTORY LUMBER

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.

206a. WIDTHS, THICKNESSES AND LENGTHS

a) WIDTHS: Standard widths shall be nominal 5" and wider, but permitting narrow widths, if specified. Shop Lumber is usually shipped in random widths although specified widths may be supplied. Widths nominal 6" & narrower shall not be more than 1/8" scant when dry; nominal 8" & wider widths shall not be more than 1/4" scant when dry.

b) THICKNESSES AND LENGTHS: The following thickness shall be considered standard. All other thickness shall be considered special.

Thickness (Cut full size)	Finished Thickness S2S	Lengths
1"	25/32"	4' & longer in multiples of 1'. Not more than 25% 8' & shorter
1 3/8"	1 5/32"	
1 5/8"	1 13/32"	
2"	1 25/32"	
2 1/2"	2 9/32"	
3"	2 3/4"	
4"	3 3/4"	

206b. 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' & longer.

d) Full width cuttings only in 2", 3", and 4" - 3' & longer.

206c. GRADE OF CUTTINGS

NO. 1: Cuttings in 1" and thicker stock shall be clear on both wide faces of the piece.

NO. 2: Cuttings shall be the same size as NO. 1, but will admit one of the following:

Checks	one or more small, whose combined length does not exceed 8".
Knots	tight, 1 - 5/8".
Torn or Raised Grain	very light on one wide face only.

GRADES OF FACTORY LUMBER - SHOP

206d. "SELECT SHOP"

Each piece contains 70% or more of **NO. 1 Cuttings**.

206e. "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.

206f. "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.

206g. "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.

FENCE BOARDS

210. WESTERN RED CEDAR FENCE BOARDS

Boards of this grade may be rough or surfaced, A.D., K.D., or green and are especially selected for tight construction.

The grade is determined from the best face. There are three grades: "**SELECT FENCING**", "**QUALITY FENCING**", and "**RUSTIC FENCING**".

210a. "SELECT FENCING"

Characteristics and limiting provisions are:

Checks	not limited.
Knots	sound and tight. Knots not firmly fixed or unsound approximately 1/6 width.
Pin Holes	not limited.
Shake	fine, barely perceptible (visible only when held at a favourable angle to the light).
Skips	hit and miss.
Spike Knots	approximately 1/2 face width or equivalent.
Splits	short.

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

210b. "QUALITY FENCING"

Characteristics and limiting provisions are:

Checks	not limited.
Holes	4 - 1" per 12', grub or teredo equivalent.
Honeycomb	firm, 1/3 width
Knots	sound and tight. Knots not firmly fixed or unsound approximately 1/3 the width.
Pin Holes	not limited.
Shake	not limited.
Skips	hit or miss.
Spike Knots	approximately 3/4 face width.
Splits	medium.
Unsound Wood	small spots & streaks equivalent to holes.
Wane	1/2 thickness, 1/3 width.
White specks	firm, not limited.

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

210c. "RUSTIC FENCING"

Lumber of this grade is suitable for low quality fencing and permits all characteristics which do not interfere with the use of the piece.

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

Boards re-sawn from surfaced lumber permits narrow face skips to not 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.

FOUNDATION LUMBER
Nominal 2" & Thicker, Nominal 4" & Wider

211. WESTERN RED CEDAR FOUNDATION LUMBER

The dimension stability and decay resistance qualities of this material make it ideally suited for use as Foundation Lumber.

There is only one grade of Foundation Lumber: "**FOUNDATION**". In addition to the following specific provisions applicable to Foundation Lumber, the appropriate provisions in all other paragraphs in these rules apply.

For measurement of knots see Para. 320b.

Pieces are selected from heartwood and must be free of heart centre (FOHC) and free of sapwood.

211a. "FOUNDATION"

Characteristics and limiting provisions are:

Bark Pockets not limited.

Checks seasoning only; if through at ends, limited as splits.

Knots sound, unsound or not firmly fixed but well spaced, are permitted in the following sizes or their equivalent displacement:

Nominal Width	Knot Size	Holes ** (any cause)
4"	2"	1 ¼"
6"	2 ½"	1 ½"
8"	3"	2"
10"	3 ½"	2 ½"
12"	4"	3"
Over 12"	4 ½"	3 ½"

** one or equivalent smaller per 2 lineal feet.

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

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.
Skips	hit and miss; in 5% of pieces hit or miss or one heavy skip 2' long.
Splits	medium.
Torn Grain	not limited.
Unsound Wood	peck, narrow streak 1/6 the width.
Warp	light.

STRESS GRADES

300. STRESS GRADING

Stress grading considers characteristics that impact the strength and stiffness performance of lumber. Limits on these characteristics determine the grade to which a piece will be assigned. Stress grading is applied to lumber graded under Paras. 115, 121, 122, 124, 127, 128, 129, 130, 131, and 180. Where designated, lumber grades listed under these paragraphs are assigned design values.

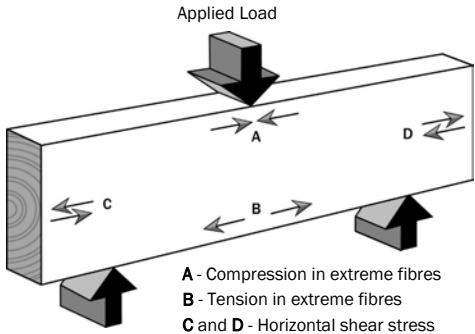
310. STRESSES ILLUSTRATED

310a. EXTREME FIBRE IN BENDING (F_b) AND HORIZONTAL SHEAR (F_v)

In structures, stress grades of lumber 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 fibres along the face farthest from the applied load and compression in the extreme fibres along the face nearest to the applied load (**Figure 1**).

At the same time, over each support, there is a stress that tends to slide the fibres 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 centre of the depth of the piece.

FIGURE 1

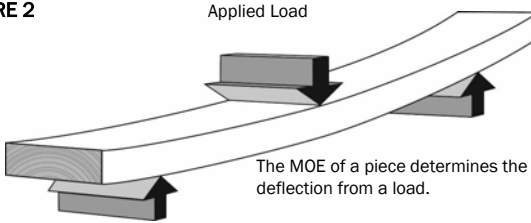


310b. MODULUS OF ELASTICITY (MOE or E)

The relationship between the amount a piece deflects and the load causing the deflection determines its stiffness (**Figure 2**). Using Hooke's Law, the MO**E** is the ratio of bending stress over bending strain, or the slope of the stress-strain relationship. A piece may deflect slightly or a lot depending on its size, the span, the load, and the MO**E** for the species and grade. A large deflection is not necessarily a sign of insufficient strength.

The application will determine the acceptable deflection. For example, the floors of a residence are usually limited to a deflection 1/360th of the span, or less.

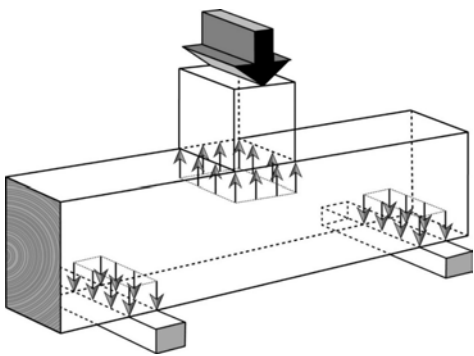
FIGURE 2



310c. COMPRESSION PERPENDICULAR TO GRAIN (F_{Cperp})

Where a joist, beam, or similar piece of lumber bears on supports, the loads tend to compress the fibres (**Figure 3**). It is therefore necessary that the bearing area be sufficient to prevent side grain crushing.

FIGURE 3

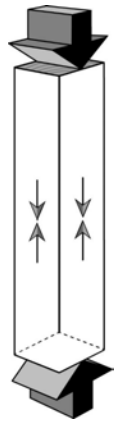


310d. COMPRESSION PARALLEL TO GRAIN ($F_{c\parallel}$)

In many parts of a structure, stress grades are used with the loads supported on the ends of the pieces. Such uses include studs, posts, columns, and struts (**Figure 4**).

The internal stress induced by this kind of loading is the same across the whole cross-section and the fibres are uniformly stressed parallel to and along the full length of the piece.

FIGURE 4



310e. EFFECT OF HOLES ON DESIGN VALUES

Many stress grades that are assigned design values for engineered and repetitive member applications, permit “not firmly fixed” (NFF) knots or knot holes.

Knots - not firmly fixed and holes do not reduce strength any more than intergrown knots, so no distinction need be made between knots and holes. For the sake of appearance, holes in certain grades are frequently restricted more severely than knots.

320. MEASUREMENT OF KNOTS

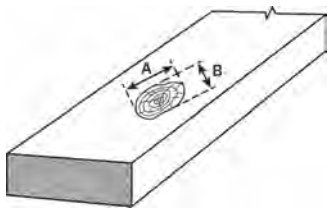
The methods of knot measurement in the NLGA Grading Rules are assigned based on the intended use of the lumber product. Generally, for non-structural lumber products, the method described in Para. 320a shall be applied.

For stress-graded lumber, the method described in Para. 320b shall be applied.

320a. KNOTS - NON-STRUCTURAL LUMBER

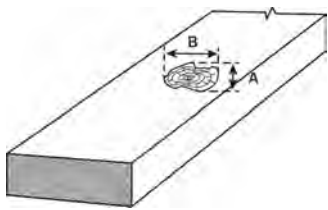
Unless otherwise specified, knots in non-structural lumber shall be measured using the "average diameter method" calculated by averaging the maximum and minimum diameters showing on the surface of the face as illustrated in **Figures 5**, **6**, and **7**.

FIGURE 5 Round or Oval Knots



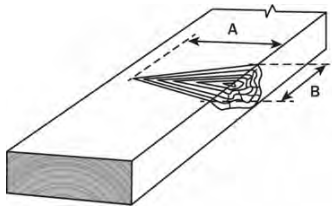
Knot size = (Length **A** + Length **B**) / 2

FIGURE 6 Irregular Knots



Knot size = (Length **A** + Length **B**) / 2

FIGURE 7 Spike Knots

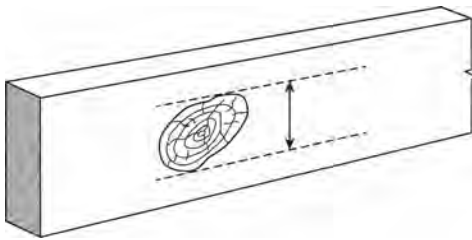


Knot size = (Length **A** + Length **B**) / 2

320b. KNOTS - STRUCTURAL LUMBER

In stress grades of dimension lumber, timbers, and other grades where specified, knots on wide faces are measured between lines parallel to the edges as illustrated in **Figure 8**.

FIGURE 8



The following are general guidelines for the measurement of knots in stress grades of structural lumber:

Note: *Illustrations on the following pages are examples only. Judgement must be used in measuring the many different knots that occur in natural growth for equivalent effect on a piece.*

a) The sum of the sizes of all knots in any 6" of length of a piece shall not exceed twice the size of the largest knot permitted.

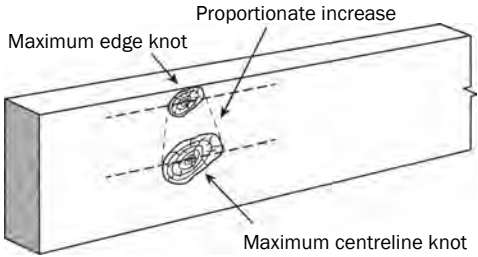
More than one knot of maximum permissible size shall not be in the same 6" of length and the combination of knots must not be serious.

b) Displacement as used in the NLGA Grading Rules means the amount of clear wood displaced by a knot and considered in its relation to the amount it reduces the strength of the cross section of the piece of lumber under consideration.

c) Narrow face and spike knots are measured by the displacement method. Stress grades are graded full length with listed knot sizes applying full length.

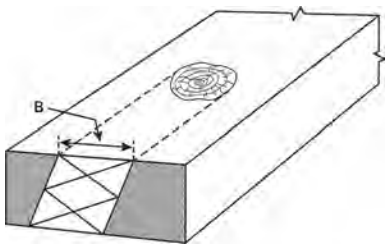
d) The allowable size of knots on the wide faces, when appearing away from the edge, shall be proportionately increased from the size specified for knots located along the centerline. The increase shall start at a distant from the edge equal to 1/2 the diameter of the allowable edge knot (**Figure 9**).

FIGURE 9



Wide face knots extending through the piece to the reverse face are measured as shown in **Figure 10**.

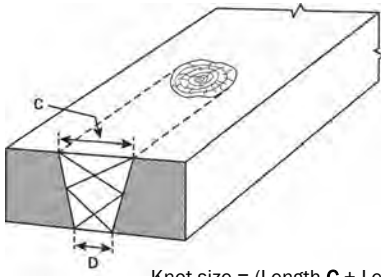
FIGURE 10



Knot size = Length **B**

When tapering knots are encountered, their equivalent size is determined as shown in **Figure 11**.

FIGURE 11



Knot size = (Length **C** + Length **D**) / 2

Narrow face and spike knots are judged by the amount of cross section (displacement) they occupy as illustrated in **Figures 12** and **13** and as described in the NGR Interpretations 1.9.1 appended to these rules.

Alternatively, spike knots may also be measured by converting their dimensions to the equivalent "edge of wide face" knot. Refer to the NGR Interpretations 1.9.2 appended to these rules.

FIGURE 12

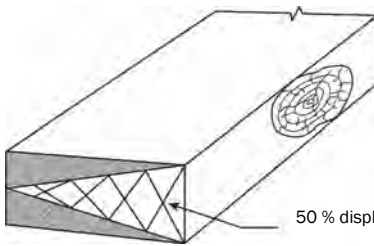
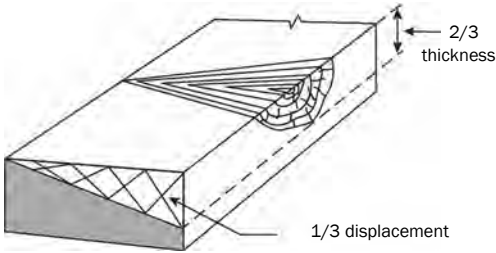


FIGURE 13



330. POSTS & TIMBERS - SHAKE, CHECKS AND SPLITS

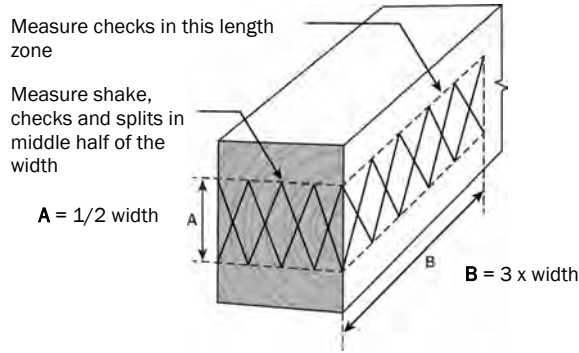
Due to the nature of shake, checks, and splits in Posts & Timbers, judgement must be used in evaluating their extent.

Shake 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. Grade limitations are applied primarily for appearance.

340. POSTS & TIMBERS AND BEAMS & STRINGERS - MEASUREMENT OF SHAKE, CHECKS AND SPLITS

The measurement of shake, checks and splits in Beams & Stringers is confined to the middle 1/2 of the width (height when standing on the narrow edge) 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 as illustrated in **Figure 14**.

FIGURE 14 B&S Measurements

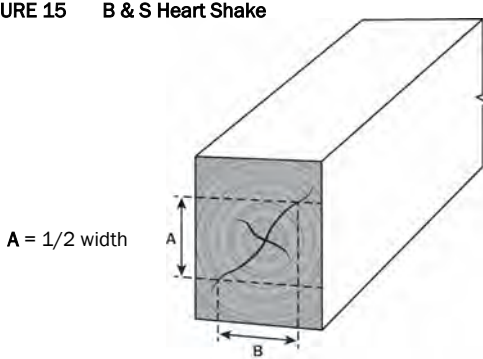


340a. HEART SHAKE

The measurement method for heart shake is dependent on the timber category:

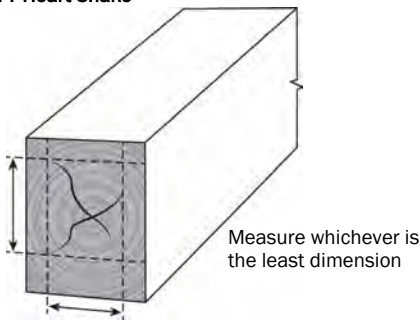
a) Heart shake in Beams & Stringers is measured at the ends of pieces, between lines enclosing the shake and parallel to the wide faces as illustrated in **Figure 15**.

FIGURE 15 B & S Heart Shake



b) Heart shake in Posts & Timbers is measured at the ends of pieces, between lines parallel with the two faces (enclosing the extent of the shake) that give the least dimension as illustrated in **Figure 16**.

FIGURE 16 P & T Heart Shake

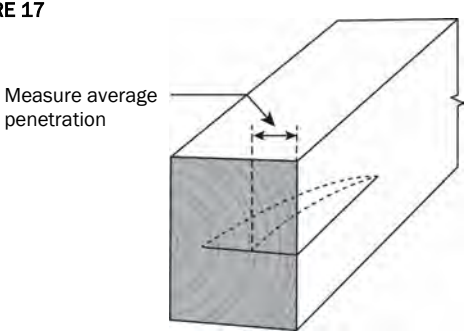


340b. CHECKS

Checks are measured as an average of the penetration perpendicular to the wide face (**Figure 17**). 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.

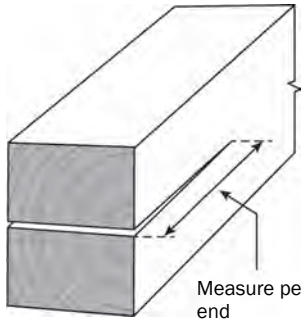
FIGURE 17



340c. SPLITS

Splits are measured as the average penetration of a split from the end of the piece and parallel to the edges of the piece (**Figure 18**).

FIGURE 18



350. DENSITY AND RATE OF GROWTH

The greater the relative density (specific gravity) of lumber, the greater is the strength of wood fibres.

One method of measuring specific gravity is described in ASTM D245. This method visually measures 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 for strength.

350a. MEDIUM GRAIN

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. 350c.

In Douglas Fir and Western Larch, pieces averaging less than 4 rings per inch are accepted if averaging 1/3 or more summerwood (the dark portion of the annual ring).

350b. CLOSE GRAIN

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. 350c.

In Douglas Fir and Western Larch, pieces averaging 5 rings or more than 30 rings per inch, are accepted as close grain if averaging 1/3 or more summerwood (the dark portion of the annual ring).

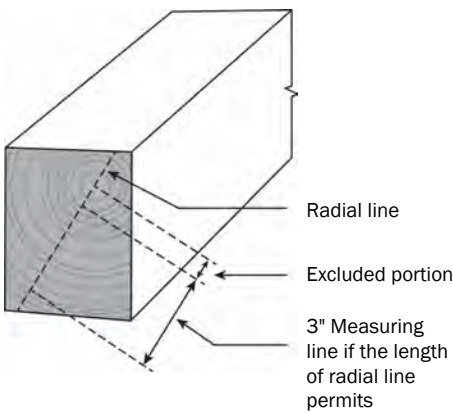
350c. MEASUREMENT OF AVERAGE RATE OF GROWTH

The following describes the measurement method for determining the average rate of growth:

a) Average rate of growth is measured on a line at a right angle to the rings in an area representative of the average growth in the cross section at either one end or the other. If the size of the piece permits, the measuring line should be 3" long.

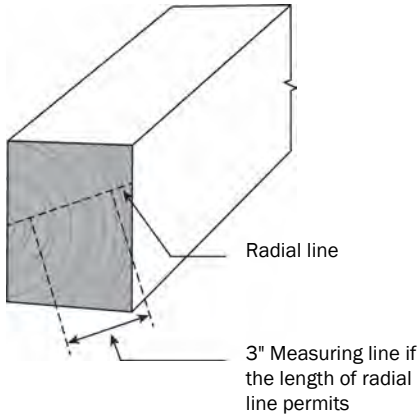
b) In Boxed heart (pith present) pieces, the measurement may exclude an inner portion of the radius amounting to approximately 1/4 of the least dimension (**Figure 19**).

FIGURE 19 **Boxed Heart (Pith present)**



c) In FOHC (side cut) pieces, the measuring length shall be centrally located (**Figure 20**).

FIGURE 20 FOHC (Free of heart centre or side cut)



Note: *Stress grades specify minimum requirements and maximum characteristics, all of which may be present in the same piece. The grading rules commonly prohibits any serious combination of characteristics which reduces strength. Relative density, however, may compensate in part for such a combination; that is, if a piece is above average in density, that fact may be taken into account in assessing the effect of a combination of characteristics.*

360. SLOPE OF GRAIN

Slope of Grain is the deviation of the wood fibre from a line parallel to the edges of a piece (see example in **Figure 21**).

The deviation is expressed as a ratio such as a slope of grain of 1 in 8, 1 in 10, 1 in 12, or 1 in 15.

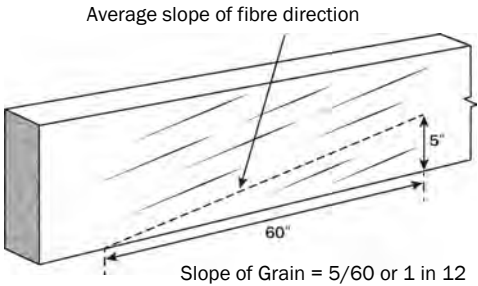
These ratios provide slope of grain grading requirements which relate to the assignment of design values to small lumber sections.

In lumber nominal 2 inches & thicker and nominal 4 inches & wider, slope of grain is measured over a sufficient length and area to be representative of the general slope of the fibres. Local deviations around knots and elsewhere are disregarded in the general slope measurement.

In thinner or narrower lumber, the displacement of local grain deviation (other than around knots) which exceeds the slope provisions of the grade is limited to the knot displacement permitted.

In lumber, less than one inch net in thickness, the average slope of grain anywhere in the length shall not pass completely through the thickness of the piece in a length less than the allowable slope. For instance, for an allowable slope of 1 in 8, the average slope of grain shall not pass completely through the piece in a distance less than 8 inches regardless of the thickness.

FIGURE 21 Slope of Grain Example



400. REINSPECTION: GENERAL

Unless otherwise agreed upon between buyer and seller, lumber sold under these rules shall be subject to reinspection provisions as described herein.

Buyer and seller may agree on the settlement of complaints in accordance with the terms of sale or alternately on any other method with respect to grade moisture content, size, species, manufacture, and tally of a shipment.

In the absence of special agreement between buyer and seller, the purchase, sale or shipment of lumber designated by grades described in these rules, NLGA Special Products Standards, and Interpretations shall be construed as agreement between buyer and seller to abide by all applicable provisions of these rules and make available the lumber for the purpose of reinspection by a CLSAB / ALSC accredited inspection agency (herein after referred to as the "Agency") whose grade stamp appears on the lumber or who has supervised the grading of the lumber in question or by their authorized Reinspection Agency.

Upon written request by the buyer or seller, reinspection services shall be made available by the Agency at a reasonable cost.

The Agency assumes no responsibility for, or concern in, arranging or paying for labour or other services necessary in performing the reinspection.

Reinspection shall also be made available for non-standard grades and non-grade stamped lumber provided the appropriate documentation is made available to the Agency.

The Agency shall re-inspect shipments in the case of complaint for grade, moisture content, size, species, manufacture, measurement, or tally. For reinspection purposes, the following shall apply:

a) **An item of a shipment** consists of a grade and size, without reference to lengths.

b) **Mixed grade shipment** contains more than one grade (i.e., lumber grade stamped as NO. 1 or NO. 2 however invoiced as "2 & Btr").

- In a mixed grade shipment, the buyer and seller shall agree that the grades specified in the mixture are considered as one grade (the lessor of the combination grades invoiced) in determining an item.
- A shipment that specifies quantities and/or percentages of grades shall not be considered a mixed shipment and each item shall be considered separately.

c) Buyer and seller shall consent to the method of invoicing prior to shipment.

Unless otherwise agreed to between buyer and seller, reinspection shall be conducted in accordance with the invoice.

401. COMPLAINTS

Unless otherwise specified by the terms of sale or special contract, the grading of lumber is based upon; grade, moisture content, size, and manufacture at time of grading and/or grade stamping, shipment and unloading by the buyer (see Para. 407.1).

For complaints on lumber to be recognized, the lumber shall be in the form in which it was invoiced.

Any subsequent change in manufacture or working or through kiln drying, treatments, fabrication or other use relieves the seller of their responsibility in recognizing any complaint except in cases of prior consent of the parties involved.

In the case of a complaint involving measurement (i.e., FBM), tally, or both, the entire item shall be held intact until re-inspected or re-tallied.

In the case of complaint regarding grade, moisture content, size, species or manufacture, but not involving measurement or tally, the buyer shall be required through agreement to accept that portion of the shipment that is of the invoiced grade, moisture content, size, species or manufacture as the case may be.

Upon receipt of complaint from the buyer/seller, the buyer/seller shall either resolve the complaint to the satisfaction of the buyer/seller or shall immediately contact the Agency whose grade stamp appears on the lumber or who supervised the grading of the lumber in question and request that they provide reinspection or re-tally service, as the case may be.

402. ASSISTANCE

The party calling for the reinspection, or re-tally shall be responsible to the Agency for payment of expenses associated with the reinspection or re-tally. Upon mutual agreement, the buyer and seller may share in the payment of expenses of the reinspection or re-tally.

In the event buyer/seller are not able to come to a mutual agreement, the payment of expenses for the reinspection or re-tally is defined in Para. 411 of these procedures.

The buyer shall promptly provide all reasonable assistance to facilitate the reinspection or re-tally.

403. BUYER'S RESPONSIBILITIES

Requests for reinspection or re-tally shall be acknowledged provided:

a) The buyer holds intact and properly protects that portion of the shipment which is in dispute in accordance with Para. 405.

b) The lumber which is in dispute and not kept intact shall be considered of the highest invoiced grade specified of the items on which the complaint is made.

Note: *It shall be recognized between buyer and seller that lumber which is in dispute shall be held intact. However, the buyer may, in determining whether a complaint is valid, examine some or all of the shipment which may necessitate in the removal of paper wrap and/or strapping.*

The seller shall acknowledge this as a reasonable method of determining whether a complaint exists. It shall be the buyer's responsibility to re-pile/repackage the lumber examined, and to identify the disputed lumber to the Agency for verification.

Any action on the part of the buyer in accepting and using that portion of the shipment that is of the grade, size, species, manufacture, and moisture content specified shall not be construed as acceptance of the entire shipment.

The buyer shall pay for the lumber in accordance with the terms of the sale for that portion accepted, however acceptance of part of a shipment shall not prejudice the buyer's just claims that any unused lumber conforms to the specifications of the grade, size, species, manufacture, or moisture content.

The buyer shall understand that that portion of lumber which has been accepted, used or not available for reinspection shall be included in calculating the results of the reinspection (entire item).

Example:

Item:	100,000 FBM
Accepted and/or used:	30,000 FBM
Portion remaining for reinspection:	70,000 FBM
Reinspection below grade results:	5,000 FBM

Note: *The 5,000 FBM below grade shall be calculated on the 100,000 FBM (entire item)* ***NOT*** *the 70,000 FBM.*

404. SELLER'S RESPONSIBILITIES

Unless otherwise settled, the seller, upon receipt of complaint from the buyer, shall immediately request the Agency to provide reinspection or re-tally, as the case may be, in accordance with the rules in effect at the time of execution of the contract.

Failing action by the seller to execute the request to provide reinspection or re-tally shall be cause for the buyer to request reinspection or re-tally directly with the Agency. Failure by the seller to execute a request for reinspection or re-tally shall not relieve the seller of their responsibility in accepting the terms and conditions for reinspection or re-tally as contained herein.

405. TIME FRAME

The buyer shall file a complaint with the seller within the time limits specified as follows:

405.1 FILING OF COMPLAINTS (STORAGE / PROTECTION)

The onus by the buyer to hold the disputed lumber intact and properly protected, shall not exceed **30 CALENDAR DAYS** from the date of filing the request for reinspection with the seller, unless alternate means of settling the complaint have been mutually agreed to by buyer and seller.

Upon receipt of the complaint from the buyer, the seller shall immediately notify the buyer that arrangements shall be made for reinspection or re-tally, unless alternate means of settling the complaint have been mutually agreed to by buyer and seller.

The disputed lumber held in excess of **30 CALENDAR DAYS** shall become the responsibility of the seller to hold intact and properly protect unless alternative arrangements have been agreed to between buyer and seller.

Failure by the seller to make appropriate arrangements to hold intact and properly protect the disputed lumber shall relieve the buyer from the responsibility in accepting any portion of the disputed lumber.

The Agency, upon receipt of the complaint from the buyer or seller, shall when scheduling their availability to perform the reinspection or re-tally be cognisant of the **30 CALENDAR DAY** requirements and make every effort to have the disputed lumber re-inspected or re-tallied within the **30 CALENDAR DAYS**.

405.2 GRADE

Complaints must be filed within **10 NORMAL WORKING/BUSINESS DAYS** after receipt of the shipment.

In the case of shipments composed of wrapped, strapped, or packaged units, reinspection for grade shall be permitted provided the complaint is filed within **90 CALENDAR DAYS** after receipt of the shipment.

In either case, reinspection shall involve only natural grade and manufacturing characteristics which are not altered by time and may include, but are not limited to, knots, knot size and placement, manufacture, pitch, wane, and skips.

The **90 CALENDAR DAY** time limit for filing complaints is provided solely to protect the buyer's claim to a reinspection until such time as the wrapped, strapped, or packaged units are opened, and shall not be construed to permit a delay in payment of invoices.

Complaints on lumber shipped in wrapped or strapped packages shall only be recognized up to **90 CALENDAR DAYS** provided:

- **a)** The lumber is grade stamped or marked in some recognizable manner establishing its identity in a positive way.
- **b)** There is no evidence of handling abuse or unsatisfactory protection.
- **c)** The seller's responsibility for nonconforming lumber shall apply only to that portion of the shipment which is in nonconformance to the grade requirements at the time of shipment as indicated by the Agency's report.

Complaints on warp, splits, stain, fungus, and other characteristics which may develop subsequent to arrival at the destination shall not be recognized unless proof can be provided that these characteristics developed prior to the lumber arriving at its destination.

405.3 MOISTURE CONTENT

In case of a complaint involving moisture content, the buyer shall inform the seller of the complaint within **72 HOURS** (3 normal working /business days of the buyer; weekends/statutory holidays shall not be included) after the lumber is unloaded in the buyer's yard or their designated location.

In such cases, the seller shall respond to the complaint within **72 HOURS** (3 normal working / business days; weekends / statutory holidays shall not to be included) from receipt of buyer's complaint.

405.4 TALLY, MEASUREMENT MANUFACTURE AND SIZE

In cases of complaints involving tally, measurement, species, manufacture or size, the buyer shall hold intact the entire shipment and shall file complaint with the seller within **10 NORMAL WORKING / BUSINESS DAYS** of receipt of shipment.

405.5 SPECIAL AGREEMENTS BETWEEN BUYER AND SELLER

Resolution shall be agreed upon between buyer and seller. This does preclude requesting the Agency to perform a verification or reinspection of the issue of complaint.

406. PROCEDURES

All requests for reinspection or re-tally shall be made in writing to the Agency and shall be accompanied by a copy of the purchase order, buyer's acceptance or acknowledgement of the order and a copy of the facilities invoice (prices may be deleted).

All pertinent information shall be made available to the Agency including but not limited to; grading rules, location, reason for reinspection, date of arrival of shipment and date of lodging the complaint plus any other information that may be helpful to the Agency.

407. MOISTURE CONTENT COMPLAINTS

For complaints on moisture content to be recognized, the Agency shall perform its reinspection in accordance with the following conditions and procedures:

407.1 MOISTURE CONTENT RESTRICTIONS

Restrictions on moisture content shall apply at the time of grading and grade stamping (if applicable), at time of shipment, and at time of unloading by the buyer in accordance with Para. 44, Moisture Content Standards.

When lumber is shipped on open transport equipment (i.e., rail, truck, boat, etc.) which exposes the lumber to the weather, the seller shall be relieved from responsibility for the re-absorption of moisture after the lumber has been loaded on said equipment provided the seller notifies the buyer, and the buyer consents to the method of shipment.

407.2 MOISTURE CONTENT TESTING

Unless otherwise agreed to between buyer and seller, moisture content determinations shall be made with electric resistance type meters correctly calibrated and adjusted for species and wood temperature.

Testing shall be conducted in accordance with ASTM D7438 "Standard Practice for Field Calibration and Application of Hand-Held Moisture Meters" procedures. Para. 44 of these grading rules shall also be referred to when conducting reinspection for moisture content.

407.3 MOISTURE CONTENT MEASUREMENT

Unless otherwise agreed to between buyer and seller, reinspection shall include testing of all pieces of the item under complaint. All pieces not exceeding the maximum permissible moisture content shall be separated from those in excess of the permissible moisture content.

408. SHORTAGE OR DAMAGE

All claims for shortages or damage shall be supported by an Affidavit from the buyer or his agent, and shall include but are not limited to, piece tallies, numbers off car seals, if any, car numbers and initials, a report from the Transportation Agent at destination, or by an Affidavit that the Transportation Agent was requested to make such a report and refused to do so.

409. AGENCY RESPONSIBILITY

The responsibility of the Agency on reinspection or re-tally shall be deemed to have been fulfilled when it has supplied all parties concerned with a report on the results of the reinspection or re-tally.

The Agency reserves the right to request prepayment of all expenses or a deposit to cover the estimated expenses.

410. SETTLEMENT PROVISIONS

410.1 GRADE

The contractual obligation of the seller shall be deemed to have been fulfilled when each item in the shipment upon reinspection is found to be 95% or more of the invoiced grade or better.

When, upon reinspection, the degrades are found to be more than 5% below grade, or when the degrades are found 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. Such degrades, if accepted by the buyer, shall be paid at the appropriate grade price.

410.2 MOISTURE CONTENT

The shipment shall be considered as of the moisture content as specified when 95% or more of the FBM (volume) is within the maximum allowable moisture content.

410.3 "OUT OF CONTRACT" SITUATIONS

Throughout the NLGA Grade Rules some characteristics are identified with a percentage of pieces permitted in a shipment.

If the number of pieces in a shipment exceed the allowable percentage permitted even though these pieces are within the grade characteristic limitations for the grade under consideration, an "**Out of Contract**" situation occurs.

Examples of characteristics that are restricted by percent of pieces in a shipment that are subject to an "**Out of Contract**" situation if the number of pieces is exceeded include but are not limited to: "Cutouts" in Para. 112d., "Hit & Miss" skip in Para. 124, "Wane extending partially or completely through the edge" in Para. 750, "Occasional piece" references, etc.

Other "**Out of Contract**" situations may include, but are not limited to incorrect size, species, tally and / or manufacture, which differ from the invoice agreed to between buyer and seller.

Grade and moisture content settlement provisions are addressed in Paras. 410.1 and 410.2, respectively and are not considered "**Out of Contract**" situations.

Settlement of "**Out of Contract**" situations shall be agreed to between buyer and seller.

411. COST

The expense of the reinspection shall be borne by the seller if the item under complaint is found to be less than 95% of the invoiced grade or moisture content.

The expense of reinspection shall be borne by the buyer, if 95% or more of the shipment is of the invoiced grade or moisture content.

If more than one item is under complaint, the expense of reinspection shall be pro-rated between buyer and seller in the ratio of the invoiced footage and to items found to be less than 95% on grade to those found to be 95% or more on, or above grade.

412. SPECIALLY WORKED LUMBER

In the case of special grades, when grades are in dispute, or sizes are in dispute, the Agency shall not make reinspection unless the request is accompanied by the exact specifications under which the product was sold.

Grades of Factory lumber such as Shop, Moulding Stock and Box are designed for remanufacture into special products. Other grades shown herein are primarily designed to be used for the specific purposes and in the sizes shown in the individual grade descriptions. Therefore, when lumber is ordered and invoiced as a specific grade and then remanufactured and the product ("Product of" lumber) shipped, no guarantee of the remanufactured product is made. However, for the purpose of providing a method upon which complaints may be settled the following shall apply:

412.1 "RESAWN" LUMBER

When lumber is sold on a specific grade and then "resawn" and the product shipped, the product will be considered on-grade if fifty percent (50%) or more of it is of the grade invoiced or better, unless the purchase agreement specifies otherwise.

412.2 "RIPPED" OR "RUN TO PATTERN" LUMBER

When lumber is sold on a specific grade and to be "ripped" or "run to pattern" lumber and the product shipped, settlement provisions are subject to agreement between buyer and seller.

413. SPECIAL PRODUCTS STANDARD LUMBER

In the event of a complaint on NLGA Special Products Standard (**SPS**) lumber grades (such as **SPS 1** or **SPS 2**, etc.), reference shall be made to the reinspection clause outlined in the appropriate SPS for procedures and settlement provisions. Unless otherwise provided for in the reinspection provisions of the Special Products Standards, the reinspection provisions listed above shall apply.

700. INTRODUCTION

Throughout the NLGA Grading Rules, various words and terms are used with meanings specifically applicable to lumber. The Glossary provides definitions and descriptions of characteristics applied in lumber grading and also defines the terms used to describe various stages of the permitted characteristics (such as light, medium, or heavy).

Note: *This Glossary incorporates the "National Grading Rule (NGR) for Dimension Lumber - Glossary". Where noted, NLGA has edited or added sections to the NGR Glossary for clarity. These sections are not intended to supersede the NGR.*

The adapted NGR Glossary entries are identified by even-numbered Paras. and the NLGA Glossary entries are identified by odd-numbered Paras., or as otherwise indicated.

An index to the Glossary paragraphs follows:

737a	RESAWN
737b	RIPPED
738	SAPWOOD
739a	SAW-SIZED
739b	SIZED DIMENSION
740	SHAKE
742	SPLITS
744	STAINS
746	STRESS GRADES
747	TOLERANCE IN SAWING
748	TRIM
749	SQUARE-END TRIM (DECKING)
750	WANE
752	WARP
754	COMBINATION GRADES

702. BURL

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

Separation of the wood normally occurring across or through the rings of annual growth and usually as a result of seasoning.

a) "**Surface check**" occurs on a face of a piece.

b) "**Through check**" extends from one surface of a piece to the opposite or adjoining surface.

c) "**Small checks**" are not over 1/32" wide or 4" long.

d) "**Medium checks**" are not over 1/32" wide or 10" long.

e) "**Large checks**" are more than 1/32" wide or longer than 10" or both.

f) "**Roller check**" is a crack in the wood structure caused by a piece of cupped lumber being flattened in passing between the machine rollers.

"**Light roller check**" is a perceptible opening not over 2' long.

"**Medium roller check**" is a perceptible opening over 2' long but not exceeding 4' in length.

"**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)

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 centre decay**" - is a localized decay developing along the pith in some species and is detected by visual inspection. The limitation for heart centre decay only applies to Southern Pine. Heart centre 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 fibres 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 peck ceases after the trees are felled.

710. EDGE

In lumber, there are three definitions for "**edge**":

a) The narrow face of rectangular-shaped pieces.

b) The corner of a piece at the intersection of two longitudinal faces.

NLGA Note: *This edge definition is also known as an arris.*

c) In stress grades, that part of the wide face nearest the corner with the narrow face of the piece.

Further refinements of "**edge**" are:

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", 3/16", and 1/4" respectively.

NLGA Note: *Lumber nominal 4" or less in thickness is frequently shipped with eased edges unless otherwise specified.*

NLGA Note: *The NLGA Grading Rules specify that when the standard radius is exceeded on eased edged lumber, the grade stamp shall indicate the non-standard radius. This is not an NGR requirement.*

NLGA Note: *The NLGA Grading Rules restrict the maximum non-standard radius for nominal 2" lumber to 1/4". This is not an NGR limitation.*

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:

i) The decay occupies more of the narrow face than the allowable maximum wane in thickness when in streak form, or

ii) 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 oversize tolerance but may not be undersize at the time of manufacture.

712. GRAIN

Fibres in wood and their direction, size, arrangement, appearance, or quality.

For requirements and method of measuring "**medium grain**", "**close grain**", and dense material, see Para. 350.

a) "**Slope of grain**" is the deviation of the line of fibres from a straight line parallel to the sides of the piece. For method of measurement, see Para. 360.

b) "**Summerwood**" is the portion of the annual growth ring formed during the latter part of the yearly growth ring. It is darker in color, denser, and mechanically stronger than springwood.

c) "**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 mechanically strong as summerwood.

d) "**Vertical grain**" (**V.G.**) or "**edge grain"** (**E.G.**) or "**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.

e) "**Flat grain**" (**F.G.**) or "**slash grain"** (**S.G.**) 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.

f) "**Mixed grain**" (**M.G.**) lumber includes either or both vertical and flat grained pieces.

g) "**Spiral grain**" is a deviation in the slope of grain caused when the fibres in a tree take a spiral course around the trunk of the tree, instead of the normal vertical course.

h) "**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**".

i) "**Dark grain**" is a grain which is darker than the others and should not be confused with pitch streak.

NLGA Note: *The definition for "**dark grain**" included above is not an NGR definition.*

714. HEART (HEARTWOOD)

Inner core of the tree trunk comprising the annual rings containing non-living elements. In some species, heartwood has a prominent colour different from sapwood.

a) "**Boxed heart**" means with the pith enclosed in the piece.

b) "**Heart centre**" is the pith or centre core of the log.

c) "**Free of heart centre**" (**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)

Lumber or other wood products that has been heated in a closed chamber, with or without moisture content reduction, until it 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) "**Pin hole**" is not over 1/16" in diameter.

b) "**Medium (small) hole**" is not over 1/4" in diameter.

c) "**Large hole**" is not over 1" in diameter.

d) "**Very large hole**" is over 1" in diameter.

e) "**Slough knot**" is a corner knot hole running from one wide face into the adjoining narrow face and measured by taking the average of its measurements on the wide face.

NLGA Note: *The definition for "**slough knot**" included above is not an NGR definition.*

717. KILN DRIED LUMBER

Lumber dried in a chamber in which the required moisture content is obtained by artificial heat and/or humidity control.

718. KNOTS

Portion of a branch or limb that has become incorporated in a piece of lumber.

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.

In lumber, knots are classified as to form, size, quality, and occurrence:

a) "**Round**" knot is produced when the limb is cut at approximately a right angle to its long axis.

b) "**Oval**" knot is produced when the limb is cut at slightly more than a right angle to the long axis.

c) "**Spike**" knot is produced when the limb is cut either lengthwise or diagonally.

d) "**Pin**" knot is not over 1/2".

e) "**Small**" knot is not over 3/4".

f) "**Medium**" knot is not over 1 1/2".

g) "**Large**" knot is over 1 1/2".

h) "**Sound**" knot contains no decay.

i) "**Pith**" knot is sound in all respects except it contains a pith hole not over 1/4" in diameter.

j) "**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) "**Unsound**" knot contains decay.

l) "**Firm**" knot is solid across its face but contains incipient decay.

m) "**Tight**" knot in so fixed by growth, shape, or position that it retains its place in the piece.

n) "**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) "**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) "**Encased**" knot is one which is not intergrown with the growth rings of the surrounding wood.

q) "**Loose**" or "**not firmly fixed**" knot is one not held tightly in place by growth, shape, or position.

r) "**Fixed**" knot will retain its place in dry lumber under ordinary conditions but is movable under pressure though not easily pushed out.

s) "**Knot cluster**" is two or more knots grouped together as a unit with the fibres of the wood deflected around the entire unit. A group of single knots is not a knot cluster.

t) "**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 size must not be in same 6" of length and the combination of knots must not be serious.

720. MANUFACTURING IMPERFECTIONS

Deficiencies or blemishes which are the result of surfacing (dressing) lumber, 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 is not over 1/64" deep.

"**Light**" torn grain is not over 1/32" deep.

"**Medium**" torn grain is not over 1/16" deep.

"**Heavy**" torn grain is not over 1/8" deep.

"**Very heavy**" torn grain is 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 on face or edge is not over 1/64" in depth.

***(may be approximately 6" in length)

"**Light**" skip on face is not over 1/32" in depth.

***(may be 12" in length)

"**Light**" skip on edge is not over 1/32" in depth.

***(may be 2' in length)

"**Medium**" skip on face is not over 1/16" in depth.

***(may be 12" in length)

"**Medium**" skip on edge is not over 1/16" in depth.

***(may be 2' in length)

"**Heavy**" skip on face &/or edge is not over 1/8" in depth.

f) "**Hit and miss**" skip is a series of skips not over 1/16" deep with surfaced areas between.

***(may be 4' in length)

NLGA Note: *The asterisked (*****) portions for the definition of skips noted in **e)** and **f)** above are in addition to the NGR definitions.*

g) "**Hit or miss**" skip 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.

Mismatch levels are described as follows:

"**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 surfacing line.

"**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.

l) "**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".

m) "**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.

n) "**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 favourable angle and are perfectly smooth to the touch.

"**Slight**" knife marks are readily visible but evidence no unevenness to the touch.

o) "**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.

"**Very heavy**" wavy dressing is over 1/8" deep.

722. MANUFACTURING IMPERFECTION CLASSIFICATION

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

Weight of the water in wood expressed in percentage of the weight of the oven-dry wood.

726. OCCASIONAL PIECES

Refers to not more than 10% of the pieces in a parcel or shipment.

728. PITCH

Accumulation of resinous material in lumber.

a) "**Ligh**t" pitch is the light but evident presence of pitch.

b) "**Medium**" pitch is a somewhat more evident presence of pitch than is "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

Well-defined accumulation of pitch in the wood cells in the form of a streak. Pitch streaks are described as follows, with equivalent areas being permissible:

a) "**Very small**" pitch streak is 3/8" in width and 15" in length.

b) "**Small**" pitch streak is 1/12 the width and 1/6 the length of the piece.

c) "**Medium**" pitch streak is 1/6 the width and 1/3 the length of the piece.

d) "**Large**" pitch streak is not over 1/4 the width by 1/2 the length of the surface.

e) "V**ery large**" pitch streak is over 1/4 the width by 1/2 the length of the surface.

f) "P**itch seam**" is a shake or check which contains pitch.

732. PITH

Small soft core in the structural centre 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" wide by 4" long).

b) "**Small**" pith occupies not over 3/4 square inch (1/4" wide by 3" long, 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

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) "**Large**" pocket is not over 4 square inches in area.

e) "**Very large**" pocket is over 4 square inches in area.

f) "**Closed**" pocket has an opening on one surface only.

g) "**Through**" or "o**pen**" 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, acknowledgement, 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.

737a. RESAWN

Lumber which has been further manufactured by cutting through the thickness from edge to edge, resulting in two or more pieces retaining the original width but each piece being less (thinner) in thickness than the original thickness.

737b. RIPPED

Lumber which has been further manufactured by cutting through the thickness from face to face, resulting in two or more pieces retaining the original thickness, but each piece being of a narrower width than the original width.

738. SAPWOOD

Outer layers of wood growth in the tree between the bark and the heartwood, which contains 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.
- **d)** "**Bright Sap**", unless specifically restricted, is not limited in any grade. It is not limited if treated with anti-stain solution, kiln dried or air dried.

NLGA Note: *The definition for "**bright sap**" included above is not an NGR definition.*

739a. SAW-SIZED

Lumber uniformly sawn to the standard surface size but permitting in 20% of the pieces a manufacturing tolerance of 1/32" under. In addition, an oversize tolerance of 1/8" is permitted.

739b. SIZED DIMENSION

Sized dimension lumber is uniformly manufactured to the net surfaced sizes and may be rough, surfaced or partially surfaced on one or more faces.

When opposing faces are rough, a variation of 1/32" over size is permitted in NO. 2 & higher and Standard & higher grades, and in addition, a variation of 1/32" undersize in 20% of the pieces is permitted. In Stud, Utility and NO. 3 a variation of 1/16" over or under is acceptable in 20% of the pieces. When opposing faces are rough, grade stamps on Sized Dimension lumber must be identified with "**Sized**" or "**SZD**".

740. SHAKE

Lengthwise separation of the wood which occurs between or through the rings of annual growth.

a) "**Light**" shake is not over 1/32" wide.

b) "**Medium**" shake is not over 1/8" wide.

c) "**Surface**" shake occurs on only one surface of a piece.

d) "**Through**" shake extends from one surface of a piece to the opposite or to an adjoining surface.

e) "**Pith**" shake, "h**eart**" 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 seasoning check by the fact that its greatest width is nearest the pith whereas the greatest width of a season check in a pith-centred piece is farthest from the pith.

f) "**Ring**" shake occurs between the growth rings to partially or wholly encircle the pith.

NLGA Note: *Longitudinal resinous or bark seams should not be confused with shake unless showing a separation.*

742. SPLITS

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) "**Very short**" split is equal in length to 1/2 the width of the piece.

b) "**Short**" split is equal in length to the width of the piece and in no case exceeds 1/6 the length.

c) "**Medium**" split is equal in length to twice the width of the piece and in no case exceeds 1/6 the length.

d) "**Long**" split is longer than a medium split.

744. STAINED WOOD

a) "**Stained heartwood**" or "**firm red heart**" is a marked variation from the natural colour.

Note: *The colour ranges from pink to brown.*

This stain 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**" similarly has no effect on the intended use of the pieces in which it is permitted but affects appearance in varying degrees:

i) "**Light**" stained sapwood is so slightly discolored that it does not affect natural finishes.

ii) "**Medium**" stained sapwood has a pronounced difference in coloring.

Note: *Sometimes the usefulness for natural finishes, but not for paint finishes, is affected.*

iii) "**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 PS 20, Sections 6.3.2.1 and 6.3.2.2.

NLGA Note: *In Canada and countries other than the United States, specified strength values may be used in place of working stress values.*

747. TOLERANCE IN SAWING

In the normal manufacturing process of sawing rough lumber, some deviation from the intended line of cut may occur. Unless otherwise specified, occasional pieces may have some deviation from the intended line of cut not to exceed the full tolerance in sawing, which at the time of manufacture, is as follows:

Nominal Wide or Narrow Face	Tolerance in Size
Under 2"	1/16" under 1/8" over
2" & larger not including 5"	1/8" under 1/4" over
5" & larger not including 8"	3/16" under 3/8" over
8" & larger	1/4" under 1/2" over

Note: *When ordered "STANDARD SAWN", NLGA Para. 820d shall apply.*

748. TRIM

a) Trimming of lumber is the act of cross-cutting a piece to a given length.

NLGA Note: *See NLGA Para.36 for trimming requirements.*

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.*

NLGA Note: *The NLGA out-of-square tolerance for DET lumber is limited to 1/16" for each nominal 1" of thickness or width.*

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.

749. DECKING SQUARE-END TRIM

When orders for **Decking** specify "**Square-end trim**", pieces are trimmed square with a tolerance of 1/64" off-square permitted, based on 6" widths, measured on the face side.

750. WANE

a) Bark or lack of wood from any cause, except eased edges, on the edge or corner of a piece of lumber.

b) "**Wane Dip**" - 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).

c) Excluding NO. 1 and higher grades, "**wane dip**" can occur on the ends, provided: wane dip on end can be the length of the allowable hole and no deeper than allowable skip for the grade.

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/or tables as shown in Paras. 810a to 810d:

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:

- **i)** If under nominal 2" thick, three times as much as crook for nominal 2" faces.
- **ii)** If nominal 2" thick and under nominal 3" thick, twice as much as crook for nominal 2" faces.
- **iii)** If nominal 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 permitted is shown in Paras. 810a, 810b, or 810c, as applicable.

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 allowed is shown in the following table:

CUP TABLE

Nominal Face Width	Cup Classification			
	Very Light	Light	Medium	Heavy
2" & 3"	1/32"	1/32"	1/32"	1/16"
4"	1/32"	1/32"	1/16"	1/8"
5" & 6"	1/32"	1/16"	1/8"	3/16"
8"	1/16"	1/8"	3/16"	1/4"
10"	3/32"	3/16"	1/4"	3/8"
12"	1/8"	1/4"	3/8"	1/2"
14" & wider	Proportionately more	Proportionately more	Proportionately more	Proportionately more

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 permitted is shown in Para. 810d.

754. COMBINATION GRADES

PS 20 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 grades apply.]

NLGA Note: *For use in the U.S., data collected during the North American In-grade test program for the* ***D Fir-L (N), "NO. 1 & Better"*** *grade combination also permitted separate allowable property values to be assigned to the combination.*

NLGA Note: *In Canada, CSA O141 also allows grouping of the two highest grades in a grade category, and grade marking the combination as an "**& Better**" grade. The combined grade is assigned the specified strength values of the lower grade in the combination. Specified strength values are **not** assigned to the combination in Canada.*

NLGA Note: *The following grading restrictions (adapted from the ALSC No. 1 & Better Policy) apply to the "**NO. 1 & Better**" combination grade for **D Fir-L (N)** that has been assigned unique allowable property values for use in the U.S.:*

- ***a)*** *Eligible material shall only be pulled by a mill performing the initial breakdown of logs, and*
- ***b)*** *The "**NO. 1 & Better**" combination grade stamp shall not be applied to regraded, remanufactured, pre-graded or pre-sorted material.*

*When the **D Fir-L (N)** species group or its individual constituent species are grade-stamped "**NO. 1 & Better**", it is not permissible to simultaneously sort any other grades with any higher allowable property values than the "**NO. 1 & Better**" combination grade even if these pieces would otherwise qualify. These grades which shall not be sorted include Select Structural, 1450Fb & higher MSR, M10 & higher MEL, lamination, scaffold plank, and Select decking.*

810. CROOK AND TWIST TABLES

810a. CROOK TABLE FOR SELECTS (PARAS. 112 & 117)

In the grades of Selects, maximum crook is limited to the amount shown in the table below for the appropriate length, grade, and width, measured according to Para. 752 b). 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.

Length	Grade	Nominal Face Width				
		4"	6"	8"	10"	12"
8'	C Sel & Btr (Choice WW P)	1/4"	1/4"	3/16"	3/16"	1/8"
	D Select (Quality WW P)	3/8"	3/8"	5/16"	5/16"	1/4"
10'	C Sel & Btr (Choice WW P)	3/8"	5/16"	5/16"	1/4"	3/16"
	D Select (Quality WW P)	9/16"	9/16"	1/2"	7/16"	3/8"
12'	C Sel & Btr (Choice WW P)	9/16"	1/2"	7/16"	3/8"	5/16"
	D Select (Quality WW P)	7/8"	3/4"	11/16"	5/8"	9/16"
14'	C Sel & Btr (Choice WW P)	3/4"	11/16"	9/16"	1/2"	3/8"
	D Select (Quality WW P)	1-1/8"	1-1/16"	15/16"	7/8"	3/4"
16'	C Sel & Btr (Choice WW P)	1"	7/8"	3/4"	5/8"	1/2"
	D Select (Quality WW P)	1-1/2"	1-3/8"	1-1/4"	1-1/8"	1"

810b. CROOK TABLE FOR COMMONS (PARAS. 113 & 118)

Maximum crook is limited to the amount shown in the table below for the appropriate length, grade, and width, measured according to Para. 752 b). 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.

Length	"Commons" Board Grade	Nominal Face Width				
		4"	6"	8"	10"	12"
8'	NO. 2 & Btr	1/2"	7/16"	3/8"	5/16"	1/4"
	NO. 3	13/16"	3/4"	11/16"	5/8"	1/2"
	NO. 4	1"	15/16"	7/8"	13/16"	3/4"
10'	NO. 2 & Btr	13/16"	11/16"	9/16"	1/2"	3/8"
	NO. 3	1-1/4"	1-3/16"	1-1/16"	1"	13/16"
	NO. 4	1-9/16"	1-7/16"	1-3/8"	1-1/4"	1-3/16"
12'	NO. 2 & Btr	1-1/8"	1"	7/8"	11/16"	9/16"
	NO. 3	1-13/16"	1-11/16"	1-9/16"	1-7/16"	1-1/8"
	NO. 4	2-1/4"	2-1/8"	2"	1-13/16"	1-11/16"
14'	NO. 2 & Btr	1-9/16"	1-5/16"	1-1/8"	15/16"	3/4"
	NO. 3	2-1/2"	2-5/16"	2-1/8"	1-15/16"	1-9/16"
	NO. 4	3-1/16"	2-7/8"	2-11/16"	2-1/2"	2-5/16"
16'	NO. 2 & Btr	2"	1-3/4"	1-1/2"	1-1/4"	1"
	NO. 3	3-1/4"	3"	2-3/4"	2-1/2"	2"
	NO. 4	4"	3-3/4"	3-1/2"	3-1/4"	3"

810c. STANDARD CROOK TABLE

Maximum crook is limited to the amount (in inches) shown in the table below for the appropriate length, classification, and width, measured according to Para. 752 b).

Length	Class	Nominal Face Width						
		2"	3"	4"	5" - 6"	8"	10"	12"
4' & 6'	Very light	1/8	1/8	1/8	1/8	1/16	1/16	1/16
	Light	1/4	1/4	1/4	3/16	1/8	1/16	1/16
	Medium	3/8	3/8	3/8	1/4	3/16	1/8	1/8
	Heavy	1/2	1/2	1/2	3/8	1/4	3/16	3/16
8'	Very light	1/4	1/4	3/16	1/8	1/8	1/16	1/16
	Light	3/8	3/8	3/8	5/16	1/4	3/16	1/8
	Medium	1/2	1/2	1/2	1/2	3/8	1/4	3/16
	Heavy	3/4	3/4	3/4	5/8	1/2	3/8	1/4
10'	Very light	3/8	5/16	1/4	3/16	3/16	1/8	1/8
	Light	3/4	5/8	1/2	7/16	3/8	1/4	3/16
	Medium	1-3/8	1	3/4	5/8	1/2	7/16	3/8
	Heavy	1-3/4	1-1/4	1-1/8	1	7/8	3/4	5/8
12'	Very light	1/2	3/8	3/8	5/16	1/4	1/4	3/16
	Light	1	3/4	11/16	5/8	1/2	7/16	3/8
	Medium	1-1/2	1-1/8	1	7/8	13/16	3/4	9/16
	Heavy	2	1-1/2	1-3/8	1-1/4	1-1/8	1	13/16
14'	Very light	5/8	1/2	7/16	3/8	5/16	1/4	3/16
	Light	1-1/4	1	7/8	3/4	5/8	1/2	3/8
	Medium	2	1-1/2	1-1/4	1-1/8	1	7/8	3/4
	Heavy	2-3/4	2	1-3/4	1-1/2	1-1/4	1-1/8	1
16'	Very light	3/4	5/8	1/2	7/16	3/8	5/16	1/4
	Light	1-5/8	1-1/4	1	7/8	3/4	5/8	1/2
	Medium	2-1/2	1-7/8	1-1/2	1-3/8	1-1/8	1	7/8
	Heavy	3-1/4	2-1/2	2	1-3/4	1-1/2	1-1/4	1-1/8
18'	Very light	1	3/4	5/8	1/2	7/16	3/8	5/16
	Light	2	1-3/8	1-1/8	1	7/8	3/4	5/8
	Medium	3	2-1/16	1-5/8	1-1/2	1-1/4	1-1/8	1
	Heavy	4	2-3/4	2-1/4	2	1-3/4	1-1/2	1-1/4

810c. (continued) STANDARD CROOK TABLE

Length	Class	Nominal Face Width						
		2"	3"	4"	5" - 6"	8"	10"	12"
20'	Very light	1-1/8	7/8	3/4	5/8	1/2	7/16	3/8
	Light	2-1/4	1-1/2	1-3/8	1-1/4	1	7/8	3/4
	Medium	3-3/8	2-1/4	2-1/16	1-7/8	1-1/2	1-5/16	1-1/8
	Heavy	4-1/2	3	2-3/4	2-1/2	2	1-3/4	1-1/2
22'	Very light	1-1/4	1	7/8	3/4	5/8	1/2	7/16
	Light	2-1/2	1-3/4	1-5/8	1-1/2	1-1/4	1	7/8
	Medium	3-3/4	2-5/8	2-7/16	2-1/4	1-7/8	1-1/2	1-1/4
	Heavy	5	3-1/2	3-1/4	3	2-1/2	2	1-3/4
24' and longer*	Very light	1-1/2	1-1/8	1	7/8	3/4	5/8	1/2
	Light	3	2	1-7/8	1-3/4	1-1/2	1-1/4	1
	Medium	4-1/2	3	2-3/4	2-5/8	2-1/4	1-7/8	1-5/8
	Heavy	6	4	3-3/4	3-1/2	3	2-1/2	2-1/4

Note: ****** *The term "**and longer**" implies the listed crook restrictions apply to all lengths equal to or greater than 24 feet.*

810d. STANDARD TWIST TABLE

Maximum twist is limited to the amount (in inches) shown in the table below for the appropriate length, classification, and width, measured according to Para. 752 d).

Length	Class	Nominal Face Width					
		2"	3" - 4"	5" - 6"	8"	10"	12"
4'	Very light	1/16	1/8	3/16	1/4	5/16	3/8
	Light	1/8	1/4	3/8	1/2	5/8	3/4
	Medium	3/16	3/8	1/2	3/4	7/8	1-1/8
	Heavy	1/4	1/2	3/4	1	1-1/4	1-1/2
6'	Very light	3/32	3/16	5/16	3/8	7/16	9/16
	Light	3/16	3/8	1/2	3/4	7/8	1-1/8
	Medium	9/32	1/2	3/4	1-1/8	1-3/8	1-5/8
	Heavy	3/8	3/4	1-1/8	1-1/2	1-7/8	2-1/4
8'	Very light	1/8	1/4	3/8	1/2	5/8	3/4
	Light	1/4	1/2	3/4	1	1-1/4	1-1/2
	Medium	3/8	3/4	1-1/8	1-1/2	1-7/8	2-1/4
	Heavy	1/2	1	1-1/2	2	2-1/2	3
10'	Very light	5/32	5/16	7/16	5/8	3/4	15/16
	Light	5/16	5/8	7/8	1-1/4	1-1/2	1-7/8
	Medium	1/2	7/8	1-3/8	1-7/8	2-3/8	2-3/4
	Heavy	5/8	1-1/4	1-7/8	2-1/2	3-1/8	3-3/4
12'	Very light	3/16	3/8	9/16	3/4	15/16	1-1/8
	Light	3/8	3/4	1-1/8	1-1/2	1-7/8	2-1/4
	Medium	9/16	1-1/8	1-5/8	2-1/4	2-3/4	3-3/8
	Heavy	3/4	1-1/2	2-1/4	3	3-3/4	4-1/2
14'	Very light	7/32	7/16	5/8	7/8	1-1/16	1-5/16
	Light	7/16	7/8	1-1/4	1-3/4	2-1/8	2-5/8
	Medium	5/8	1-1/4	1-7/8	2-5/8	3-1/4	3-7/8
	Heavy	7/8	1-3/4	2-5/8	3-1/2	4-3/8	5-1/4
16'	Very light	1/4	1/2	3/4	1	1-1/4	1-1/2
	Light	1/2	1	1-1/2	2	2-1/2	3
	Medium	3/4	1-1/2	2-1/4	3	3-3/4	4-1/2
	Heavy	1	2	3	4	5	6

810d. (continued) STANDARD TWIST TABLE

Length	Class	Nominal Face Width					
		2"	3" - 4"	5" - 6"	8"	10"	12"
18'	Very light	5/16	9/16	13/16	1-1/8	1-7/16	1-11/16
	Light	9/16	1-1/8	1-5/8	2-1/4	2-3/4	3-3/8
	Medium	7/8	1-5/8	2-1/2	3-3/8	4-1/4	5
	Heavy	1-1/8	2-1/4	3-3/8	4-1/2	5-5/8	6-3/4
20' and longer*	Very light	5/16	5/8	15/16	1-1/4	1-9/16	1-7/8
	Light	5/8	1-1/4	1-7/8	2-1/2	3-1/8	3-3/4
	Medium	1	1-7/8	2-3/4	3-3/4	4-5/8	5-5/8
	Heavy	1-1/4	2-1/2	3-3/4	5	6-1/4	7-1/2

***Note:** * The term "**and longer**" implies the listed twist restrictions apply to all lengths equal to or greater than 20 feet.*

820. SIZE TABLES

820a. STANDARD DRY (MAXIMUM 19% MC) SIZES - FINISH, CLEARS, FLOORING, CEILING, SIDING, AND STEPPING

Thicknesses apply to all widths and widths to all thicknesses (S1S or S2S Thicknesses) (S1E or S2E Widths).

Item	Nominal Thickness	Surfaced Thickness		Nominal Width	Surfaced Width	
		Imperial	Metric		Imperial	Metric
Finish & Clears	3/8"	5/16"	7.9 mm	2"	1-1/2"	38.1 mm
	1/2"	7/16"	11.1 mm	3"	2-1/2"	63.5 mm
	5/8"	9/16"	14.3 mm	4"	3-1/2"	88.9 mm
	3/4"	5/8"	15.9 mm	5"	4-1/2"	114.3 mm
	1"	3/4"	19.1 mm	6"	5-1/2"	139.7 mm
	1-1/4"	1"	25.4 mm	8"	7-1/4"	184.2 mm
	1-1/2"	1-1/4"	31.8 mm	10"	9-1/4"	235.0 mm
	2"	1-1/2"	38.1 mm	12"	11-1/4"	285.8 mm
	2" to 4"	1/2" off	12.7 mm off	Over 12"	3/4" off	19.1 mm off
Flooring	3/8"	5/16"	7.9 mm	2"	1-1/2"	38.1 mm
	1/2"	7/16"	11.1 mm	3"	2-1/2"	63.5 mm
	5/8"	9/16"	14.3 mm	4"	3-1/2"	88.9 mm
	3/4"	5/8"	15.9 mm	5"	4-1/2"	114.3 mm
	1"	3/4"	19.1 mm	6"	5-1/2"	139.7 mm
	1-1/4"	1"	25.4 mm			
	1-1/2"	1-1/4"	31.8 mm			
Ceiling	3/8"	5/16"	7.9 mm	3"	2-1/2"	63.5 mm
	1/2"	7/16"	11.1 mm	4"	3-1/2"	88.9 mm
	5/8"	9/16"	14.3 mm	5"	4-1/2"	114.3 mm
	3/4"	11/16"	17.5 mm	6"	5-1/2"	139.7 mm

820a. (continued) STANDARD DRY (MAXIMUM 19% MC) SIZES - FINISH, CLEARS, FLOORING, CEILING, SIDING, AND STEPPING

Item	Nominal Thickness	Surfaced Thickness		Nominal Width	Surfaced Width	
		Imperial	Metric		Imperial	Metric
Siding (T&G) (1/4" or 6.4 mm Tongue)	5/8"	9/16"	14.3 mm	4"	3-1/8"	79.4 mm
	1"	23/32"	18.3 mm	5"	4-1/8"	104.8 mm
				6"	5-1/8"	130.2 mm
				8"	6-7/8"	174.6 mm
				10"	8-7/8"	225.4 mm
				12"	10-7/8"	276.2 mm
Siding (Shiplapped) (1/2" or 12.7 mm Lap)	5/8"	9/16"	14.3 mm	4"	2-7/8"	73.0 mm
	1"	23/32"	18.3 mm	5"	3-7/8"	98.4 mm
	2"	1-1/2"	38.1 mm	6"	4-7/8"	123.8 mm
				8"	6-5/8"	168.3 mm
				10"	8-5/8"	219.1 mm
				12"	10-5/8"	269.9 mm
Stepping	1"	3/4"	19.1 mm	8"	7-1/4"	184.2 mm
	1-1/4"	1"	25.4 mm	10"	9-1/4"	235.0 mm
	1-1/2"	1-1/4"	31.8 mm	12"	11-1/4"	285.8 mm
	2"	1-1/2"	38.1 mm	Over 12"	1" off	25.4 mm off

Note: *The term "**off**" refers to the amount that is "**less than nominal**" size. (e.g., a nominal 14" wide piece of Stepping has a dry surfaced size of 13" [1" less than nominal 14"])*

820b. STANDARD SIZES (SEASONED AND UNSEASONED)

Thicknesses apply to all widths and all widths to all thicknesses (S1S or S2S) (S1E or S2E).

Item	Surfaced Thickness					Surfaced Width				
	Nominal	Dry		Green		Nominal	Dry		Green*	
		inch	mm	inch	mm		inch	mm	inch	mm
Boards & Patio Decking	3/8	5/16	7.9	11/32	8.7	2	1-1/2	38.1	1-9/16	39.7
	1/2	7/16	11.1	15/32	11.9	3	2-1/2	63.5	2-9/16	65.1
	5/8	9/16	14.3	19/32	15.1	4	3-1/2	88.9	3-9/16	90.5
	3/4	5/8	15.9	11/16	17.5	5	4-1/2	114.3	4-5/8	117.5
	1	3/4	19.1	25/32	19.8	6	5-1/2	139.7	5-5/8	142.9
	1-1/4	1	25.4	1-1/32	26.2	7	6-1/2	165.1	6-5/8	168.3
	1-1/2	1-1/4	31.8	1-9/32	32.5	8	7-1/4	184.2	7-1/2	190.5
						9	8-1/4	209.6	8-1/2	215.9
						10	9-1/4	235.0	9-1/2	241.3
						11	10-1/4	260.4	10-1/2	266.7
						12	11-1/4	285.8	11-1/2	292.1
						14	13-1/4	336.6	13-1/2	342.9
						16	15-1/4	387.4	15-1/2	393.7
Centre-Matched (1/4" or 6.4 mm T&G)	1	3/4	19.1	25/32	19.8	4	3-1/8	79.4	3-3/16	81.0
	1-1/4	1	25.4	1-1/32	26.2	6	5-1/8	130.2	5-1/4	133.4
	1-1/2	1-1/4	31.8	1-9/32	32.5	8	6-7/8	174.6	7-1/8	181.0
Centre-Matched (3/8" or 9.5 mm T&G)	2	1-1/2	38.1	1-9/16	39.7	4	3	76.2	3-1/16	77.8
	2-1/2	2	50.8	2-1/16	52.4	6	5	127.0	5-1/8	130.2
	3	2-1/2	63.5	2-9/16	65.1	8	6-3/4	171.5	7	177.8
	3-1/2	3	76.2	3-1/16	77.8	10	8-3/4	222.3	9	228.6
	4	3-1/2	88.9	3-9/16	90.5	12	10-3/4	273.1	11	279.4

820b. (continued) STANDARD SIZES (SEASONED AND UNSEASONED)

Item	Surfaced Thickness					Surfaced Width				
	Nominal	Dry		Green		Nominal	Dry		Green*	
		inch	mm	inch	mm		inch	mm	inch	mm
Dimension Lumber: (Studs, Light Framing, Structural Light Framing, Joists & Planks, Machine Graded, and Glued) **Decking**	**2**	1-1/2	38.1	1-9/16	39.7	**2**	1-1/2	38.1	1-9/16	39.7
	2-1/2	2	50.8	2-1/16	52.4	**3**	2-1/2	63.5	2-9/16	65.1
	3	2-1/2	63.5	2-9/16	65.1	**4**	3-1/2	88.9	3-9/16	90.5
	3-1/2	3	76.2	3-1/16	77.8	**5**	4-1/2	114.3	4-5/8	117.5
	4	3-1/2	88.9	3-9/16	90.5	**6**	5-1/2	139.7	5-5/8	142.9
	4-1/2	4	101.6	4-1/16	103.2	**7**	6-1/2	165.1	6-5/8	168.3
						8	7-1/4	184.2	7-1/2	190.5
						9	8-1/4	209.6	8-1/2	215.9
						10	9-1/4	235.0	9-1/2	241.3
						11	10-1/4	260.4	10-1/2	266.7
						12	11-1/4	285.8	11-1/2	292.1
						14	13-1/4	336.6	13-1/2	342.9
						16	15-1/4	387.4	15-1/2	393.7
Shiplap (3/8" or 9.5 mm Lap) (1/2" or 12.7 mm Lap optional)	**1**	3/4	19.1	25/32	19.8	**4**	3-1/8	79.4	3-3/16	81.0
						6	5-1/8	130.2	5-1/4	133.4
						8	6-7/8	174.6	7-1/8	181.0
						10	8-7/8	225.4	9-1/8	231.8
						12	10-7/8	276.2	11-1/8	282.6

***** In Western R Cedar and Eastern W Cedar only, the minimum green sizes for surfaced widths are:

Nominal Surfaced Width	Green (Unseasoned)	
	inch	mm
5"	4-9/16	115.9
6"	5-9/16	141.3
7"	6-9/16	166.7
8"	7-3/8	187.3
9"	8-3/8	212.7
10"	9-3/8	238.1
11"	10-3/8	263.5
12"	11-3/8	288.9
14"	13-7/16	341.3
16"	15-7/16	392.1

820c. STANDARD SIZES - INDUSTRIAL CLEARS (SEASONED AND UNSEASONED)

Thicknesses apply to all widths and all widths to all thicknesses.

Item	Surfaced Thickness					Surfaced Width				
	Nominal	Dry		Green*		Nominal	Dry		Green*	
		inch	mm	inch	mm		inch	mm	inch	mm
Industrial Clears	1	3/4	19.1	25/32	19.8	2	1-1/2	38.1	1-9/16	39.7
	1-1/4	1	25.4	1-1/32	26.2	3	2-1/2	63.5	2-9/16	65.1
	1-1/2	1-1/4	31.8	1-9/32	32.5	4	3-1/2	88.9	3-9/16	90.5
	2	1-1/2	38.1	1-9/16	39.7	5	4-1/2	114.3	4-5/8	117.5
	2-1/2	2	50.8	2-1/16	52.4	6	5-1/2	139.7	5-5/8	142.9
	3	2-1/2	63.5	2-9/16	65.1	7	6-1/2	165.1	6-5/8	168.3
	3-1/2	3	76.2	3-1/16	77.8	8	7-1/4	184.2	7-1/2	190.5
	4	3-1/2	88.9	3-9/16	90.5	9	8-1/4	209.6	8-1/2	215.9
						10	9-1/4	235.0	9-1/2	241.3
						11	10-1/4	260.4	10-1/2	266.7
						12	11-1/4	285.8	11-1/2	292.1
						14	13-1/4	336.6	13-1/2	342.9
						16	15-1/4	387.4	15-1/2	393.7

***** Nominal 5" and thicker pieces are surfaced ½" less than nominal in both thickness and width.

820d. ALTERNATE SIZES - DIMENSION AND TIMBERS - STANDARD SAWN (ROUGH GREEN)

Nominal Size	Standard Sawn Size	Variation Over Standard Sawn Size	Variation Under Standard Sawn Size	Minimum Rough Green Size
2"	1-3/4"	1/4"	* 1/16"	* 1-11/16"
3"	2-3/4"	3/8"	* 1/16"	* 2-11/16"
4"	3-3/4"	3/8"	* 1/16"	* 3-11/16"
** **6"**	5-3/4"	3/8"	-	5-3/4"
8"	7-3/4"	1/2"	1/8"	7-5/8"
10"	9-3/4"	1/2"	1/8"	9-5/8"
12"	11-3/4"	1/2"	1/8"	11-5/8"
14" & larger	1/4" Off	1/2"	1/8"	

* 20% of the pieces may be 1/32" less.

** Standard sawn lumber, nominal 5" and thicker shall be cut not more than 3/8" under the nominal size.

820e. STANDARD SIZES - SELECTS & COMMONS (DRY)

Thickness		Width	
Nominal	Surfaced	Nominal	Surfaced
3/4	5/8"	**2"**	1-1/2"
4/4	3/4"	**3"**	2-1/2"
5/4	1-5/32"	**4"**	3-1/2"
6/4	1-13/32"	**5"**	4-1/2"
7/4	1-19/32"	**6"**	5-1/2"
8/4	1-13/16"	**7"**	6-1/2"
9/4	2-3/32"	**8" & Wider**	3/4" off nominal
10/4	2-3/8"		
11/4	2-9/16"		
12/4	2-3/4"		
16/4	3-3/4"		

Surfaced square size shall be governed by thickness. At manufacturer's option, 4/4 lumber may be 25/32".

820f. STANDARD SIZES - BEAMS & STRINGERS AND POSTS & TIMBERS

Applies to nominal 5" and thicker pieces. See Para. 32.

Item	Surfaced Thickness & Width				
	Nominal	Dry		Green	
		Imperial	Metric	Imperial	Metric
Beams & Stringers and Posts & Timbers	5" to 6"	1/2" off nominal	12.7 mm off nominal	1/2" off nominal	12.7 mm off nominal
	7" to 15"	3/4" off nominal	19.1 mm off nominal	1/2" off nominal	12.7 mm off nominal
	16" and greater	1" off nominal	25.4 mm off nominal	1/2" off nominal	12.7 mm off nominal

Note: *The term "**off nominal**" refers to the amount that is "less than nominal" size. (e.g., a nominal 8" width piece has a dry surfaced size of 7 1/4")*

830. LENGTH TABLES

830a. STANDARD RANDOM LENGTHS - ALL SPECIES

Item	Grade / Thickness	Standard Lengths
Selects & Commons, Paras. 112, 113, 117, and 118	Selects - all grades	6' & longer in multiples of 1', except D Fir-L Selects shall be 4' & longer with 3% of 4' and 5' permitted.
	Commons - all grades	6' & longer in multiples of 1'.
Boards, Para. 114 and Light Framing	"**SELECT MERCH**" (Para. 114), "**CONST**", "**STAND**", "**UTILITY**"	6' to 16' or longer
	"**ECONOMY**"	4' to 16' or longer
Structural Light Framing and Joists & Planks	"**SELECT STRUCTURAL**", "**NO. 1**","**NO. 2**","**NO. 3**" Nominal 2" thick	6' to 16' or longer
	"**SELECT STRUCTURAL**", "**NO. 1**","**NO. 2**","**NO. 3**" Nominal 3" to 4" thick	8' to 16' or longer
	"**ECONOMY**"	4' to 16' or longer
Beams & Stringers And Posts & Timbers	"**SELECT STRUCTURAL**", "**NO. 1**", "**NO. 2**", "**STANDARD**"	8' to 16' or longer
	"**UTILITY**"	6' to 16' or longer
Industrial Clears	All grades and thicknesses	6' to 16' or longer
Patio Decking	"**SELECT PATIO**", "**COMMERCIAL PATIO**"	6' to 16' or longer (shorter lengths may be available if specified)

830b. STANDARD LENGTHS - ALL SPECIES (EXCEPT WR CEDAR)

Standard lengths are multiples of 1'. In all items, longer lengths than those listed may be included at the shipper's option.

Item	Grade	Standard Lengths
Finish, Casing and Base	"**C & BETTER**"	3' to 16' or longer. Not less than 85% 7' to 16' or longer
	"**D**"	3' to 16' or longer. Not less than 75% 7' to 16' or longer
Flooring, Ceiling and Siding	Flooring and Ceiling "**C & BETTER**"	3' to 16' or longer. Not less than 85% 7' to 16' or longer
	Siding "**C & BETTER**"	4' to 16' or longer. Not less than 85% 7' to 16' or longer
	Flooring and Ceiling "**D**"	3' to 16' or longer. Not less than 75% 7' to 16' or longer
	Siding "**D**"	4' to 16' or longer. Not less than 75% 7' to 16' or longer
	"E"	3' and longer
Stepping	"**C & BETTER**" and "**D**"	3' to 16' or longer; 70% 10' or longer
Gutter	All grades	8' to 24" or longer
Window Jamb, Door Jamb, Door Sill, Window Sill, Window Stool	All grades	3' and longer

830c. STANDARD LENGTHS - WESTERN RED CEDAR

Item	Grade	Standard Lengths
Finish, Clear Panelling, Ceiling & Drop Siding	"**CLEAR HEART**" & "**A**"	3' to 16' or longer, minimum 85% - 8' to 16' or longer, maximum 15% - 3' to 7'.
	"**B**"	3' to 16' or longer, minimum 75% - 8' to 16' or longer.
Bevel Siding	All grades: Standard lengths are 3' & longer in multiples of 1'. Standard bundles are 6' to 16' with the inclusion of 17' to 20' optional with the shipper.	
	"**CLEAR HEART**" & "**A**"	For 6" & narrower; not more than 20% of the footage may be 6' & 7' bundles. For 8" & wider; not more than 15% of the footage may be 6' & 7' bundles.
	"**B**"	Not more than 20% of the footage may be 6' & 7' bundles.
	"**C**"	No specified percentage of lengths guaranteed.
Tight Knotted Panelling & Sidings	"**SELECT KNOTTY**"	3' to 16' or longer, minimum 85% - 8' to 16' or longer, maximum 15% - 3' to 7'.
	"**QUALITY KNOTTY**"	3' to 16' or longer, minimum 75% - 8' to 16' or longer, maximum 25% - 3' to 7'.

850. CANADIAN DESIGN VALUES – INTRODUCTION

The specified strengths and moduli of elasticity values for stress-graded lumber products used in Canada have been developed by NLGA using Limit State Design (**LSD**). These design values were derived, using CSA O86 Technical Committee adopted protocols, from test data obtained by sampling and testing of full-size and/or small-clear specimens.

Lumber physical properties are regularly monitored to ensure that assigned design values remain applicable for structural design.

The NLGA design values for use in Canada presented in these grading rules have been approved by the CSA Technical Committee on Engineering Design in Wood and are also published in CSA O86.

All species included under the NLGA Grading Rules (refer to Paras. 7 and 7a) are grouped into four species groups for the purposes of assigning design values in Canada. These species groups are D Fir-L (N), Hem-Fir (N), S-P-F, and North Species.

The design values for the use categories and grades for these major species groups are tabulated in the following paragraphs:

Para. 851 – Structural Joists & Planks, Structural Light Framing, and Stud
Para. 852 – Light Framing
Para. 853 – Beams & Stringers
Para. 854 – Posts & Timbers
Para. 855 – Decking
Para. 856 – Machine Stress Rated (MSR) Lumber
Para. 857 – Machine Evaluated Lumber (MEL)

The tables show specified design values for engineered use as single members, dry service conditions, and for normal duration of load.

Adjustment of these values for other conditions of loading and the criteria for their use in the design of structures are presented in the CSA O86 standard.

851. SPECIFIED STRENGTHS, MODULI OF ELASTICITY, AND RELATIVE DENSITY FOR STRUCTURAL JOISTS & PLANKS AND STRUCTURAL LIGHT FRAMING (PARA. 124) GRADES, AND STUD (PARA. 121) GRADE

Species Group	Grade	Bending (MPa)	Tension Parallel to Grain (MPa)	Longitudinal Shear (MPa)	Compression		Modulus of Elasticity (GPa)		Relative Density
					Parallel to Grain (MPa)	Perpendicular to Grain (MPa)			
		f_b	f_t	f_v	f_c	f_{cp}	E	E_{05}	G
D Fir-L (N)	Select Str	16.5	10.6	1.9	19.0	7.0	12.5	8.5	0.49
	NO. 1/NO. 2	10.0	5.8		14.0		11.0	7.0	
	NO. 3/Stud	4.6	2.1		7.3		10.0	5.5	
Hem-Fir (N)	Select Str	16.1	8.4	1.6	16.9	4.6	11.0	8.0	0.44
	NO. 1/NO. 2	12.0	5.0		14.9		10.0	7.0	
	NO. 3/Stud	6.9	2.9		8.6		9.0	5.5	
S-P-F	Select Str	16.5	8.6	1.5	14.5	5.3	10.5	7.5	0.42
	NO. 1/NO. 2	11.8	5.5		11.5		9.5	6.5	
	NO. 3/Stud	7.0	3.2		9.0		9.0	5.5	
North Species	Select Str	10.6	6.2	1.3	13.0	3.5	7.5	5.5	0.35
	NO. 1/NO. 2	7.6	4.0		10.4		7.0	5.0	
	NO. 3/Stud	4.5	2.0		5.2		6.5	4.0	

Note: *Refer to CSA O86 for size factors and other design value adjustments for specific applications.*

852. SPECIFIED STRENGTHS, MODULI OF ELASTICITY, AND RELATIVE DENSITY FOR LIGHT FRAMING (PARA. 122) GRADES

Species Group	Grade	Bending (MPa)	Tension Parallel to Grain (MPa)	Longitudinal Shear (MPa)	Compression		Modulus of Elasticity (GPa)		Relative Density
					Parallel to Grain (MPa)	Perpendicular to Grain (MPa)			
		f_b	f_t	f_v	f_c	f_{cp}	E	E_{05}	G
D Fir-L (N)	Const.	13.0	6.6	3.2	16.0	7.0	10.0	5.5	0.49
	Stand.	7.3	3.7		13.1		9.0	5.0	
Hem-Fir (N)	Const.	15.6	5.7	2.7	15.4	4.6	9.5	5.5	0.44
	Stand.	8.7	3.2		13.2		8.5	5.0	
S-P-F	Const.	15.3	6.2	2.6	13.1	5.3	9.0	5.5	0.42
	Stand.	8.6	3.5		10.8		8.0	5.0	
North Species	Const.	9.9	4.5	2.2	11.9	3.5	6.5	4.0	0.35
	Stand.	5.5	2.5		9.8		6.0	3.5	

Note: *Refer to CSA O86 for size factors and other design value adjustments for specific applications.*

853. SPECIFIED STRENGTHS, MODULUS OF ELASTICITY, AND RELATIVE DENSITY FOR BEAM & STRINGER (PARA. 130) GRADES

Species Group	Grade	Bending (MPa)	Tension Parallel to Grain (MPa)	Longitudinal Shear (MPa)	Compression		Modulus of Elasticity (GPa)		Relative Density
					Parallel to Grain (MPa)	Perpendicular to Grain (MPa)			
		f_b	f_t	f_v	f_c	f_{cp}	E	E_{05}	G
D Fir-L (N)	Sel. Str.	19.5	10.0	1.5	13.2	7.0	12.0	8.0	0.49
	NO. 1	15.8	7.0		11.0		12.0	8.0	
	NO. 2	9.0	3.3		7.2		9.5	6.0	
Hem-Fir (N)	Sel. Str.	16.8	7.4	1.2	13.0	4.6	11.5	8.0	0.44
	NO. 1	14.4	6.3		12.4		11.0	7.5	
	NO. 2	14.4	6.3		12.4		11.0	7.5	
S-P-F	Sel. Str.	13.6	7.0	1.2	9.5	5.3	8.5	6.0	0.42
	NO. 1	11.0	4.9		7.9		8.5	6.0	
	NO. 2	6.3	2.3		5.2		6.5	4.5	
North Species	Sel. Str.	12.8	6.5	1.0	7.2	3.5	8.0	5.5	0.35
	NO. 1	10.8	4.6		6.0		8.0	5.5	
	NO. 2	5.9	2.2		3.9		6.0	4.0	

Note 1: *Refer to CSA 086 for size factors and other design value adjustments for specific applications.*

Note 2: *Specified strengths and moduli of elasticity for Beams & Stringers are based on loads applied to the narrow face. See CSA 086 for factors to be applied when Beams & Stringers are loaded on the wide face.*

Note 3: *Longitudinal shear modulus may be estimated as E/16.*

854. SPECIFIED STRENGTHS, MODULUS OF ELASTICITY, AND RELATIVE DENSITY FOR POST & TIMBER (PARA. 131) GRADES

Species Group	Grade	Bending (MPa)	Tension Parallel to Grain (MPa)	Longitudinal Shear (MPa)	Compression		Modulus of Elasticity (GPa)		Relative Density
					Parallel to Grain (MPa)	Perpendicular to Grain (MPa)			
		f_b	f_t	f_v	f_c	f_{cp}	E	E_{05}	G
D Fir-L (N)	Sel. Str.	18.3	10.7	1.5	13.8	7.0	12.0	8.0	0.49
	NO. 1	13.8	8.1		12.2		10.5	6.5	
	NO. 2	6.0	3.8		7.5		9.5	6.0	
Hem-Fir (N)	Sel. Str.	13.6	7.9	1.2	11.3	4.6	10.0	7.0	0.44
	NO. 1	10.2	6.0		10.0		9.0	6.0	
	NO. 2	4.5	2.8		6.1		8.0	5.5	
S-P-F	Sel. Str.	12.7	7.4	1.2	9.9	5.3	8.5	6.0	0.42
	NO. 1	9.6	5.6		8.7		7.5	5.0	
	NO. 2	4.2	2.6		5.4		6.5	4.5	
North Species	Sel. Str.	12.0	7.0	1.0	7.5	3.5	8.0	5.5	0.35
	NO. 1	9.0	5.3		6.7		7.0	5.0	
	NO. 2	3.9	2.5		4.1		6.0	4.0	

Note 1: *Refer to CSA O86 for size factors and other design value adjustments for specific applications.*

Note 2: *Longitudinal shear modulus may be estimated as E/16.*

855. SPECIFIED STRENGTHS, MODULUS OF ELASTICITY, AND RELATIVE DENSITY FOR DECKING (PARA. 127) GRADES

The design values of the "Select" and "Commercial" Decking grades are equivalent to the "Select Structural" and "NO. 1/NO. 2" Structural Light Framing grades, respectively.

Species Group	Grade	Bending (MPa)	Tension Parallel to Grain (MPa)	Longitudinal Shear (MPa)	Compression		Modulus of Elasticity (GPa)		Relative Density
					Parallel to Grain (MPa)	Perpendicular to Grain (MPa)			
		f_b	f_t	f_v	f_c	f_{cp}	E	E_{05}	G
D Fir-L (N)	Select	16.5	10.6	1.9	19.0	7.0	12.5	8.5	0.49
	Comm.	10.0	5.8		14.0		11.0	7.0	
Hem-Fir (N)	Select	16.1	8.4	1.6	16.9	4.6	11.0	8.0	0.44
	Comm.	12.0	5.0		14.9		10.0	7.0	
S-P-F	Select	16.5	8.6	1.5	14.5	5.3	10.5	7.5	0.42
	Comm.	11.8	5.5		11.5		9.5	6.5	
North Species	Select	10.6	6.2	1.3	13.0	3.5	7.5	5.5	0.35
	Comm.	7.6	4.0		10.4		7.0	5.0	

Note: *Refer to CSA O86 for size factors and other design value adjustments for specific applications.*

856. DESIGN VALUES FOR MACHINE STRESS-RATED (MSR) LUMBER (PARA. 128b) GRADES

856a. SPECIFIED STRENGTHS AND MODULUS OF ELASTICITY FOR STANDARD MSR GRADES

MSR Grade	Bending (MPa)	Modulus of Elasticity (MPa)	Tension Parallel to Grain (MPa)	Compression	
				Parallel to Grain (MPa)	Perpendicular to Grain (MPa)
	f_b	E	f_t	f_c	f_{cp}
1200F_b - 1.2E	17.4	8,300	6.7	15.1	5.3
1350F_b - 1.3E	19.5	9,000	8.4	16.9	5.3
1450F_b - 1.3E	21.0	9,000	9.0	17.3	5.3
1500F_b - 1.4E	21.7	9,700	10.1	17.5	5.3
1650F_b - 1.5E	23.9	10,300	11.4	18.1	5.3
1800F_b - 1.6E	26.1	11,000	13.2	18.7	5.3
1950F_b - 1.7E	28.2	11,700	15.4	19.3	5.3
2100F_b - 1.8E	30.4	12,400	17.7	19.9	6.5
2250F_b - 1.9E	32.6	13,100	19.6	20.5	6.5
2400F_b - 2.0E	34.7	13,800	21.6	21.1	6.5
2550F_b - 2.1E	36.9	14,500	23.0	21.7	6.5
2700F_b - 2.2E	39.1	15,200	24.1	22.3	6.5
2850F_b - 2.3E	41.3	15,900	25.8	22.9	6.5
3000F_b - 2.4E	43.4	16,500	26.9	23.5	6.5

Note 1: *Refer to CSA O86 for size factors and other design value adjustments for specific applications and species.*

Note 2: *Grades of MSR may be produced with alternate design values as provided for in NLGA SPS 2.*

856b. SPECIFIED STRENGTHS AND MODULUS OF ELASTICITY FOR ALTERNATIVE MSR GRADES

The following MSR grades provide a modulus of elasticity with higher corresponding strengths. For these MSR grades, qualification and daily quality control for tensile strength (f_t) are required as specified in NLGA SPS 2.

MSR Grade	Bending (MPa)	Modulus of Elasticity (MPa)	Tension Parallel to Grain (MPa)	Compression	
				Parallel to Grain (MPa)	Perpen-dicular to Grain (MPa)
	f_b	E	f_t	f_c	f_{cp}
1400F_b - 1.2E	20.3	8,300	9.0	17.1	5.3
1600F_b - 1.4E	23.2	9,700	10.7	17.9	5.3
1650F_b - 1.3E	23.9	9,000	11.4	18.1	5.3
1800F_b - 1.5E	26.1	10,300	14.6	18.7	5.3
2000F_b - 1.6E	29.0	11,000	14.6	19.5	5.3
2250F_b - 1.7E	32.6	11,700	19.6	20.5	5.3
2250F_b - 1.8E	32.6	12,400	19.6	20.5	6.5
2400F_b - 1.8E	34.7	12,400	21.6	21.1	6.5

Note: *Refer to CSA O86 for size factors and other design value adjustments for specific applications and species.*

856c. RELATIVE DENSITY

Relative density values are assigned based on the Grade "E" values of MSR lumber as follows:

Species Group	Grade "E" (MPa)	Assigned Relative Density (G)
D Fir-L (N)	All Grade "E" values	0.49
S-P-F	8,300 to 11,700	0.42
	12,400 to 13,100	0.47
	≥ 13,800	0.50
Hem-Fir (N)	All Grade "E" values	0.44
North Species	All Grade "E" values	0.35

Note: *Relative density values assigned to all MSR/MEL grades are shown above, unless otherwise qualified by tests and designated on the grade stamp as provided for in NLGA SPS 2.*

856d. LONGITUDINAL SHEAR

For all grades of MSR lumber, specified strengths in longitudinal shear (f_v) are assigned the values shown in Para. 851 for the appropriate species group.

857. SPECIFIED STRENGTHS AND MODULUS OF ELASTICITY FOR MACHINE EVALUATED LUMBER (MEL) (PARA. 128c) GRADES

MEL Grade	Bending (MPa)	Modulus of Elasticity (MPa)	Tension Parallel to Grain (MPa)	Compression	
				Parallel to Grain (MPa)	Perpen-dicular to Grain (MPa)
	f_b	E	f_t	f_c	f_{cp}
M-10	20.3	8,300	9.0	17.1	5.3
M-11	22.4	10,300	9.5	17.7	5.3
M-12	23.2	11,000	9.5	17.9	5.3
M-13	23.2	9,700	10.7	17.9	5.3
M-14	26.1	11,700	11.2	18.7	5.3
M-15	26.1	10,300	12.3	18.7	5.3
M-18	29.0	12,400	13.5	19.5	6.5
M-19	29.0	11,000	14.6	19.5	5.3
M-21	33.3	13,100	15.7	20.7	6.5
M-22	34.0	11,700	16.8	20.9	5.3
M-23	34.7	12,400	21.3	21.1	6.5
M-24	39.1	13,100	20.2	22.3	6.5
M-25	39.8	15,200	22.4	22.5	6.5
M-26	40.6	13,800	20.2	22.7	6.5

Note 1: *Refer to CSA O86 for size factors and other design value adjustments for specific applications and species.*

Note 2: *Grades of MEL may be produced with alternate design values as provided for in NLGA SPS 2.*

900. U.S. REFERENCE DESIGN VALUES – INTRODUCTION

Reference design values for structural lumber manufactured under the NLGA Grading Rules have been developed for use in the United States.

The reference design values included in these grade rules have been reviewed by the U.S. Forest Products Laboratory and approved by the American Lumber Standard Committee, Board of Review. Users should take care to ensure that they are using the latest published design values.

Reference design values are developed in conformance to the American Softwood Lumber Standard, PS 20 and relevant ASTM standards. Lumber physical properties are regularly monitored to ensure that assigned design values remain applicable for structural design.

Load and Resistance Factor Design Values

The design values tabulated in Paras. 902 to 909 are for use in the United States with Allowable Stress Design (**ASD**). An alternative design method known as Load and Resistance Factor Design (**LRFD**) is also used in the U.S. The design values for LRFD, called reference strength, can be computed by multiplying the ASD reference design values by the factors listed in the following table:

Conversion Factors for ASD to LRFD Values

Extreme Fiber in Bending	Tension Parallel to Grain	Horizontal Shear	Compression Perpendicular to Grain	Compression Parallel to Grain	Modulus of Elasticity
F_b	F_t	F_v	$F_{c\perp}$	F_c	E
2.54	2.70	2.88	2.08	2.40	1.00

901. U.S. REFERENCE DESIGN VALUES – BACKGROUND

901a. DESIGN VALUE ESTABLISHMENT AND APPLICATION

Reference design values and adjustment factors found in Paras. 901 to 909 apply to lumber of NLGA species and species groups (see Paras. 7 and 7a) for use in the United States.

The design values are calculated in accordance with the requirements of **ASTM D1990** "Standard Practice for Establishing Allowable Properties for Visually Graded Dimension Lumber from In-Grade Tests of Full Size Specimens" and, where applicable, **ASTM D2555** "Methods for Establishing Clear Wood Strength Values", and **ASTM D245** "Standard Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber" published by ASTM and in accordance with the requirements of **PS 20** "American Softwood Lumber Standard".

The reference design values shown herein are recommended for use in design for all normal construction. Higher and lower design values may be used to meet special structural requirements. The "National Design Specification (NDS) for Wood Construction" published by the American Wood Council (AWC), sets forth design methods for normal and most special structural uses.

Reference design values are assigned to six basic properties of wood. These are fiber stress in bending (F_b), tension parallel to grain (F_t), horizontal shear (F_v), compression parallel to grain (F_c), compression perpendicular to grain ($F_{c\perp}$), and modulus of elasticity (E).

Four of the above-mentioned lumber design properties relate directly to safety. These are F_b, F_t, F_c, and F_v.

For dimension lumber, four of the above-mentioned properties are derived from full size tests of commercially graded lumber ("In-grade" tests). These are F_b, F_t, F_c, and E. The other two properties, and all properties for timbers, are based on tests of clear wood for the various species or species groups.

Modifications are then made, in accordance with ASTM standards for moisture content, factors of safety and duration of load. For the clear wood case, values are further reduced to reflect the effects of grade characteristics (see ASTM D2555 and D245). During In-grade testing, species groups were sampled from production; or, in the case of Northern Species, as individual species, which were grouped together using the criteria of ASTM D1990. For timbers, the grouping procedures of ASTM D2555 were followed.

The modulus of elasticity (E) is an experimental constant or ratio of the amount a material will deflect in proportion to an applied load. It, along with the moment of inertia, may be used to predict how much a member will deflect. It is a measure of stiffness and not a strength property or working stress, so is not related to safety except when used in column design where the listed averages

shown herein are reduced more than three times in design formulas and computation.

The tabulated "**E**" values in this section are average values and individual pieces having values both above and below the listed average occur in all lumber grades.

For all normal construction, use of these average "**E**" values provides a conservative prediction of deflections which occur in wall, floor, and roof assemblies. Tests by government, university and private research organizations show that deflections occurring when loads are applied to members in load sharing systems are less than predicted for single members. In such applications, the effect of several members sharing the load, together with the stiffening effects of fastenings and coverings, more than offset the variations inherent between the individual pieces.

The reference "**E**" values for dimension lumber and decking shown in the tables of Paras. 902 to 906 and Para. 909 apply to dry use of lumber manufactured in either dry or unseasoned condition.

Reference "**E**" values for Beams & Stringers and Posts & Timbers shown in the tables of Paras. 907 and 908, respectively, apply to both wet and dry use of lumber manufactured in either dry or unseasoned condition.

For dimension lumber, values are based on In-grade testing and for timbers, values are derived from clear wood testing. The mean "**E**" values for various species based on the two test methods are comparable. As an example, Table 901h compares "**E**" values for the Select Structural grade.

In the NLGA Grading Rules, the various grades used for construction purposes are divided into size categories according to the principal end uses.

The reference design values for these major grade categories are tabulated in Paras. 902 to 909. The tables show reference design values for engineered use as single members and for normal duration of load in pounds per square inch. Adjustment of these values for other conditions of loading and the criteria for their use in the design of structures are outlined in the "National Design Specification (NDS) for Wood Construction", which is available from the American Wood Council (AWC).

Bending values, for all size/use categories except Decking and Scaffold Plank, apply to pieces loaded on the narrow face (edgewise use) such as joists, rafters, or beams. Adjustment factors for pieces loaded on the wide face (flatwise use) are tabulated in Para. 901d.

901b. ENGINEERING DESIGN VALUES

The reference design values are derived from data or calculations that include consideration of 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.

901c. REPETITIVE MEMBER DESIGN VALUES

In actual practice, only a few pieces will 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 and when these pieces are used together in a repetitive member system, a 15% increase factor is allowed for fiber stress in bending.

A repetitive member system is defined as three or more framing or supporting members, such as joists, studs, planks, or decking, which are adjacent or are spaced not more than 24 inches and are joined by floor, roof, or other load-distributing elements.

901d. FLATWISE USE OF LUMBER

Tabulated values are based on edgewise use for grades of Light Framing, Structural Light Framing, Studs, or Structural Joists & Planks, as well as for Machine Graded Lumber. When used flatwise rather than on edge, the reference fiber stress in bending (F_b) shall be multiplied by the factors in the following table:

F_b Adjustment Factors for Flatwise Use of Dimension Lumber

Nominal Width	Nominal Thickness	
	2" and 3"	4"
Less than 4"	1.00	1.00
4"	1.10	1.00
5"	1.10	1.05
6"	1.15	1.05
8"	1.15	1.05
10" & Wider	1.20	1.10

Bending design values for Decking (specified for flatwise use) are based on nominal 4" thickness. For thinner pieces, the following adjustments to F_b shall be applied:

All Widths	Nominal Thickness		
	2"	3"	4"
F_b Flat-use Factor	1.10	1.04	1.00

For Beams & Stringers, subjected to loads applied to the wide face (flatwise use), the following adjustment factors shall be used:

Beam & Stringer Grade	Adjustment Factors for Flatwise Use		
	Bending (F_b)	Modulus of Elasticity (E)	Other Properties
Sel. Str.	0.86	1.0	1.0
NO. 1	0.74	0.9	1.0
NO. 2	1.0	1.0	1.0

901e. EFFECT OF MOISTURE CONTENT ON DESIGN VALUES

The reference design values shown in the tables in Paras. 902 to 906, are applicable to lumber that will be used under dry conditions such as in most covered structures. The section properties of lumber for use in design should be based on the surfaced sizes shown in these rules.

For nominal 2" to 4" thick lumber, the dry surfaced size should be used. In calculating design values, the natural gain 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. The gain in load carrying capacity due to increased strength and stiffness resulting from drying offsets the design effect of size reductions due to shrinkage.

By adjusting design values to compensate for loss in size by shrinkage of unseasoned lumber, use of the surfaced sizes shown is possible and design is simplified.

Because of the built-in adjustments explained above, dry surfaced sizes should be used for design purposes in all instances. There are two situations where the tabulated design values should be adjusted:

a) MC Adjustment Factors for Nominal 2" to 4" Thick Lumber When Moisture Content Will Exceed 19% in Use

When nominal 2" to 4" thick dimension lumber or decking is designed for exposed uses where the moisture content will exceed 19% for an extended period of time, the reference design values shown in the tables in Paras. 902 to 906 shall be multiplied by the following adjustment factors:

Extreme Fiber in Bending	Tension Parallel to Grain	Compression Parallel to Grain	Horizontal Shear	Compression Perpendicular to Grain	Modulus of Elasticity
F_b	F_t	F_c	F_v	$F_{c\perp}$	E
0.85 *	1.0	0.8 *	0.97	0.67	0.9

* Where the size-adjusted bending value (F_b x size factor) does not exceed 1150 psi, or the size-adjusted compression parallel to grain value (F_c x size factor) does not exceed 750 psi, a factor of unity may be used.

b) MC Adjustment Factors for Nominal 5" & Thicker Lumber When Moisture Content Will Exceed 19% in Use

When lumber nominal 5" and thicker is designed for exposed uses where the moisture content will exceed 19% for an extended period of time, the design values shown in the tables in Paras. 907 and 908. shall be multiplied by the following adjustment factors:

Extreme Fiber in Bending	Tension Parallel to Grain	Compression Parallel to Grain	Horizontal Shear	Compression Perpendicular to Grain	Modulus of Elasticity
F_b	F_t	F_c	F_v	$F_{c\perp}$	E
1.00	1.00	0.91	1.00	0.67	1.00

901f. HORIZONTAL SHEAR DESIGN VALUES FOR LUMBER AND TIMBERS

Reference horizontal shear design values for lumber were revised and approved by the American Lumber Standard Committee, in accordance with changes to **ASTM D245** "Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber".

These new lumber shear design values are higher than earlier assigned values and are shown in the tables in Paras. 902 to 909.

Revisions have also been made to design equations for use with the new shear design values. These equations no longer include increase factors to account for splits or checks in the lumber, and the notching equations have been revised. For further information, see the American Wood Council website at **www.awc.org**

901g. ADJUSTMENT FACTORS FOR WIDTH

a) Tabulated reference design values for dimension lumber apply to the nominal 12" width for Structural Joists & Planks and Structural Light Framing. For all other sizes of these grades, use the following adjustment factors:

Nominal Width (Depth)	Bending (F_b)		Tension Parallel to Grain (F_t)	Compression Parallel to Grain (F_c)	All Other Properties
	Nominal < 4" thick	Nominal ≥ 4" thick			
≤ 4"	1.5	1.5	1.5	1.15	1.0
5"	1.4	1.4	1.4	1.1	1.0
6"	1.3	1.3	1.3	1.1	1.0
8"	1.2	1.3	1.2	1.05	1.0
10"	1.1	1.2	1.1	1.0	1.0
12"	1.0	1.1	1.0	1.0	1.0
≥ 14"	0.9	1.0	0.9	0.9	1.0

b) Tabulated design values for Light Framing grades (Construction, Standard, Utility) apply to nominal 4" and narrower lumber, except that values for Utility grade apply only to nominal 2" x 4" lumber.

c) Tabulated reference design values for Stud grade apply to nominal 5" and 6" widths. For nominal 4" and narrower Stud grade, use the factors listed below:

Nominal Width (Depth)	Bending (F_b)	Tension Parallel to Grain (F_t)	Compression Parallel to Grain (F_c)	All Other Properties
≤ 4"	1.1	1.1	1.05	1.0
5" - 6"	1.0	1.0	1.0	1.0

For Stud grade lumber wider than nominal 6", use the reference design values for the NO. 3 grade (Para. 902) and width adjustment factors as listed in Para 901g a) above.

901h. MODULUS OF ELASTICITY

The mean "**E**" values for various species based on the In-grade and clear wood test methods are comparable. As an example, the following table compares "**E**" values for the "Select Structural" grade.

See commentary in Para. 901a .

Select Structural Grade "E" Values *

Species Group	Clear Wood Basis Dry E Values (psi)	In-grade Basis Dry E Values (psi)
D Fir-L (N)	1,800,000	1,900,000
Hem-Fir (N)	1,500,000	1,600,000
S-P-F	1,500,000	1,500,000
North Species	1,100,000	1,100,000

***** The In-grade "**E**" values were derived from tests of full-size dimension lumber; the clear wood values were derived from tests of small clear specimens of dimension lumber.

902. REFERENCE DESIGN VALUES: STRUCTURAL LIGHT FRAMING AND JOISTS & PLANKS (Para. 124)

Values are based on a nominal 2" x 12" basis. For size adjustment factors, see Para. 901g a).

Species or Species Group	Grade	Extreme Fiber in Bending (psi)	Tension Parallel to Grain (psi)	Horizontal Shear (psi)	Compression		Modulus of Elasticity (million psi)		Specific Gravity
					Parallel to Grain (psi)	Perpendicular to Grain (psi)			
		F_b	F_t	F_v	F_c	$F_{c\perp}$	E	E_{min}	G
D Fir-L (N)	Select Str	1350	825	180	1900	625	1.9	0.69	0.49
	NO. 1 & Btr	1150	750		1800		1.8	0.66	
	NO. 1/NO. 2	850	500		1400		1.6	0.58	
	NO. 3	475	300		825		1.4	0.51	
Hem-Fir (N)	Select Str	1200	750	145	1650	405	1.6	0.58	0.44
	NO. 1/NO. 2	1000	500		1400		1.5	0.55	
	NO. 3	575	275		825		1.3	0.47	
S-P-F	Select Str	1250	700	135	1400	425	1.5	0.55	0.42
	NO. 1/NO. 2	875	450		1150		1.4	0.51	
	NO. 3	500	250		650		1.2	0.44	
North Species	Select Str	975	425	110	1100	350	1.1	0.40	0.35
	NO. 1/NO. 2	625	275		850		1.1	0.40	
	NO. 3	350	150		500		1.0	0.37	
Yellow Cedar (N)	Select Str	1200	725	175	1200	540	1.6	0.58	0.46
	NO. 1/NO. 2	800	475		1000		1.4	0.51	
	NO. 3	475	275		575		1.2	0.44	

902 (continued) REFERENCE DESIGN VALUES: STRUCTURAL LIGHT FRAMING AND JOISTS & PLANKS (Para. 124)

Species	Grade	Extreme Fiber in Bending (psi)	Tension Parallel to Grain (psi)	Horizontal Shear (psi)	Compression		Modulus of Elasticity (million psi)		Specific Gravity
					Parallel to Grain (psi)	Perpendicular to Grain (psi)			
		F_b	F_t	F_v	F_c	$F_{c\perp}$	E	E_{min}	G
C Sitka	Select Str	1300	950	125	1200	455	1.7	0.62	0.43
	NO. 1/NO. 2	925	550		1100		1.5	0.55	
	NO. 3	525	325		625		1.4	0.51	
Norway Spruce (N)	Select Str	950	600	190	1100	410	1.5	0.55	0.40
	NO. 1/NO. 2	650	425		900		1.3	0.47	
	NO. 3	375	250		525		1.2	0.44	

903. REFERENCE DESIGN VALUES: LIGHT FRAMING (Para. 122)

Values are based on a nominal 2" x 4" basis. For size adjustment factors, see Para. 901g b).

Species or Species Group	Grade	Extreme Fiber in Bending (psi)	Tension Parallel to Grain (psi)	Horizontal Shear (psi)	Compression		Modulus of Elasticity (million psi)		Specific Gravity
					Parallel to Grain (psi)	Perpendicular to Grain (psi)			
		F_b	F_t	F_v	F_c	$F_{c\perp}$	E	E_{min}	G
D Fir-L (N)	Const	950	575	180	1800	625	1.5	0.69	0.49
	Stand	525	325		1450		1.4	0.66	
	Utility	250	150		950		1.3	0.58	
Hem-Fir (N)	Const	1150	550	145	1700	405	1.4	0.51	0.44
	Stand	625	300		1450		1.3	0.47	
	Utility	300	150		950		1.2	0.44	
S-P-F	Const	1000	500	135	1400	425	1.3	0.47	0.42
	Stand	550	275		1150		1.2	0.44	
	Utility	275	125		750		1.1	0.40	
North Species	Const	700	325	110	1050	350	1.0	0.37	0.35
	Stand	400	175		875		0.9	0.33	
	Utility	175	75		575		0.9	0.33	
Yellow Cedar (N)	Const	925	550	175	1200	540	1.3	0.47	0.46
	Stand	525	300		1050		1.2	0.44	
	Utility	250	150		675		1.1	0.40	
Coast Sitka	Const	1050	650	125	1300	455	1.4	0.51	0.43
	Stand	600	350		1100		1.3	0.47	
	Utility	275	175		725		1.2	0.44	
Norway Spruce (N)	Const	725	475	190	1100	410	1.2	0.44	0.40
	Stand	400	275		925		1.1	0.40	
	Utility	200	125		600		1.1	0.40	

Note: *Values for the Utility grade apply only to nominal 2" x 4" lumber.*

904. REFERENCE DESIGN VALUES: STUDS (Para. 121)

Values based on a nominal 2" x 6" basis. For size adjustment factors, see Para. 901g c).

For Studs wider than nominal 6", use the property values for NO. 3 grade shown in Para. 902 and width adjustment factors as listed in Para. 901g a).

Species or Species Group	Grade	Extreme Fiber in Bending (psi)	Tension Parallel to Grain (psi)	Horizontal Shear (psi)	Compression		Modulus of Elasticity (million psi)		Specific Gravity
					Parallel to Grain (psi)	Perpendicular to Grain (psi)			
		F_b	F_t	F_v	F_c	$F_{c\perp}$	E	E_{min}	G
D Fir-L (N)	Stud	650	400	180	900	625	1.4	0.51	0.49
Hem-Fir (N)	Stud	775	375	145	900	405	1.3	0.47	0.44
S-P-F	Stud	675	350	135	725	425	1.2	0.44	0.42
North Species	Stud	475	225	110	550	350	1.0	0.37	0.35
Y Cedar (N)	Stud	625	375	175	650	540	1.2	0.44	0.46
C Sitka	Stud	725	450	125	675	455	1.4	0.51	0.43
N Spruce (N)	Stud	500	325	190	575	410	1.2	0.44	0.40

905. REFERENCE DESIGN VALUES: SELECT STRUCTURAL SCAFFOLD PLANK (Para. 180)

No width adjustment factors apply to these values.

Species or Species Group	Nominal 2" Maximum Thickness [1] Wet Service Condition [2]		Nominal 3" Maximum Thickness [3] Wet Service Condition [4]	
	Extreme Fiber in Bending (psi) Single Member	Modulus of Elasticity (million psi)	Extreme Fiber in Bending (psi) Single Member	Modulus of Elasticity (million psi)
	F_b	E	F_b	E
D Fir-L (N)	2050	2.0	1550	1.7
Hem-Fir (N)	1450	1.7	1100	1.5
S-P-F	1350	1.5	1000	1.3
Hem-Tam (N)	1700	1.4	1300	1.3
W Hem (N)	1800	1.8	1350	1.6
C Sitka	1400	1.7	1050	1.5
P Pine	1450	1.4	1100	1.2
WW Pine	1250	1.4	925	1.3
Red Pine	1250	1.3	950	1.1
EW Pine (N)	1300	1.4	975	1.3

[1] The standard dressed “DRY” sizes shall be used in all calculations for nominal 2" thick material.

[2] For “Wet” use conditions where the moisture content in service will exceed 19%, the values for nominal 2" thick planks shall be multiplied by the following adjustment factors:

Extreme fibre in bending (F_b)	0.86
Modulus of Elasticity (E)	0.97

[3] The actual manufactured sizes shall be used in all calculations for nominal 3" thick material.

[4] Values for nominal 3" thick material are not dependent on service conditions.

906. REFERENCE DESIGN VALUES: DECKING (Para. 127)

No width adjustment factors apply to the values in this table. Bending values are for given for single members.

Species or Species Group	Grade	Extreme Fiber in Bending (psi)	Compression Perpendicular to Grain (psi)	Modulus of Elasticity (million psi)
		F_b	$F_{c\perp}$	E
D Fir-L (N)	Select	1750	625	1.8
	Comm.	1450		1.7
Hem-Fir (N)	Select	1350	405	1.5
	Comm.	1100		1.4
Hem-Tam (N)	Select	1500	555	1.3
	Comm.	1250		1.1
S-P-F	Select	1200	425	1.5
	Comm.	1000		1.3
W Hem (N)	Select	1500	410	1.6
	Comm.	1300		1.4
C Sitka	Select	1250	455	1.7
	Comm.	1050		1.5
P Pine	Select	1200	535	1.3
	Comm.	1000		1.1
W Cedar (N)	Select	1200	425	1.1
	Comm.	1050		1.0
WW Pine	Select	1100	375	1.4
	Comm.	925		1.3
Red Pine	Select	1150	440	1.3
	Comm.	975		1.2
EW Pine (N)	Select	900	350	1.2
	Comm.	775		1.1
North Species	Select	900	350	1.1
	Comm.	775		1.0
Coast Species	Select	1250	370	1.5
	Comm.	1050		1.4

Note 1: *Values for fibre stress in bending (F_b) apply only when the plank is used flatwise, e.g., when loaded on the wide face.*

Note 2: *See Paras. 901a to 901f for conditions of use and adjustment factors.*

907. REFERENCE DESIGN VALUES: BEAMS & STRINGERS (Para. 130)

Species or Species Group	Grade	Single member	Tension Parallel to Grain (psi)	Horizontal Shear (psi)	Compression		Modulus of Elasticity (million psi)
		Extreme Fiber in Bending (psi)			Parallel to Grain (psi)	Perpendicular to Grain (psi)	
		F_b	F_t	F_v	F_c	$F_{c\perp}$	E
D Fir-L (N)	Sel. Str	1600	950	170	1100	625	1.6
	NO. 1 Str	1300	675		925		1.6
	NO. 2 Str	875	425		600		1.3
Hem-Fir (N)	Sel. Str	1250	725	135	900	405	1.3
	NO. 1 Str	1000	500		750		1.3
	NO. 2 Str	675	325		475		1.1
Hem-Tam (N)	Sel. Str	1450	850	165	950	555	1.3
	NO. 1 Str	1200	600		800		1.3
	NO. 2 Str	775	400		500		1.1
S-P-F	Sel. Str	1100	650	125	775	425	1.3
	NO. 1 Str	900	450		625		1.3
	NO. 2 Str	600	300		425		1.0
W Hem (N)	Sel. Str	1400	825	135	1000	410	1.4
	NO. 1 Str	1150	575		850		1.4
	NO. 2 Str	750	375		550		1.1
Coast Sitka	Sel. Str	1150	675	115	775	455	1.5
	NO. 1 Str	950	475		650		1.5
	NO. 2 Str	625	325		425		1.2
P Pine	Sel. Str	1100	725	130	750	535	1.1
	NO. 1 Str	925	500		625		1.1
	NO. 2 Str	600	300		400		0.9

907. (continued) REFERENCE DESIGN VALUES: BEAMS & STRINGERS (Para. 130)

Species or Species Group	Grade	Single member		Horizontal Shear (psi)	Compression		Modulus of Elasticity (million psi)
		Extreme Fiber in Bending (psi)	Tension Parallel to Grain (psi)		Parallel to Grain (psi)	Perpendicular to Grain (psi)	
		F_b	F_t	F_v	F_c	$F_{c\perp}$	E
Western Cedars (N)	Sel. Str	1150	675	130	850	425	1.0
	NO. 1 Str	925	475		700		1.0
	NO. 2 Str	625	300		450		0.8
WW Pine	Sel. Str	1050	600	120	775	375	1.3
	NO. 1 Str	850	425		625		1.3
	NO. 2 Str	550	275		400		1.0
R Pine	Sel. Str	1050	625	130	725	440	1.1
	NO. 1 Str	875	450		600		1.1
	NO. 2 Str	575	300		375		0.9

Note 1: *No design values are assigned for EW Pine (N), N. Aspen, Black Cottonwood, Northern Species, and Coast Species.*

Note 2: *Values for fibre stress in bending (F_b) apply only when the member is loaded on the narrow face (edgewise use).*

Note 3: *See Paras. 901a to 901f for conditions of use and adjustment factors.*

908. REFERENCE DESIGN VALUES: POSTS & TIMBERS (Para. 131)

Species or Species Group	Grade	Single member	Tension Parallel to Grain (psi)	Horizontal Shear (psi)	Compression		Modulus of Elasticity (million psi)
		Extreme Fiber in Bending (psi)			Parallel to Grain (psi)	Perpendicular to Grain (psi)	
		F_b	F_t	F_v	F_c	$F_{c\perp}$	E
D Fir-L (N)	Sel. Str	1500	1000	170	1150	625	1.6
	NO. 1 Str	1200	825		1000		1.6
	NO. 2 Str	725	475		700		1.3
Hem-Fir (N)	Sel. Str	1150	775	135	950	405	1.3
	NO. 1 Str	925	625		850		1.3
	NO. 2 Str	550	375		575		1.1
Hem-Tam (N)	Sel. Str	1350	900	165	1000	555	1.3
	NO. 1 Str	1100	725		875		1.3
	NO. 2 Str	650	425		600		1.1
S-P-F	Sel. Str	1050	700	125	800	425	1.3
	NO. 1 Str	850	550		700		1.3
	NO. 2 Str	500	325		500		1.0
W Hem (N)	Sel. Str	1300	875	135	1100	410	1.4
	NO. 1 Str	1050	700		950		1.4
	NO. 2 Str	650	425		650		1.1
Coast Sitka	Sel. Str	1100	725	115	825	455	1.5
	NO. 1 Str	875	575		725		1.5
	NO. 2 Str	525	350		500		1.2
P Pine	Sel. Str	1000	675	130	800	535	1.1
	NO. 1 Str	825	550		700		1.1
	NO. 2 Str	475	325		325		0.9

908. (continued) REFERENCE DESIGN VALUES: POSTS & TIMBERS (Para. 131)

Species or Species Group	Grade	Single member		Horizontal Shear (psi)	Compression		Modulus of Elasticity (million psi)
		Extreme Fiber in Bending (psi)	Tension Parallel to Grain (psi)		Parallel to Grain (psi)	Perpendicular to Grain (psi)	
		F_b	F_t	F_v	F_c	$F_{c\perp}$	E
Western Cedars (N)	Sel. Str	1050	700	130	900	425	1.0
	NO. 1 Str	875	575		800		1.0
	NO. 2 Str	500	350		550		0.8
WW Pine	Sel. Str	975	650	120	800	375	1.3
	NO. 1 Str	775	525		700		1.3
	NO. 2 Str	450	300		500		1.0
R Pine	Sel. Str	1000	675	130	775	440	1.1
	NO. 1 Str	800	550		675		1.1
	NO. 2 Str	475	325		475		0.9

Note 1: *No design values are assigned for EW Pine (N), N. Aspen, Black Cottonwood, Northern Species, and Coast Species.*

Note 2: *If Post & Timber sizes are graded to Beams & Stringers requirements, reference design values for Beams & Stringers apply.*

Note 3: *See Paras. 901a to 901f for conditions of use and adjustment factors.*

909. REFERENCE DESIGN VALUES FOR MACHINE GRADED LUMBER

909a. SPECIFIC GRAVITY

Assigned specific gravity values vary depending on the Grade "**E**" values of machine graded lumber as follows:

Species Group	Grade "E" (million psi)	Assigned Specific Gravity (G)
D Fir-L (N)	1.2 to 1.9	0.49
	2.0 to 2.2	0.53
	≥ 2.3	0.57
S-P-F	1.2 to 1.7	0.42
	1.8 to 1.9	0.46
	≥ 2.0	0.50
Hem-Fir (N)	all Grade "E" values	0.44
North Species	all Grade "E" values	0.35

Note: *Specific gravity values assigned to all MSR/MEL grades are shown above, unless otherwise qualified by tests and designated on the grade stamp.*

909b. HORIZONTAL SHEAR

Assigned horizontal shear (F_v) values vary depending on the Grade "**E**" values of machine graded lumber as follows:

Species Group	Grade "E" (million psi)	F_v value (psi)
D Fir-L (N)	1.2 to 2.2	180
	≥ 2.3	190
S-P-F	1.2 to 1.7	135
	1.8 to 1.9	160
	≥ 2.0	170
Hem-Fir (N)	all Grade "E" values	145
North Species	all Grade "E" values	110

When a grade is qualified by test and daily quality controlled for specific gravity and the specific gravity value is designated on the grade stamp, the horizontal shear value (in psi) may be calculated from the following formula (as per ASTM D6570, Appendix X1.1.3):

$$F_v = (284.8 \times \text{Specific gravity (G) value}) + 26.6$$

Note: *Calculated values to be rounded to the nearest 5 psi.*

909c. COMPRESSION PERPENDICULAR TO GRAIN

Assigned compression perpendicular to grain ($F_{c\perp}$) values vary depending on the Grade "**E**" values of machine graded lumber as follows:

Species Group	Grade "E" (million psi)	$F_{c\perp}$ value (psi)
D Fir-L (N)	1.2 to 1.9	625
	≥ 2.0	715
S-P-F	1.2 to 1.7	425
	1.8 to 1.9	525
	≥ 2.0	615
Hem-Fir (N)	all Grade "E" values	405
North Species	all Grade "E" values	350

When a grade is qualified by test and daily quality controlled for specific gravity and the specific gravity value is designated on the grade stamp, the allowable compression perpendicular to grain value (in psi) may be calculated from the following formula (as per ASTM D6570, Appendix X1.2.1.2):

$$F_{c\perp} = (2243.8 \times \text{Specific gravity (G) value}) - 473.8$$

Compression perpendicular to grain values are based on a 0.04 inch deformation limit and are standard design for most structures. Compression perpendicular to grain values (in psi) at 0.02 inch deformation can be calculated from the "0.04" $F_{c\perp}$ value with the following formula (as per ASTM D6570, Appendix X1.3.1):

$$F_{c\perp\ .02} = (0.71 \times F_{c\perp\ .04}) + 15$$

Note: *Calculated values to be rounded to the nearest 5 psi.*

909d. REFERENCE DESIGN VALUES: MACHINE STRESS-RATED (MSR) LUMBER (Para. 128b)

MSR Grade	Bending at Extreme Fiber (psi)	Modulus of Elasticity (psi)	Tension Parallel to Grain (psi)	Compression Parallel to Grain (psi)
	F_b	E	F_t	F_c
1200F_b - 1.2E	1200	1,200,000	600	1400
1350F_b - 1.3E	1350	1,300,000	750	1600
1450F_b - 1.3E	1450	1,300,000	800	1625
1500F_b - 1.4E	1500	1,400,000	900	1650
1650F_b - 1.5E	1650	1,500,000	1020	1700
1800F_b - 1.6E	1800	1,600,000	1175	1750
1950F_b - 1.7E	1950	1,700,000	1375	1800
2100F_b - 1.8E	2100	1,800,000	1575	1875
2250F_b - 1.9E	2250	1,900,000	1750	1925
2400F_b - 2.0E	2400	2,000,000	1925	1975
2550F_b - 2.1E	2550	2,100,000	2050	2025
2700F_b - 2.2E	2700	2,200,000	2150	2100
2850F_b - 2.3E	2850	2,300,000	2300	2150
3000F_b - 2.4E	3000	2,400,000	2400	2200

The grade MOE is assigned in increments of 100,000 psi.

Note 1: *Grades of MSR may be produced with alternate design stress assignments as provided for in NLGA SPS 2.*

Note 2: *Values for fiber stress in bending (**F_b**) apply only when the member is loaded on the narrow face (edgewise use). See Para. 901d for adjustment factors to **F_b** when the member is loaded on the wide face (flatwise use).*

The following grades provide a modulus of elasticity with higher corresponding strengths. For these MSR grades, qualification and daily quality control for tensile strength (F_t) are required as specified in NLGA SPS 2.

MSR Grade	Bending at Extreme Fiber (psi)	Modulus of Elasticity (psi)	Tension Parallel to Grain (psi)	Compression Parallel to Grain (psi)
	F_b	E	F_t	F_c
1400F_b - 1.2E	1400	1,200,000	800	1600
1600F_b - 1.4E	1600	1,400,000	950	1675
1650F_b - 1.3E	1650	1,300,000	1020	1700
1800F_b - 1.5E	1800	1,500,000	1300	1750
2000F_b - 1.6E	2000	1,600,000	1300	1825
2250F_b - 1.7E	2250	1,700,000	1750	1925
2250F_b - 1.8E	2250	1,800,000	1750	1925
2400F_b - 1.8E	2400	1,800,000	1925	1975

909e. REFERENCE DESIGN VALUES: MACHINE EVALUATED LUMBER (MEL) (Para. 128c)

MEL Grade	Bending at Extreme Fibre (psi)	Modulus of Elasticity (psi)	Tension Parallel to Grain (psi)	Compression Parallel to Grain (psi)
	F_b	E	F_t	F_c
M-10	1400	1,200,000	800	1600
M-11	1550	1,500,000	850	1675
M-12	1600	1,600,000	850	1675
M-13	1600	1,400,000	950	1675
M-14	1800	1,700,000	1000	1750
M-15	1800	1,500,000	1100	1750
M-18	2000	1,800,000	1200	1825
M-19	2000	1,600,000	1300	1825
M-21	2300	1,900,000	1400	1950
M-22	2350	1,700,000	1500	1950
M-23	2400	1,800,000	1900	1975
M-24	2700	1,900,000	1800	2100
M-25	2750	2,200,000	2000	2100
M-26	2800	2,000,000	1800	2150

MEL allowable stresses are assigned in the following increments:

Mechanical Property	Increment (psi)
Modulus of Elasticity (**E**)	100,000
Fibre Stress in Bending (F_b)	50
Tension Parallel to Grain (F_t)	50
Compression Parallel to Grain (F_c)	25
Compression Perpendicular to Grain ($F_{c\perp}$)	5

Note: *Grades of MEL may be produced with alternate design value assignments as provided for in NLGA SPS 2.*

NOTES

AD	air-dried
ADF	after deducting freight
ALS	American Lumber Standard (as per PS 20)
ALSC	American Lumber Standard Committee, Incorporated
APP or **App**	Appearance grade
AST	at ship tackle
ASTM	American Society of Testing and Materials
Av or **Avg**	average
B&Btr	B and better grade
B&S	beams and stringers
BD	board
Bd Ft (**bf**)	board foot (feet)
Bdl	bundle
Bev	bevelled
BH	boxed heart
B/L	bill of lading
BM	board measure
BN	bull-nosed
BSND	bright sapwood no defect
Btr	better
CB	centre beaded
CB1S	centre bead, one side
CB2S	centre bead, two sides
CERT FGR JNT	certified finger joint
CF	cost and freight
CIF	cost, insurance, and freight
CIFE	cost, insurance, freight, and exchange
C/L	carload
Clg	ceiling
Clr	clear
CLS	Canadian Lumber Standard (as per CSA 0141)
CLSAB	Canadian Lumber Standards Accreditation Board
CM	centre matched
cm	centimetre
Cmrl	commercial
Com	Common grade
Constr	Construction grade
CS	caulking seam
CSA	Canadian Standards Association
Csg	casing
Cu Ft	cubic foot (feet)
CV	centre vee
CV1S	centre vee, one side
CV2S	centre vee, two sides

DET	double end-trimmed
Dim	dimension
Dkg	decking
D/S (**D/sdg**)	drop siding
D&M	dressed and matched
D&CM	dressed and centre matched
D2S&CM	dressed two sides and centre matched
D2S&SM	dressed two sides and standard matched
E	edged
E (**MOE**)	modulus of elasticity
EB1S	edge bead, one side
EB2S	edge bead, two sides
E&CB2S (**DB2S**)	Edge and centre bead, two sides
E&CV1S (**DV1S** or **V&CV1S**)	Edge and centre vee, one side
E&CV2S (**DV2S** or **V&CV2S**)	Edge and centre vee, two sides
ECON	Economy grade
EE	eased edges
EG	edge (vertical) grain
E/L	even (numbered) lengths
EM	end matched
EV1S	edge vee, one side
EV2S	edge vee, two sides
Fac	factory
FAS	free alongside (named vessel)
FBM or **fbm**	foot board measure
F_b	extreme fibre (CA), or extreme fiber (US), in bending
F_{cp} or $F_{c\perp}$	compression perpendicular to grain
F_c	compression parallel to grain
FG (**SG**)	flat (slash) grain
FJ	fingerjoined
FLB	full-length bundling
Flg	flooring
FOB	free on board (at a named location)
FOHC	free of heart centre
FOK	free of knots
Frm	framing
Frt	freight
FSM	foot surface measure
ft	foot or feet
F_t	tension parallel to grain
F_v	horizontal shear
G	grain
GRN	green
GM	grade mark
G/S	grade stamp

HB	hollow back
H & M	hit and miss
H or M	hit or miss
HRA	heat resistant adhesive
Hrt	heart
HT	heat-treated
in (**In** or **IN**)	inch or inches
J&P	joists and planks
Jnt	joint or joined
KD	kiln-dried
LAM (**Lam**)	lamination
Lbr	lumber
LCL	less than carload
Lgr	longer
Lgth	length
Lin	lineal or linear
Lng	lining
LSE	long-span flat-wise modulus of elasticity
M	thousand
m	metre
mm	millimetre
MBM	thousand (foot) board measure
MC	moisture content
MEL	machine-evaluated lumber
Merch	merchantable
MG	mixed grain
MGL	machine graded lumber
Mldg	moulding
MM	million
MOE (**E**)	modulus of elasticity
MOR	modulus of rupture
MSR	machine stress-rated
NB	nested bundling
NBM	net board measure
NFF	not firmly fixed (knot)
NO.	number
N1E	nosed one side
N2E	nosed two sides
Og	ogee
Ord	order

Para. (**Par.**)	paragraph (in relation to the NLGA grading rules)
Part	partition
Pat	pattern
P&T	posts and timbers
Pc	piece
Pcs	pieces
PE	plain end
PET	precision end-trimmed
PO	purchase order
QUAL (**qual**)	Quality grade
R	radius edge
Rdm	random
Reg	regular or regulation
Res (**R/S**)	resawn or resawed
REL	random even (numbered) lengths
Rfg	roofing
Rgh	rough
R/L	random lengths
RSS	rough and/or surfaced to rough size
R/W	random widths
R/W&L	random widths and lengths
S-DRY	surfaced dry
S-GRN	surfaced green
SB1S	single bead, one side
Sdg	siding
SEL (**Sel**)	select
Sel Merch	Select merchantable grade
Sel Patio	Select patio grade
Sel Str	Select structural grade
SG	specific gravity
S.G. (**F.G.**)	slash (flat) grain
S/L	ship lap
SL&C	shipper's load and count
SM	surface measure
Specs	specifications
SPS	Special Products Standard
Sq	square
SRB	stress-rated board
Stand (**Std**)	Standard grade
StdM	standard matched
STK	sound and tight-knotted
Stk	stock
Stp (**Stpg**)	stepping
Str (**Struct**)	structural
S&E	side and edge

S&T	sound and tight (knot)
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 centre matched
S2S&CM	surfaced two sides and centre matched
S4S&CS	surfaced four sides and caulking seam
S2S&SM	surfaced two sides and standard matched
S1S1E	surfaced one side, one edge
S1S2E	surfaced one side, two edges
S2S1E	surfaced two sides, one edge
SZD	sized
Tbrs	timbers
T&G	tongue and groove, tongued and grooved
Uns	unsound (knot)
Util	Utility grade
Vert	vertical
V.G.	vertical grain
VQL	visual quality level
Wdr	wider
Wdth	width
WS	window stock
Wt	weight

Symbols:

"	inch or inches
'	foot or feet
x	by, as in 4x4
4/4, 5/4, etc.	thickness expressed in fractions of an inch

NOTES

The NLGA Grading Rules express measurements in inch-pound (imperial) units. The equivalent SI (metric) units, where stated, are provided for information only. In case of a dispute and/or discrepancy, the values stated in imperial units shall take precedence.

IMPERIAL TO METRIC

To convert:	Multiply by:
Inches to millimetres	25.4
Inches to metres	0.0254
Feet to millimetres	304.8
Feet to metres	0.3048
Square feet to square metres	0.0929
Cubic feet to cubic metres	0.0283
Pounds to kilograms	0.45359
Pound per cubic foot to kilograms per cubic metre	16.019

METRIC TO IMPERIAL

To convert:	Multiply by:
Millimetres to inches	0.03937
Millimetres to feet	0.00328
Metres to inches	39.37
Metres to feet	3.281
Square metres to square feet	10.764
Cubic metres to cubic feet	35.3147
Kilograms to pounds	2.20462
Kilograms per cubic metre to pounds per cubic foot	0.0624

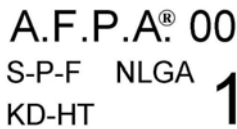
QUICK REFERENCE CONVERSION TABLE

Inches	Millimetres	Inches	Millimetres	Inches	Millimetres
1/32	0.8	19/32	15.1	6	152.4
1/16	1.6	5/8	15.9	7	177.8
3/32	2.4	21/32	16.7	8	203.2
1/8	3.2	11/16	17.5	9	228.6
5/32	4.0	23/32	18.3	10	254.0
3/16	4.8	3/4	19.1	11	279.4
7/32	5.6	25/32	19.8	12	304.8
1/4	6.4	13/16	20.6	13	330.2
9/32	7.1	27/32	21.4	14	355.6
5/16	7.9	7/8	22.2	15	381.0
11/32	8.7	29/32	23.0	16	406.4
3/8	9.5	15/16	23.8	17	431.8
13/32	10.3	31/32	24.6	18	457.2
7/16	11.1	1	25.4	19	842.6
15/32	11.9	2	50.8	20	508.0
1/2	12.7	3	76.2	21	533.4
17/32	13.5	4	101.6	22	558.8
9/16	14.3	5	127.0	23	584.2
				24	609.6

The following listing provides the contact information and grade stamp facsimiles of the NLGA member Grading Agencies that are accredited by the CLSAB and ALSC Board of Review.

Alberta Forest Products Association

Suite 1300, 10707 - 100 Ave
Edmonton, AB T5J 3M1
Tel: (780) 452-2841
Website: www.albertaforestproducts.ca
E-mail: info@albertaforestproducts.ca



Canadian Softwood Inspection Agency, Inc. and Macdonald Inspection Services (a division of CSI)

902 County Road – 50 East
Harrow, ON N0R 1G0
Tel: (855) 714-2090
Website: www.canadiansoftwood.com
E-mail: info@canadiansoftwood.com

or

Canadian Mill Services Association

Suite 280, 500 - 6th Ave
New Westminster, BC V3L 1V3

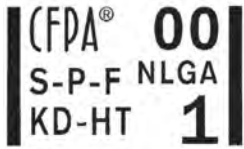
Tel: (604) 523-1288
Website: www.canserve.org
E-mail: info@canserve.org

or

or

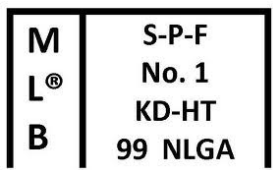
Central Forest Products Association Inc.

1200 Cook Dr
Prince Albert, SK S6V 2R8
Tel: (306) 960-5914
E-mail: cfpainspections@sasktel.net



Maritime Lumber Bureau

P.O. Box 459
Amherst, NS B4H 4A1
Tel: (902) 667-3889
Website: www.mlb.ca
E-mail: info@mlb.ca

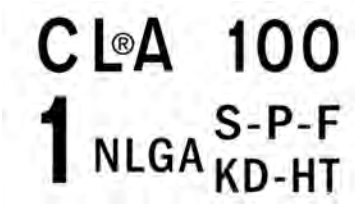


Newfoundland & Labrador Lumber Producers Association

P.O. Box 8
Glovertown, NL A0G 2L0
Tel: (709) 533-2206
E-mail: nllpa@personainternet.com

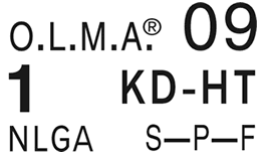
Ontario Forest Industries Association (Home of CLA Grading and Inspection)

Suite 1704 - 8 King Street East
Toronto, ON M5C 1B5
Tel: (416) 368-6188
Website: www.ofia.com
E-mail: info@ofia.com



Ontario Lumber Manufacturers Agency

244 Viau Road
Noelville, ON P0M 2N0
Tel: (705) 898-1036
Website: www.olma.ca
E-mail: info@olma.ca



Pacific Lumber Inspection Bureau

U.S. Office:
Suite 210, 1010 S. 336th St
Federal Way, WA 98003

Tel: (253) 835-3344

Canada Office:
P.O. Box 19118
Vancouver, BC
V6K 4R8

Tel: (604) 732-1782

Website: www.plib.org
E-mail: info@plib.org

Quebec Forest Industry Council
Conseil de l'industrie forestière du Québec

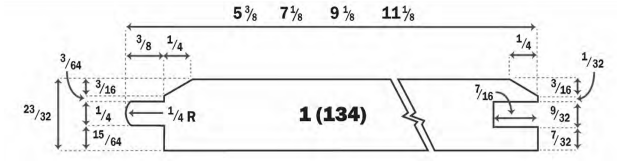
bureau 200, 1175 avenue Lavigerie
Quebec, QC G1V 4P1
Tel: (418) 657-7916
Website: www.cifq.com
E-mail: info@cifq.qc.ca

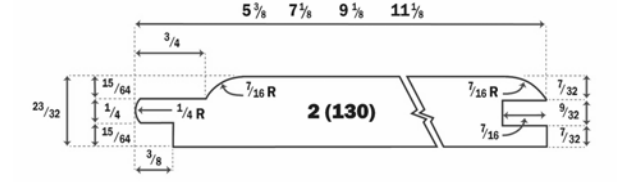
The following configurations illustrate matched, shiplapped, and moulded patterns most commonly produced by Canadian manufacturers of worked lumber. These NLGA patterns are identified numerically and classified under intended use categories, i.e., panelling, ceiling, siding, flooring, and decking.

The number in parenthesis refers to a pattern designation taken from the originating grading Agency's moulding catalog. The letters "**CLA**" refer to the "**Canadian Lumbermen's Association**" (now administered by the Ontario Forest Industries Association) and the letters "**WP**" refer to the "**Western Wood Products Association**".

Dimensions of patterns illustrated may vary according to manufacturer. When specifying, close attention must be given to the sizes stated.

PANELLING





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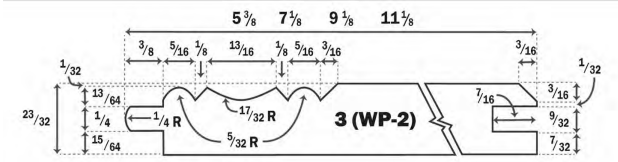

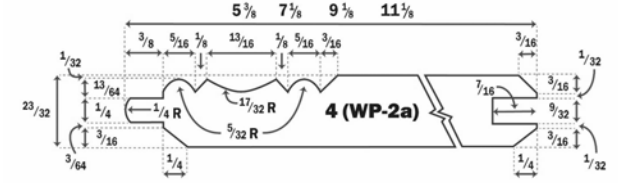

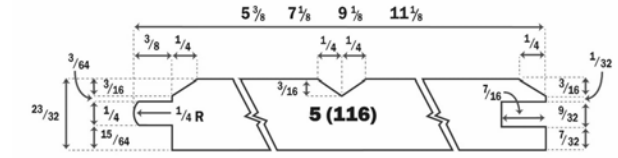

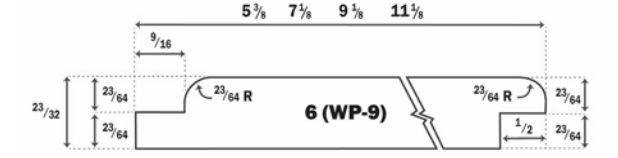

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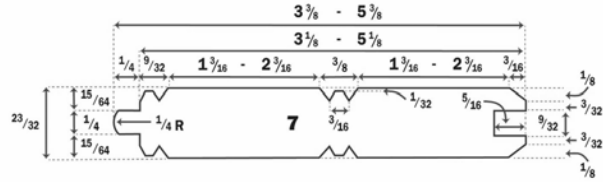

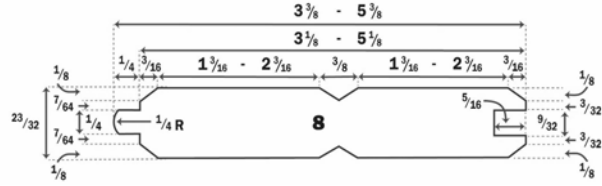

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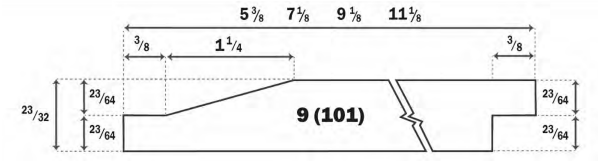

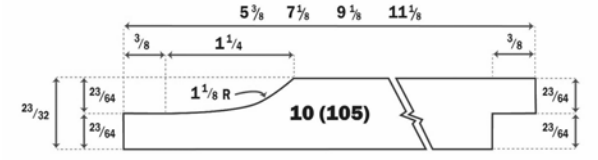

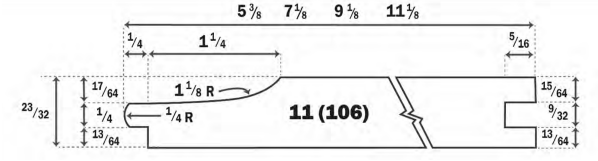

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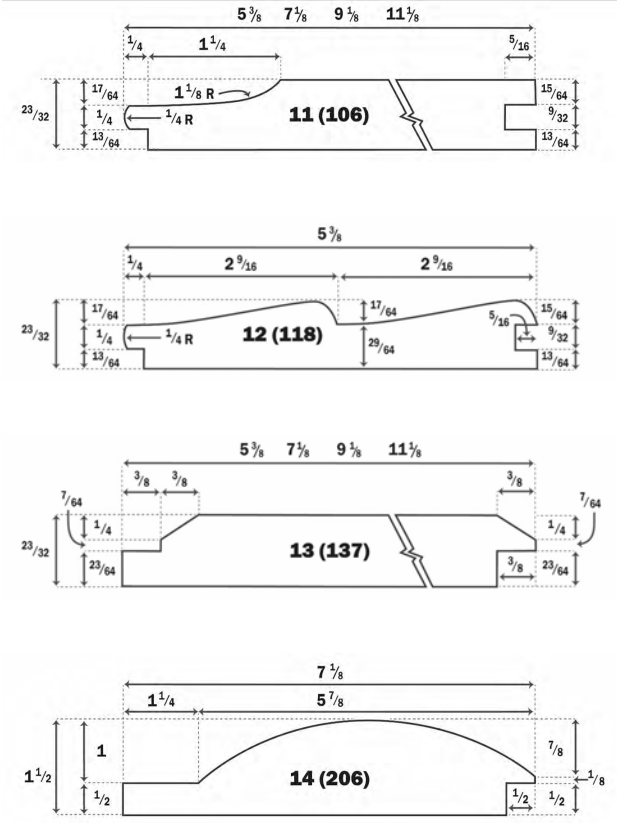

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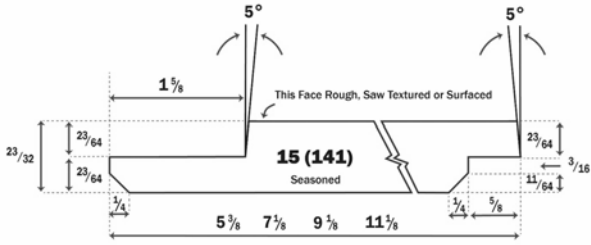

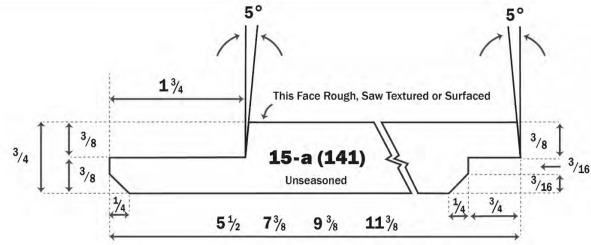

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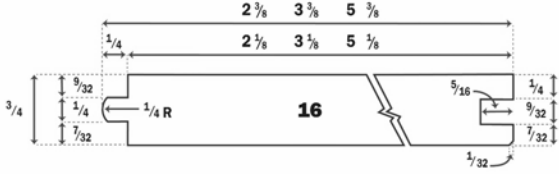

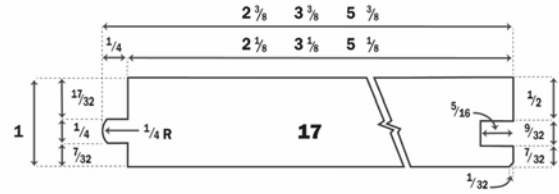

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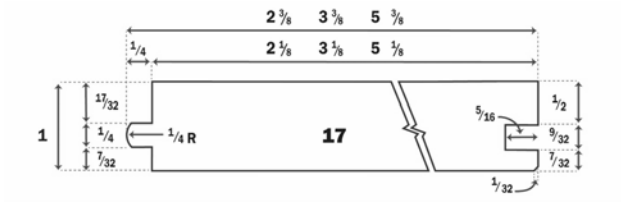

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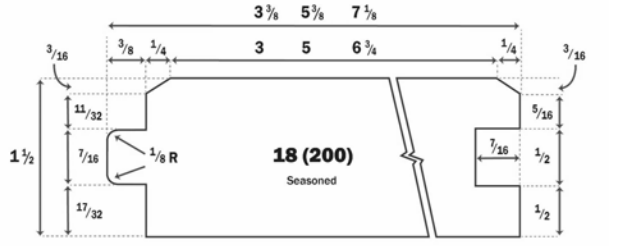

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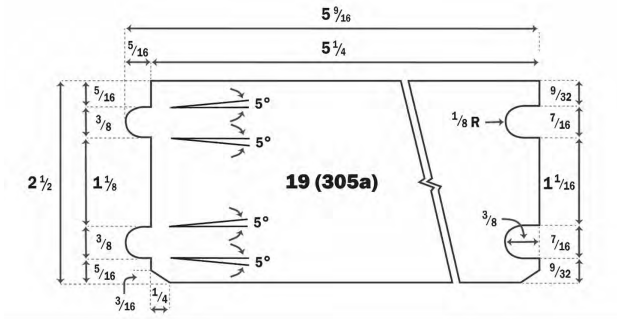

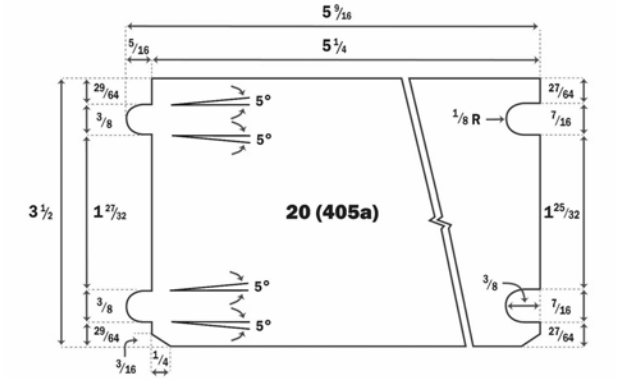

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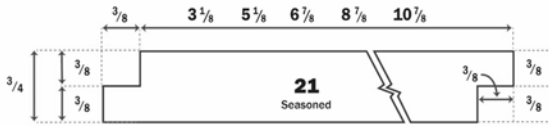

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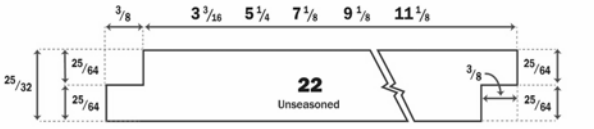
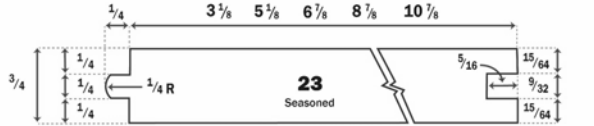
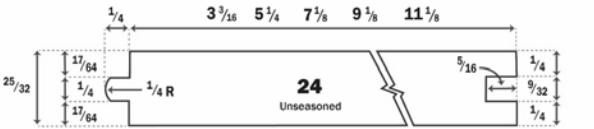
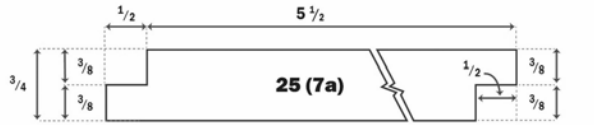


CENTREMATCH





"CLA" PATTERNS



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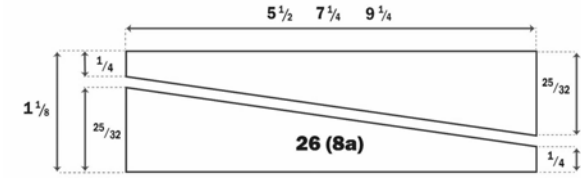

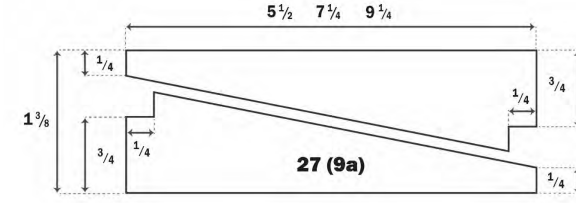

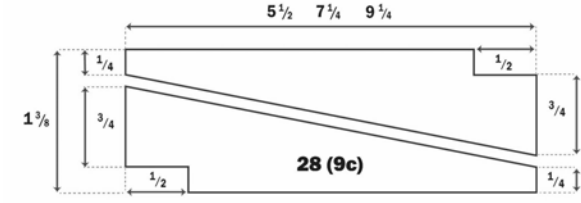

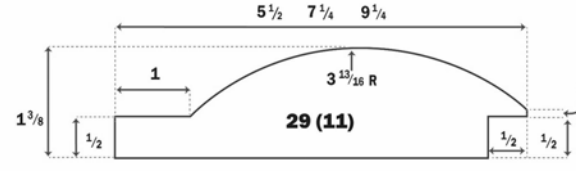

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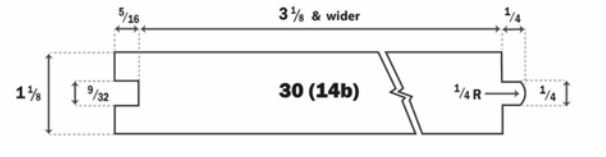
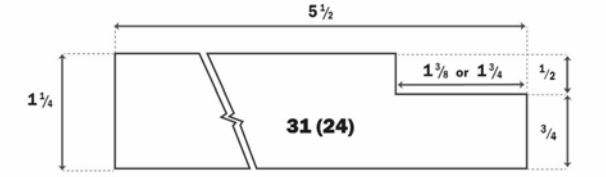
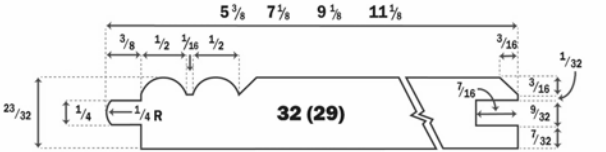
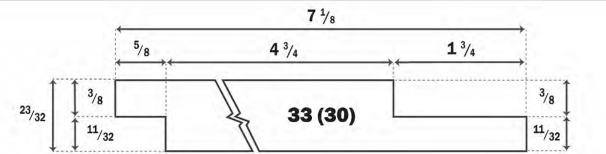








NLGA STANDARD GRADING RULES FOR CANADIAN LUMBER

September 1, 2025

This version of the NLGA Standard Grading Rules for Canadian Lumber consists of 334 pages.

This version is subject to periodic review and may be amended from time to time.

To identify or obtain the most current version of the NLGA Standard Grading Rules for Canadian Lumber, visit the publication section of the NLGA website at **www.nlga.org**

NOTES

INTERPRETATIONS

and

EUROPEAN UNION LUMBER EXPORT: VISUAL GRADE REQUIREMENTS ANNEX

Effective September 1, 2025

This version supersedes all prior editions, revisions, and supplements.

PART 1: INTERPRETATIONS OF THE NATIONAL GRADING RULE FOR DIMENSION LUMBER

The National Grading Rule (NGR) Interpretations apply to dimension lumber produced in Canada and the U.S. and are intended to provide additional guidance in the application of the rules for grading of these products.

PART 2: NLGA INTERPRETATIONS

The NLGA Interpretations provide additional clarification on the application of the NLGA Grading Rules to lumber products other than dimension lumber covered by the NGR.

PART 3: EUROPEAN UNION LUMBER EXPORT - VISUAL GRADE REQUIREMENTS ANNEX

For export of NLGA graded structural lumber to the European Union, dimension lumber must be graded to the applicable Paras. 120, 121, 122, and 124, and the additional requirements covered in this section.

PART 1: INTERPRETATIONS OF THE NATIONAL GRADING RULE FOR DIMENSION LUMBER

PART 2: NLGA INTERPRETATIONS

PART 3: EUROPEAN UNION LUMBER EXPORT: VISUAL GRADE REQUIREMENTS ANNEX

PART 1: INTERPRETATIONS OF THE NGR FOR DIMENSION LUMBER

1.0 GENERAL

The limiting provisions of the National Grading Rule (NGR) delineate the characteristics permitted. However, because lumber is manufactured from trees which have developed naturally and responsively to their environment and every piece is different it is not possible to anticipate in a grade description all of the possible combinations or types of characteristics which a grader will encounter.

These NGR Interpretations provide additional information to the grader/inspector in the application of the NGR. These interpretations have been approved by the NGR Committee and shall be considered a mandatory part of the NGR.

All measurements are based on actual size unless otherwise specified, except that splits and warp are based on nominal.

The limitations on knot sizes and other characteristics governing strength shall not be exceeded.

1.1 BARK AND PITCH POCKETS

Bark or pitch pockets are not restricted as to number.

1.2 BEVEL SAWING

Limited on the basis of equivalent loss of wood from wane.

1.3 BREAKS - TIMBER BREAKS AND COMPRESSION FAILURES

Separations resulting from seasoning which occur in allowable bands of compression wood shall not be evaluated as timber breaks or compression failures.

Compression failures and timber breaks are permitted only in the grades of Standard, NO. 3, Utility and Stud. They are limited to the size of the allowable knot hole and measured on the worst face.

1.4 CELL COLLAPSE

Cell collapse shall be evaluated as either wane or skip.

1.5 CHECKS

Seasoning checks extending from wide faces completely through the narrow face are limited as planer tears.

1.6 CHIP AND SAW CHANNELS (RABBETED EDGE)

Is limited on a basis of wane except in those instances in which the depth or width of the cut exceeds the full length wane provisions, the limitation shall be on a basis of equivalent loss of wood from maximum natural wane.

1.7 COMPRESSION WOOD

Compression wood shall be limited in effect to other appearance or strength reducing characteristics permitted in the grade.

1.8 HOLES

1.8.1 INSECT HOLES

Pin holes, grub holes and teredo holes are handled on an "equivalent smaller" basis. Equivalent smaller shall mean that the area occupied by all pin, grub and teredo holes shall be added together and treated as the maximum size hole permitted. For example, twelve 1/4" holes shall be accepted as equivalent to a single 1" hole. The poorest face shall govern.

1.8.2 MANUFACTURED HOLES

The area of a manufactured hole shall not exceed the equivalent area of the knot hole permitted and is limited to one manufactured hole in lengths of 12' or less of length, or two in lengths longer than 12', provided that they don't occur in the same cross-section. The following length restrictions shall apply:

SELECT STRUCTURAL:	equal in length to diameter of hole permitted.
NO. 1 and CONSTRUCTION:	equal in length to 1-1/2 times diameter of hole permitted.
NO. 2 and STANDARD:	equal in length to width of piece.
NO. 3, UTILITY, and STUD:	equal in length to 1-1/2 times width of piece.

Manufactured holes are defects caused by the manufacturing process that are not specifically listed in the grading rule (e.g., dog holes, log turner marks, debarker damage, etc.).

The length of manufactured holes shall be the entire length of the defect encountered and limited to the frequency and length restrictions as listed.

Manufactured holes that have no more effect on the grade of the piece than wane shall be assessed and limited as wane but not a combination of the wane and manufactured hole limitations. The listed limitations for manufactured holes shall not be used to exceed the maximum wane limitations of the grade.

1.9 KNOTS

1.9.1 KNOT MEASUREMENT

Knots appearing on wide faces are measured between lines enclosing the knot drawn parallel to the edge (**Figure 1**). Knot size is equal to the average of the two wide face measurements (**Figure 2**).

FIGURE 1

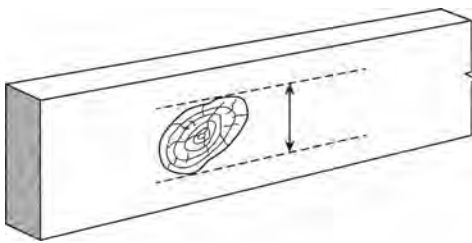
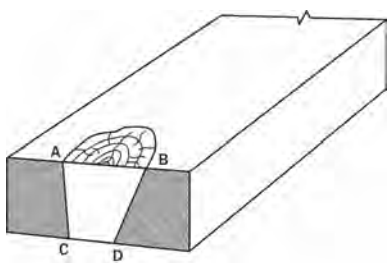


FIGURE 2



Knot size = (Length **AB** + Length **CD**) / 2

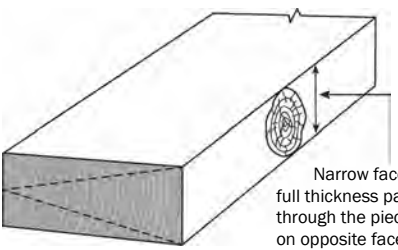
Except as otherwise provided in these interpretations for knots on narrow faces, the cross sectional area displacement shall not exceed that of the maximum knot allowed at the edge of the wide face (see chart below for allowable displacement percentages).

Allowable Displacement of Narrow Face Knots (in percentage)

Nominal Width	Light Framing - Grades			Stud - Grade	Structural Light Framing - Grades				Structural Joists & Planks - Grades			
	Const	Stand	Utility		Sel Str	NO. 1	NO. 2	NO. 3	Sel Str	NO. 1	NO. 2	NO. 3
2"	50	67	83	50	25	33	42	50				
3"	50	60	80	50	20	30	35	50				
4"	43	57	71	50	21	29	36	50				
5"				50					22	28	36	50
6"				50					20	27	34	50
8"				48					21	28	34	48
10"				49					20	27	35	49
12"				49					20	27	33	49
14"				45					18	24	31	45

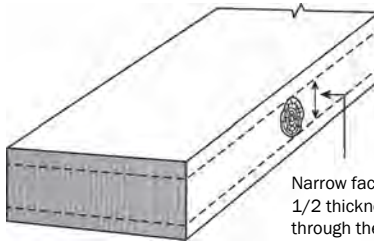
Figures 3a and **3b** illustrate examples of narrow face knots with 50% displacement.

FIGURE 3a



Narrow face knot considered at 50% displacement

FIGURE 3b

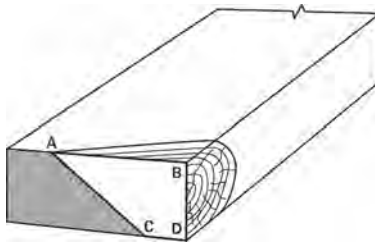


Narrow face knot considered at 50% displacement

1.9.2 SPIKE KNOTS

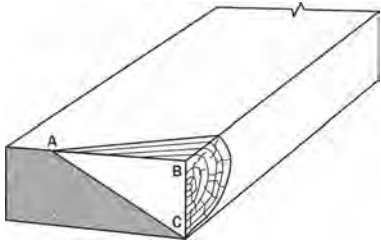
Narrow face knots (spike knots) shall be measured according to the formulas depicted in **Figures 4a, 4b, and 4c**.

FIGURE 4a



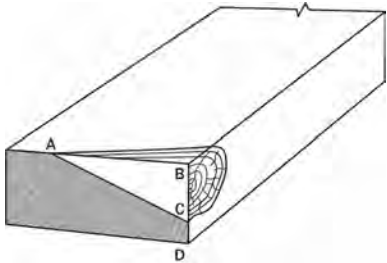
Knot size = (Length **AB** + Length **CD**) / 2

FIGURE 4b



Knot size = Length **AB** / 2

FIGURE 4c

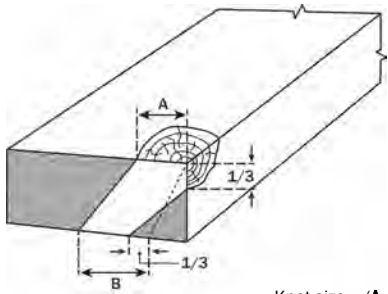


Knot size = (Length **AB** x Length **BC**) / (2 x Length **BD**)

1.9.3 MULTI-FACE KNOTS

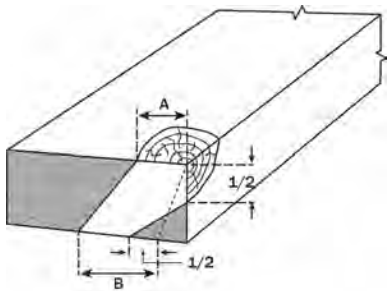
The measurement of wide face knots overlapping one or two edges is illustrated in **Figures 5a, 5b,** and **5c**.

FIGURE 5a 3-Face Knot



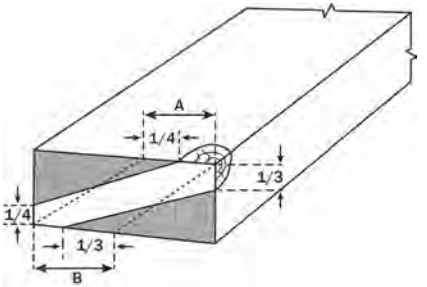
Knot size = (**A** + **B**) / 2

FIGURE 5b 3-Face Knot



Knot size = (**A** + **B**) / 2

FIGURE 5c 4-Face Knot

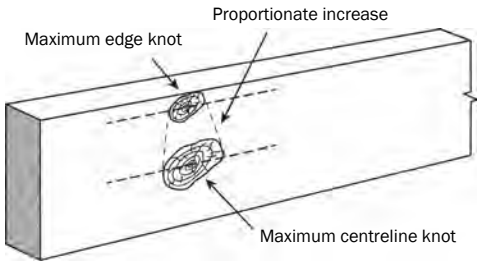


Knot size = (**A** + **B**) / 2

1.9.4 KNOT LOCATION

a) The allowable size for knots on wide faces, when appearing away from the edge, shall be proportionately increased from the size specified for knots located at the edge of the wide face, to the size specified for knots located along the centerline. The increase shall start at a distance from the edge equal to 1/2 the diameter of the allowable edge knot (**Figure 6**).

FIGURE 6



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

b) Knots appearing on the wide faces shall be "located" at the midpoint of their displacement (**Figures 7a** and **7b**).

FIGURE 7a

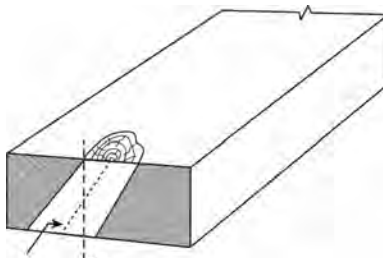
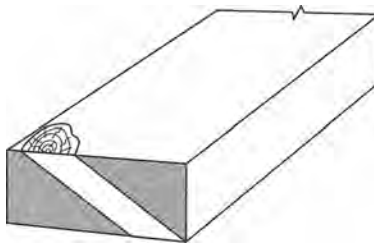


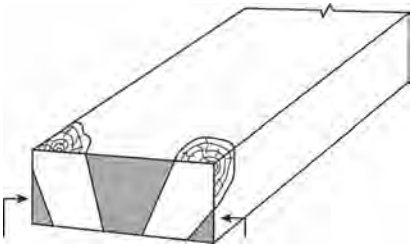
FIGURE 7b



Knot shall be considered as a centerline knot

c) A wide face knot overlapping part of the edge shall be considered an edge knot if it occupies more than 1/2 the thickness (**Figure 8**).

FIGURE 8

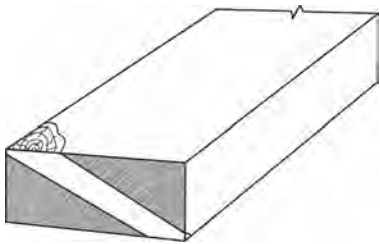


Knots overlapping less than or equal to ½ the narrow face shall be increased proportionately to centerline knot size

Knots overlapping more than ½ the narrow face are considered edge knots

d) The allowable size for diagonal knots that only involve the wide face shall be proportionately increased to the size specified for knots located along the centerline (**Figures 7a** and **7b** above). Diagonal knots involving both narrow faces are equated to an edge knot (**Figure 9**).

FIGURE 9

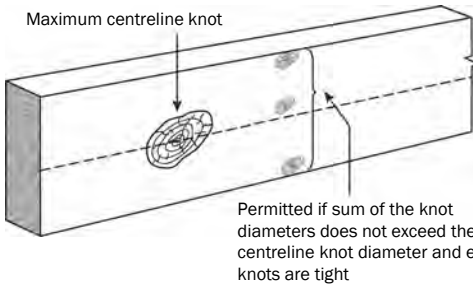


Diagonal knot involving both narrow faces is considered an edge knot

1.9.5 KNOT SPACING

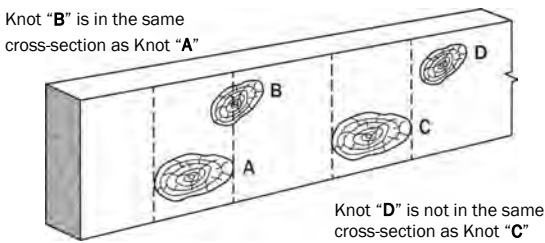
a) When two or more knots appear in the same cross section the sum of their sizes or displacement shall not exceed the maximum size specified for the centerline knot (**Figure 10**).

FIGURE 10



b) When reference is made to knots in the same cross section, the cross-section is the area across the width of a piece equal to the diameter of the largest knot present (**Figure 11**).

FIGURE 11

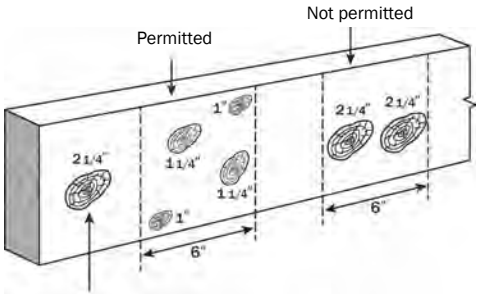


c) If loose knots, fixed knots, or holes on the edge are involved, the sum of their sizes or displacement is limited to the maximum edge knot size.

When directly opposite spike knots in boxed heart pieces are involved, the sum of their sizes or displacement shall not exceed the allowable centerline knot size.

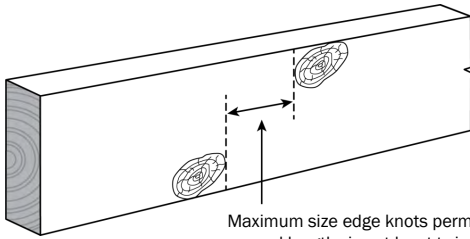
d) The sum of the sizes of all knots within any 6" of length shall not exceed twice the diameter of the allowable centerline knot (see example in **Figure 12**). No two centerline knots of maximum size may appear in the same 6" of length.

FIGURE 12: Example for Select Structural 2x8



e) Two maximum edge knots appearing on opposite edges shall be spaced at least a lengthwise distance equal to twice the size of the allowable edge knot (**Figure 13**).

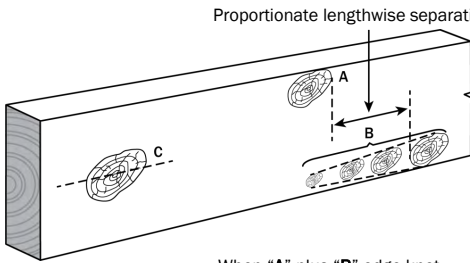
FIGURE 13



Maximum size edge knots permitted if spaced lengthwise at least twice the knot diameter

f) When the sum of knots at opposite edges on a wide face exceeds the allowable size of the centerline knot. but either or both are less than the size allowed at edge of wide face, the lengthwise spacing shall be proportionate (**Figure 14**).

FIGURE 14



When "**A**" plus "**B**" edge knot diameters exceed the maximum centreline knot diameter of "**C**" but either or both are less than the maximum edge knot allowed, the lengthwise separation is proportionate

1.9.6 ASSESSMENT OF GRAIN DEVIATIONS AROUND KNOTS

Abnormal distortion is defined as grain deviation associated with a knot which is greater than that associated with a typical knot of the same size. When abnormal grain distortion is evident, the measurement of the knot size shall include the extent of distortion.

The most critical influence of any grain deflection occurs on the narrow face or through the thickness of the piece. Abnormal grain distortion is characterized by a steep gradient running in the direction of the knot which produces extensive chipped or torn grain on the face in a semi-circular patter around the knot.

1.10 PLANER TEARS

Planer or chipper tears are permitted in NO. 2/Standard and higher grades provided they are not more than the width of the piece in length and not more than 1/4" in depth. In NO. 3, Utility, and Stud grades, tears shall not exceed the allowable hole size in depth, nor the permissible split in length.

1.11 ROLLER CHECKS

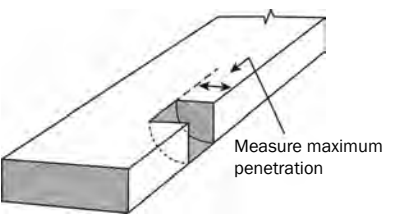
If through at the end, treat equivalent to a split. When away from ends, treat as shake.

1.12 SAW CUTS (SAW KERFS)

This characteristic occurs in two ways:

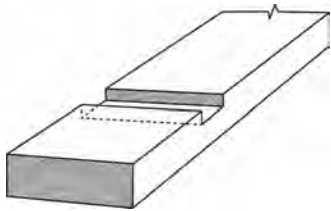
a) When the cut passes completely through the thickness and extends across a portion of the width (**Figure 15**), the maximum penetration across the width is restricted to 1/2 the allowable edge knot size.

FIGURE 15



b) The cut does not pass completely through the thickness and extends completely or partially across the width (**Figure 16**). The maximum penetration is restricted to 1/2 the equivalent narrow face knot displacement.

FIGURE 16



Note: *Generally, saw kerfs are* ***not*** *permitted in Select Structural and NO. 1 grades.*

1.13 SHAKE

A shake is "well separated" or "scattered" (i.e., not continuous) if there is evidence of wood separating the shakes. A surface shake is not permitted to extend into an adjacent or opposite face.

In NO. 2 and Standard, shake through from one wide face to the other is not permitted to extend into the edge. A shake showing on only one wide face extending into one edge shall be limited to a depth of 3/4 the thickness and a length of 2'.

Shake extending from one wide face through the edge to the other wide face is permitted in NO. 3, Utility, and Stud and is measured from the point at which the shake enters the piece as illustrated below (**Figures 17** and **18**). The shake shall not extend across the wide face more than the width of the allowable hole, measured on the worst face penetration. The shake is limited in length to 1/6 the length of the piece in NO. 3 and Utility, and 1/3 the length of the piece in Stud grade.

FIGURE 17: Whole Shake Entry Point

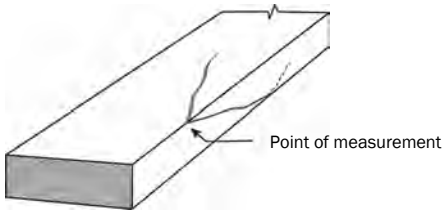
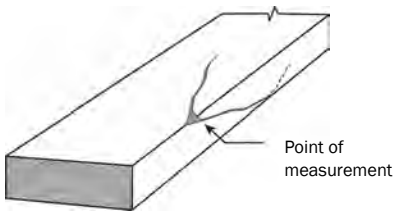
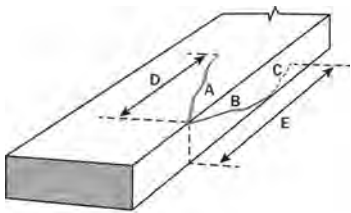


FIGURE 18: Broken-off Shake Entry Point



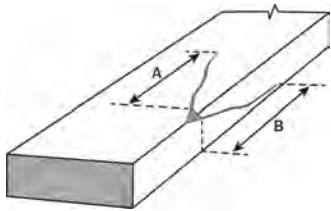
Method for measuring shake: Shake limitations are stated in the rule. Measure shakes parallel to the wide face (See **Figures 19** to **22**).

FIGURE 19



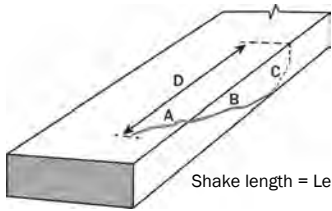
Shake length = (Length **D** + Length **E**) / 2

FIGURE 20



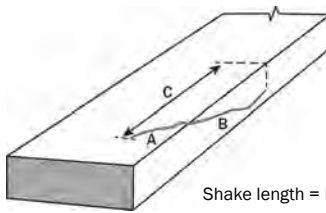
Shake length = (Length **A** + Length **B**) / 2

FIGURE 21



Shake length = Length **D**

FIGURE 22



Shake length = Length **C**

1.14 SKIPS

"**Hit and Miss**" skip is defined as a series of skips not over 1/16" deep with surfaced areas between. Where this degree of skip is permitted, it shall be further clarified to include that the "hits" shall average one hit per four lineal feet of length.

A "hit" is a plainly visible surfaced area approximately 1/2 the width or more and 2" or more in length. No piece shall have less than two hits.

"**Hit or Miss**" provisions shall not be used to permit surfacing below specified minimum sizes.

When skips appear on opposing faces, the combined scantness shall not exceed the depth permitted.

In Select Structural, NO. 1, and Construction, one medium skip 2' in length is not to be included in the limitation of "10% hit and miss".

In NO. 2, Standard, NO. 3 and Utility, the maximum skip must never appear on both the wide face and narrow face in the same cross section (in NO. 2, Standard – does not apply to hit or miss skip).

Skips permitted on the surfaced face of resawn Stress Rated Boards is limited according to the rules under which it is graded, independent of the variation in thickness permitted in resawn boards.

1.15 SLOPE OF GRAIN – NARROW FACES AND LOCAL DEVIATIONS

In 1" stress-rated boards or similar small sizes of stress-rated lumber, a general slope of grain anywhere in the length shall not pass completely through the thickness of the piece in a longitudinal distance in inches less than the number expressing the specified permissible slope. Where such a slope varies across the width of the board, its average shall be taken, except when the slope of grain occurs in a way that effects the piece more than other permitted strength reducing grade characteristics. Slope of grain on narrow faces of 2" in nominal thickness and thicker shall be measured on the same basis as on wide faces.

Local deviations must be considered in small sizes, and if a local deviation occurs in a piece less than 4" nominal in width or on the narrow face of a piece less than 2" nominal in thickness and is not associated with a permissible knot in the piece, the measurement of slope shall include the local deviation.

1.16 SPLITS

Splits are measured by average penetration. One maximum allowable split is permitted on each end of the piece. When more than one split occurs, only the worst split is considered for length of split.

1.17 UNSOUND WOOD

In NO. 2 and Standard, white speck "**1/3 face or equivalent**" is a volume restriction. When white speck appears, it is limited to the following or equivalent area:

a) a maximum of 1/3 the length for the full width of the face; or

b) a maximum of 1/3 the width of the face for the full length.

In NO. 2 and Standard, firm honeycomb or peck on the narrow face that occupies the entire thickness shall not penetrate more than 1/6 the width of the wide face and such peck must not destroy the nailing edge.

In NO. 3, Utility, and Stud, "**spots or streaks**" of soft decay occurring on one face shall not be limited in length; if through two faces, each streak is limited to 1/6 the length of the piece. Measurement shall be taken in the through portion of the streak.

Note: *"**Heart Center Streaks**" is a localized decay peculiar to Southern Yellow Pine and the limitation applies to that species.*

Note: *"**Peck**" is a type of decay peculiar to species of cedar and applies to those species.*

Note: *"**Honeycomb**" is found in most softwood species and is similar to "**white speck**" except the pitted areas are more elongated or channeled.*

Note: *"**Firm**" in relation to white speck and honeycomb provisions infers that it will not crumble readily under thumb pressure and cannot be easily picked out.*

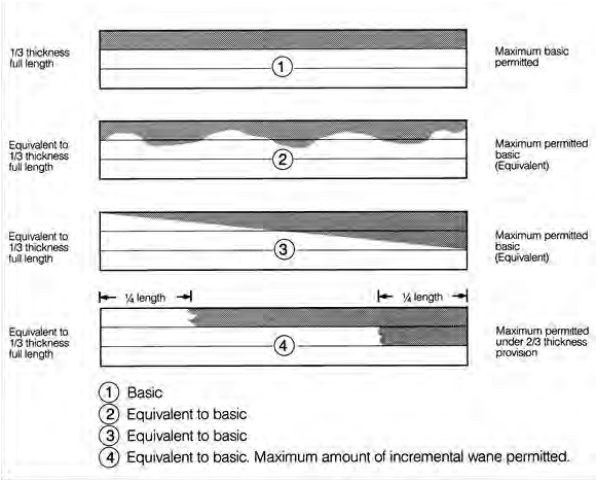
1.18 WANE

In reference to Para. 750, wane is permitted to extend partially or completely through the narrow face provided it does not displace more area than the allowable hole and does not exceed in length more than twice the allowable hole diameter.

Wane is permitted to extend partially or completely across any face provided it does not exceed the depth of the specified skip nor exceed one foot in length.

Such wane permitted in the grade description shall be measured at the point that wane exceeds the maximum thickness or width provision as stated in the grade. Wane extending partially or completely across any face shall be included in the assessment of equivalent wane. See **Figure 23** for narrow face wane examples.

FIGURE 23 EXAMPLES – NARROW FACE WANE IN NO. 2 AND STANDARD GRADES



Basic wane is maximum full length wane as stated in the NGR. The same concept of equivalent wane in thickness and width applies to all grades within their respective stated limitations.

1.19 WARP

Measurement of Crook, Twist, and Bow When in Combination:

When two or more forms of warp are both present in the same piece, only proportionate amounts of each are permitted. Maximum warp is based on gradual deviation from one end of the piece to the other.

Bow is limited according to thickness, not width.

Other forms of warp are limited according to width.

NOTES

1.0 GENERAL

Unless otherwise specified, the following NLGA Interpretations shall apply to all portions of the NLGA Grading Rules other than the NGR dimension lumber grades.

The limitations on knot sizes and other characteristics governing strength shall not be exceeded.

1.1 BEVEL SAWING

The loss of wood shall not exceed the equivalent of either the wane or skip permitted. Limited to occasional pieces.

1.2 CHIP AND SAW CHANNELS (RABETTED EDGE)

In rough lumber, such channels, tracking or stepping marks must not exceed 1/16" variation from the intended line of cut. Deeper channels shall not exceed the equivalent of either the wane or skip permitted and shall be limited to occasional pieces. Channels which are equivalent to the full length wane provisions of a given grade shall be dropped to the next lower grade and limited to occasional pieces.

1.3 GRUB AND TEREDO HOLES

Grub and teredo holes are evaluated on an equivalent smaller basis; Twelve 1/4" grub or teredo holes shall be accepted as an equivalent to a 1" hole. Grub and teredo holes shall be counted on the worst face, and there shall be no increase permitted in concentrated areas.

1.4 "HIT AND MISS" SKIP

The "**hits**" shall be plainly visible surfaced areas approximately 1/2 the width of the piece or more and 2" or more in length. "**Hits**" on the narrow face shall be completely across the narrow face and 2" or more in length. There shall be a minimum of one hit per 4 lineal feet and no piece shall have less than two "**hits**".

1.5 PIN HOLES

Pin holes are evaluated on an equivalent basis - use judgement based on the general appearance of the piece.

a) **Limited** - Approximately 30 per square foot. - Concentrated area - 50% more if balance of piece better (25% more in Clears).
b) **Scattered** - Approximately 15 per square foot. - Concentrated area - as per a) above.

1.6 SKIPS ON FACE OF RESAWN BOARDS

Skips are permitted on the surfaced face of resawn boards as limited in the rules for the various grades, independent of the variation in thickness permitted in resawn boards.

1.7 SPLITS

Unless otherwise specified, the length of a split on a face shall be limited to the length as stated in the grade for the face under consideration.

1.8 KNOTS

Unless otherwise specified in the NLGA grading rules, all knots for non-structural lumber are measured by the “average diameter” method (see Para. 320a).

2.0 SPECIFIC GRADE INTERPRETATIONS BY LUMBER PRODUCT

2.1 PARA. 108 - INDUSTRIAL CLEARS

2.1.1 PARA. 108, FACES GRADED

For pieces 5" & narrower - the best face includes both narrow faces. For pieces 6" & wider - the best face includes one narrow face.

Note: *For pieces 6" & wider, a grader may combine the wide face with the narrow face which yields the highest grade, i.e., best wide face and best narrow face.*

2.1.2 PARA. 108, BASIC SIZE

The description of characteristics permitted in the grades are based on a piece nominal 8" wide by 12' long (96 surface units = 96 SU). Larger pieces may permit more characteristics and smaller pieces permit fewer characteristics.

Example: A piece 4" wide by 12' long (48 SU) would be 1/2 the basic size and thus would permit only 1/2 the listed characteristics.

2.1.3 PARA. 108, CALCULATING CHARACTERISTICS PERMITTED IN PIECES OTHER THAN BASIC SIZE

To determine the number of characteristics permissible on the face of a piece that is other than basic size (96 SU) use the following formula:

Surface Units (SU) of Piece to be Graded / 96 SU Basic Size	X	Number of Characteristics Permitted in Basic Size	=	Number of Characteristics Permitted in Piece

Example 1: In "**D**" Industrial Clear grade, four - 1" knots are permitted. In a piece of nominal 6" wide by 12' long, therefore:

72 SU (6 x 12) / 96 SU (Basic Size)	X	Four - 1" Knots Permitted in Basic Size	=	Three - 1" Knots Permitted in Piece

When the calculation gives an answer such as 2.5, then the grade permits characteristics whose combined total is equal to 2 full size and 1 half size characteristic for 3 in total.

Where characteristics are permitted to be equivalent smaller, the number of characteristics may be increased provided their combined size does not exceed the combined size of the characteristics allowed and each individual characteristic is less than the maximum size permitted.

Example 2: The face of a "**D**" Industrial Clear grade permits four - 1" knots or 8 equivalent smaller knots. In a piece of nominal 6" wide by 10' long (60 SU):

60 SU (6 x 10) / 96 SU (Basic Size)	X	8 - 1/2" Knots as Equivalent Smaller	=	5 - 1/2" Knots or 2.5 total knot inches

Therefore, any combination of five knots totalling 2.5" or less may be permitted as long as no single knot exceeds the maximum knot size of 1". (i.e., 1 - 1" & 2 - 3/4" **or** 1 - 7/8" & 2 - 3/4" **or** 5 - 1/2", etc.).

The grade limit for knots is 8 equivalent smaller per basic size, the knots may not be broken down further (i.e., 10 - 1/4" knots as equivalent smaller is not permitted).

2.1.4 PARA. 108, EQUIVALENT CHARACTERISTICS

In "**C**" Industrial Clear and better grades, characteristics such as knots (in "**C**" Industrial Clear only), pin holes, pockets and streaks are restricted to one or the other, or an equal combination:

For example, a "**C**" Industrial Clear grade may contain: 2 small knots; **or** 1 small knot & 2 small pockets; **or** 4 pin holes and 1/2 a small streak; **or** an equivalent combination of characteristics.

A "**D**" Industrial Clear grade permits all characteristics listed to occur in the same piece.

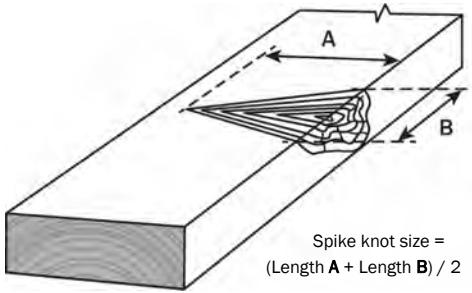
2.1.5 PARA. 108, KNOTS

2.1.5.1 PARA. 108, BASIC KNOT MEASUREMENT

Knots are measured using the average diameter method (see Para. 320a).

- **a)** Round and oval knots are measured by averaging the largest and smallest diameters on the face they occur.
- **b)** Irregular knots are measured as the average dimension of the smallest rectangle which will enclose the knot.
- **c)** Spike knots are measured by adding the length of the knot and the width of the knot at its widest point and taking the average (i.e. (5" + 1") ÷ 2 = 3" knot). (**Figure 24**)

FIGURE 24



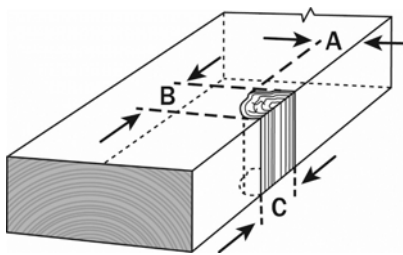
Spike knot size =
(Length **A** + Length **B**) / 2

2.1.5.2 PARA. 108, OTHER KNOT MEASUREMENTS

Single wide face knots overlapping onto the narrow face are measured as average diameter on the wide face except that the width of the knot on the narrow face (measured parallel to the long axis of the piece) cannot exceed the allowable knot size (**Figures 25** and **26**).

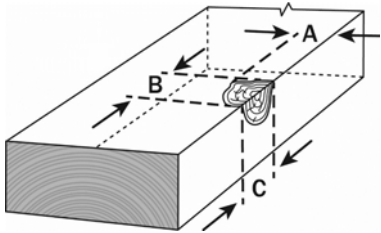
The narrow face knot size in "**D**" Industrial Clear grade is not considered.

FIGURE 25



Wide Face Knot Size = (Length **A** + Length **B**) divided by 2
Narrow Face Knot Size = Length **C**

FIGURE 26

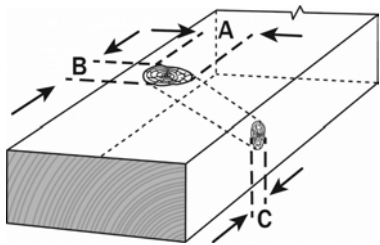


Wide Face Knot Size = (Length **A** + Length **B**) divided by 2
Narrow Face Knot Size = Length **C**

Two or more knots, separated by any amount of clear wood (even if they are the same knot on different faces), are counted as separate knots. Each is measured individually and counts toward the size/number for the grade.

Knots on the wide face are measured by average diameter and knots on the narrow face are measured by width only (**Figure 27**).

FIGURE 27



Wide Face Knot Size = (Length **A** + Length **B**) divided by 2
Narrow Face Knot Size = Length **C**

2.1.5.3 PARA. 108, EXAMPLE OF KNOT ALLOWANCES

Based on the basic size (nominal 8" width by 12' length) piece:

On the best face of a "**C**" Industrial Clear grade, 3 knots whose combined size does not exceed 1 1/2" are permitted, providing no knot is greater than 3/4". These knots must be sound and tight.

The best face of a "**D**" Industrial Clear grade permits up to 8 knots whose combined size shall not exceed 4", of which none shall exceed 1". These knots may be unsound, but they must be fixed (refer to Para. 718 r)).

The reverse face of "**D**" Industrial Clear grade permits characteristics larger or more numerous knots. Thus, the reverse face may contain up to 8 knots totalling 5" of combined knots provided no knot exceeds 1 1/4" or may permit up to 10 knots as more numerous totalling 5" of combined knots provided no knot exceeds 1".

2.1.6 PARA. 108, POCKETS

Pockets are restricted by their individual size and the combined length in inches. The total length of pockets permitted is based on the length of a 1/8" wide pocket in each of the pocket size classifications.

If the grade permits 4 small pockets, this means any number of pockets whose combined length in inches is equal to that of 4 small (4 x 4" = 16") is permitted. No pocket shall exceed the maximum individual size specified for that classification of pocket.

A pocket may be 1/16" x 6" and would be acceptable as a small pocket, but as in the above example the total length allowance shall not exceed 16".

Example 1: A nominal 2" x 8" by 12' long (Basic Size) "**C**" Industrial Clear grade permits 4 small pockets:

4 - small pockets x **4"** (per 1/8" pocket) **= 16"** (of pockets permitted)

The grade permits any number or combination of small pockets (1/4" x 2" **or** 1/8" x 4" **or** 1/16" x 6") whose combined length is less than or equal to 16".

Example 2: A nominal 2" x 6" by 12' long (3/4 of Basic Size) on the face of a "**C**" Industrial Clear grade permits:

3/4 (fraction of basic size) x **4** - small pockets x **4"** (per 1/8" pocket) **= 12"** (of pockets permitted)

The grade permits: Six - 1/4" x 2" pockets **or** two - 1/16" x 6" **or** twelve - 1/8" x 1" **or** one - 1/16" x 6" + one - 1/8" x 4" + one - 1/4" x 2"; etc., whose combined length is less than or equal to 12".

2.1.7 PARA. 108, SKIPS

Skips, when 1/2 width or less, are permitted 2x longer than otherwise specified.

When skip occurs on opposing faces, the total scantness shall not exceed the limit specified.

2.1.8 PARA. 108, WANE

Wane on the wide face and the narrow face of "**D**" Industrial Clear grade is evaluated separately. Wane on the wide face may be equivalent for width and length (total area governing).

The thickness allowance on the narrow face may not be exceeded unless the wane will be accepted for the reverse wide face.

50% more wane on the reverse face of "**D**" Industrial Clear grade means a full 50% increase in allowable wane in face area **or** in depth **or** equivalent combination of smaller wane increases in both.

2.1.9 PARA. 108, MACHINE BURN

Machine burn is acceptable providing it is not deeper than the torn grain permitted in the grade and the discoloration does not exceed the following conditions:

"**B & Btr**" Industrial Clear grade - barely visible. Can be removed with a light sanding to be suitable for a natural finish.

"**C**" Industrial Clear grade - colour is not controlled. Only slightly felt depth which is suitable for paint finishes.

"**D**" Industrial Clear grade - colour is not controlled. Depth can be readily felt.

2.1.10 PARA. 108, CUT-OUTS

If a 3" cut-out does not completely remove a characteristic, the remaining amount of the characteristic must be permitted in the grade of "**D**" Industrial Clear.

This clause can be applied to eliminate or reduce a single oversize characteristic or to reduce the total number of characteristics to that allowed.

2.2 PARA. 112 - SELECTS

Any piece of lumber in the Select grades showing a serious combination of the listed characteristics which might impair its intended use is excluded from the grade.

The following amounts of bow are permitted in the various grades:

4/4 – 2x as much as crook permitted for 8" widths.

5/4 and **6/4** –1.5x as much as crook permitted for 8" widths.

Bow is measured with the piece laying flatwise and natural with bow up (horns down).

2.2.1 KNOTS IN PARA. 112 - SELECTS

It is recommended that the number and size of knots be reduced when in combination with other characteristics that detract from the overall appearance of the piece.

The following charts give the approximate number of 1/4" knots that are permitted in each size and grade calculated from the basic size of 1" x 8" by 8' long (96 surface units (SU)).

Knot sizes up to 3/4" are counted as 3, up to 1/2" counted as 2, and up to 1/4" counted as 1.

The "**B & Better**" grade allows two 1/2" knots, or as equivalent, four 1/4" knots in the basic size of 96 SU, or one 1/4" knot per 24 SU.

B & Better - No. of 1/4" Knots per Piece									Max. Knot Size
Nominal Width	Length								
	6'	8'	10'	12'	14'	16'	18'	20'	
4"	0	1	1	2	2	2	3	3	3/8"
6"	1	2	2	3	3	4	4	5	1/2"
8"	2	2	3	4	4	5	6	6	1/2"
10"	2	3	4	5	5	6	7	8	1/2"
12"	3	4	5	6	7	8	9	10	5/8"

The "**C Select**" grade allows two 3/4" knots, or as equivalent, six 1/4" knots, in the basic size of 96 SU, or one 1/4" knot per 16 SU.

C Select - No. of 1/4" Knots per Piece									Max. Knot Size
Nominal Width	Length								
	6'	8'	10'	12'	14'	16'	18'	20'	
4"	1	2	2	3	3	4	4	5	1/2"
6"	2	3	3	4	5	6	6	7	5/8"
8"	3	4	5	6	7	8	9	10	3/4"
10"	3	5	6	7	8	10	11	12	7/8"
12"	4	6	7	9	10	12	13	15	1"

The "**D Select**" grade allows four 3/4" knots, or as equivalent, twelve 1/4" knots in the basic size of 96 SU, or one 1/4" knot per 8 SU.

D Select - No. of 1/4" Knots per Piece									Max. Knot Size
Nominal Width	Length								
	6'	8'	10'	12'	14'	16'	18'	20'	
4"	3	4	5	6	7	8	9	10	1/2"
6"	4	6	7	9	10	12	13	15	5/8"
8"	6	8	10	12	14	16	18	20	3/4"
10"	7	10	12	15	17	20	22	25	7/8"
12"	9	12	15	18	21	24	27	30	1"

Knots shall be spread out over the entire width and length of the piece.

Maximum characteristics should not be in combination within the same piece - a clear appearance must be evident.

2.2.2 PARA. 112b - B & BETTER (SUPREME - WW PINE)

Wane If maximum - should be held to pieces that are otherwise high grade. May extend across the reverse face only for approximately 1/12 the width.

Knots Must be sound and tight, and only in very high grade pieces and scattered over entire board (see chart in Section 2.2.1 for breakdown).

2.2.3 PARA. 112c - C SELECT (CHOICE - WW PINE)

Pin Holes 1 in lieu of each pitch or bark pocket permitted.

Knots Sound and tight and well scattered throughout piece.

One fixed pin knot is permitted in 8" & wider by 12' long pieces in otherwise high grade pieces (see chart in Section 2.2.1 for number).

2.2.4 PARA. 112d - D SELECT (QUALITY - WW PINE)

Pin Holes 2 in lieu of each pitch or bark pocket permitted. On reverse face: scattered in otherwise C Select and better type pieces.

Reverse Face Use NO. 3 Common grade (Para. 113c) reverse face characteristics. .

2.3 PARA. 113 - COMMONS

Any piece judged to contain a serious combination of characteristics, even though some of the characteristics may not be limiting by themselves, is excluded from the grade. Likewise, an otherwise high grade piece may be placed in a grade even though one or two of its characteristics may slightly exceed the limitation described in the rules.

2.3.1 PARA. 113a - NO. 1 COMMON (COLONIAL - WW PINE)

Black Knots Should be held to 4 for each 12' of length in otherwise high grade pieces.

Checked Knots An occasional red knot showing a barely perceptible check.

Pin Holes 6 scattered in a 1" x 8" by 12'

Roller Check A light roller check on back, not to exceed 2' or 1/8 the length whichever is less.

2.3.2 PARA. 113b - NO. 2 COMMON (STERLING - WW PINE)

Branch or Spike Knots Should be held to approximately 1/3 the width of the piece and approximately 1 1/4" wide - 3 per 12'. Must be smooth and sound.

Slough Knots Up to 3 equivalent smaller not over 1/2 the thickness of the piece.

Through Shake Permitted if the piece is otherwise of high quality.

Wormholes 1 small, not through - occasional pieces.

2.3.3 PARA. 113c - NO. 3 COMMON (STANDARD - WW PINE)

Branch or Spike Knots 1/2 width of piece approximately 4 in 12' length.

Breaks on Edge Equivalent to holes. If the breaks show lengthwise splitting, the aggregate of the splits shall not exceed 1/16" wide and the width of piece in length.

Knots Broken in Dressing Equivalent to holes.

2.3.4 PARA. 113d - NO. 4 COMMON (UTILITY - WW PINE)

Honeycomb Firm - 100% permitted.
Not Firm - equal to the unsound wood permitted.

Loose Knots and/or Holes 3 of maximum size per 12' length. Any number of equivalent smaller knots or holes provided their total size does not exceed the maximum amount of knot hole/loose knot permitted.

Shake Scattered full length. The piece shall hold together in normal handling. Single shakes shall be held to 1/2 the length in otherwise high-line pieces.

Skips In otherwise high-line pieces, skips may also include scantness up to 1/8" in thickness for 2' of length, maximum 2 occurrences per 12' of length.

Splits Limited to 1/3 the length on best face and 1/2 the length on reverse face.

Unsound Knots Restricted in size only. Must not exceed the size of loose knots permitted.

Unsound Wood The maximum size of spots of unsound wood shall be held to the area of the fixed knot allowed and the total area of all spots shall not exceed 1/4 the face area.

Wane On reverse face - wane may go through the thickness, however, the through portion must not exceed the area of the hole allowed. May extend across the width if equal to the skip allowed and no longer in length than twice the width of the piece.

2.3.5 PARA. 113e - NO. 5 COMMON (INDUSTRIAL - WW PINE)

Knots and Holes Approximately 75% of cross section in size - providing that piece will not break under handling.

Shake Full length - piece must be usable.

Skip 1/4" in thickness and 1/2" in width in otherwise NO. 3 Common and better type pieces; and 1/8" in thickness and 1/2" in width in otherwise NO. 4 or NO. 5 Common type pieces.

Splits Two or three - 1/2 the length - longer if fewer in number (as long as piece is usable).

Unsound Wood Approximately 75% of cross section - must have fastening surface sufficient to hold.

Wane Through wane equivalent to holes allowed. Reverse face 1/8" deep, full width.

White Speck and Honeycomb Not restricted - must have fastening surface sufficient to hold.

A serious combination of the above irregularities is not permissible. Pieces must be usable full length.

2.4 PARA. 114 - BOARDS

2.4.1 PARA. 114a - SELECT MERCHANTABLE

Broken Tongue or Lap 6"

Mismatched Lumber 1/32" mismatch.

Pin Holes Limited (30 per square foot).

Pitch Pockets Not limited as to number. Should be well distributed and not open through.

Seasoning Checks Any number of medium checks, none through.

Skips 20% of any face - occasional pieces.

Star Checked Knots May be accepted, if tight.

2.4.2 PARA. 114b – CONSTRUCTION

Broken Tongue or Lap 1'

Mismatched Lumber 1/32" mismatch

Pitch Pockets Not limited as to number but should be well distributed.

Skips 20% of face and edges in occasional pieces.

2.4.3 PARA. 114c – STANDARD

Broken Tongue or Lap 2'

Mismatched Lumber 1/32" mismatch.

Shake Individual through shakes may be accepted up to 1/4 the length of the piece but must not run into the edge in such a manner that the piece will break during normal handling. On the ends, shake is limited the same as splits.

Skips Hold to two medium in 12' of length on face side.

Unsound Wood On reverse face - equivalent to Utility & must not be through.

Wane Utility wane on reverse face, limited to 3/4 the thickness.

2.4.4 PARA. 114d - UTILITY

Broken Tongue or Lap 3'

Honeycomb Must be firm. Pieces must hold nails.

Mismatched Lumber 1/16" mismatch.

Shake Separated through shakes may be permitted full length of piece if adequately bonded for ordinary handling without coming apart.

Unsound Wood Spots 1 1/2" wide by nominal width of piece - 1 per 2' or equivalent 1 streak 1/3 width x 10% of length.

2.5 PARAS. 116, 117, AND 118 - BOARDS

2.5.1 PITCH - RED PINE

The description "Due to the inherent nature of the species, allowable pitch for red pine is much greater" is interpreted to mean that natural pitch streaks surrounding knots are disregarded.

2.5.2 PARA. 117b - D SELECT

For the reverse face of a "**D Select**", use Para. 118c, NO. 3 Common type back.

2.6 PARA. 118 - COMMONS

Knot descriptions are given in Para. 718. 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. It is generally the character or condition of the knot and not the size that determines the grade of the piece.

Except for limitation of the grade, spike knots are permitted in all grades of Board lumber less than 6/4 in thickness providing the spike knot or knots have not more effect than the other knots permitted.

2.7 PARA. 128 - MACHINE GRADED LUMBER (MGL)

2.7.1 PARA. 128, VISUAL QUALITY LEVEL (VQL) REQUIREMENTS

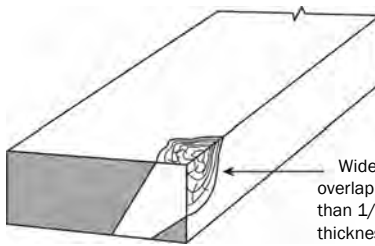
Knots partially or wholly at the edges of the wide faces, shall not occupy more of the net cross-section than those listed in Paras. 128b, 128c, and 128e and each knot at the edge of the wide faces is treated separately, including knots in the same cross-section.

2.7.1.1 PARA. 128, EDGE KNOT CONDITIONS

For a knot to be considered an "**edge knot**" for the purposes of MGL visual quality limits, one of the following conditions shall be present:

a) When a wide face knot overlaps for more than 1/2 the thickness of the narrow face (**Figure 28**).

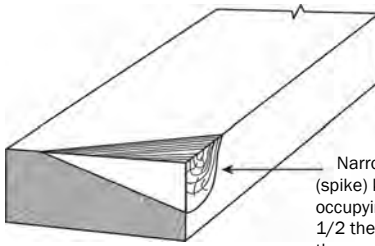
FIGURE 28



Note: *Wide face knots cannot be "re-located" prior to assessing edge knot status.*

b) When a narrow face knot (spike knot) occupies more than 1/2 the thickness of the narrow face (**Figure 29**).

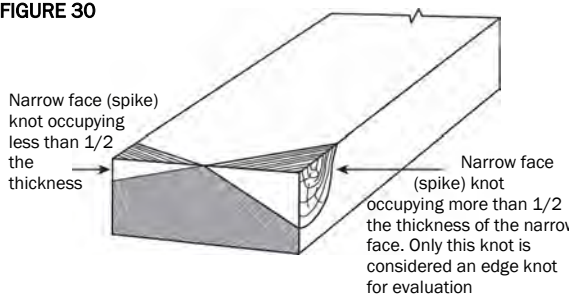
FIGURE 29



c) When combination (opposing) narrow face (spike) knots are present, or two wide face knots occur in the same cross-section, each is assessed separately and if either occupies more than 1/2 the thickness of the narrow face, then that knot is assessed as an edge knot (**Figure 30**).

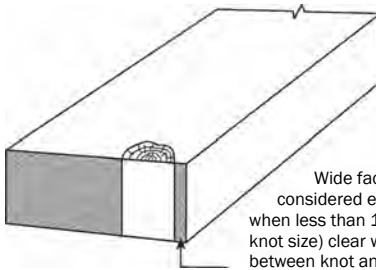
If both knots in the cross-section occupy more than 1/2 the thickness of the narrow face, the largest is considered the edge knot for evaluation.

FIGURE 30



d) When there is less than one-sixth (1/6) the size of the wide face knot of clear, straight grained wood between the knot and the nearest edge (**Figures 31** and **32**).

FIGURE 31

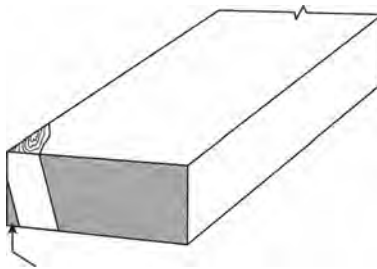


Wide face knots are considered edge knots when less than 1/6 (of the knot size) clear wood remains between knot and the nearest narrow face

Example: Referring to **Figure 31**, a 3/4" wide face knot requires less than 1/8" of clear, straight grained wood between the knot and the nearest narrow face to be considered an edge knot.

(Calculation: 3/4" x 1/6 = 3/24" or 1/8")

FIGURE 32



Wide face knots overlapping less than 1/2 the thickness of the narrow face are considered edge knots when less than 1/6 (of the knot size) equivalent area of clear wood remains between knot and the nearest narrow face

Example: Referring to **Figure 32**, a 1-1/2" wide face knot overlapping less than 1/2 the thickness of the narrow face would be considered an edge knot when less than the equivalent area of the 1/4" of wide face clear, straight grained wood remains between the knot on the opposing wide face and the nearest narrow face.

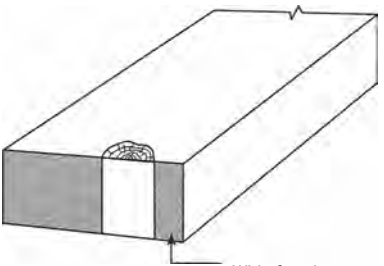
(Calculation: 1 1/2" x 1/6 = 3/2" x 1/6 = 3/12" or 1/4")

2.7.1.2 PARA. 128, NON-EDGE KNOT CONDITIONS

If any of the following conditions are present, the knot is **not** considered an edge knot:

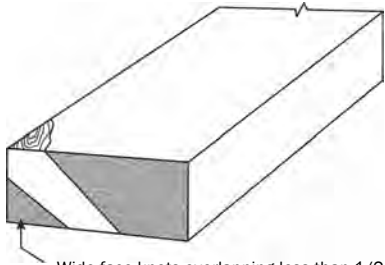
a) When there is at least 1/6 the size of the wide face knot of clear, straight grained wood between the knot and the nearest narrow face (**Figures 33** and **34**).

FIGURE 33



Wide face knots are not considered as edge knots when more than 1/6 (of the knot size) clear wood remains between knot and nearest narrow face

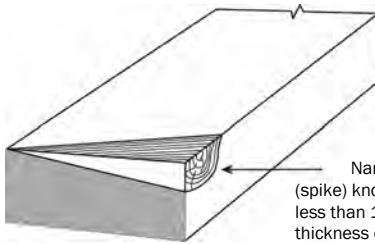
FIGURE 34



Wide face knots overlapping less than 1/2 the thickness of the narrow face are not considered as edge knots when more than 1/6 (of the knot size) equivalent area of clear wood remains between knot and nearest narrow face

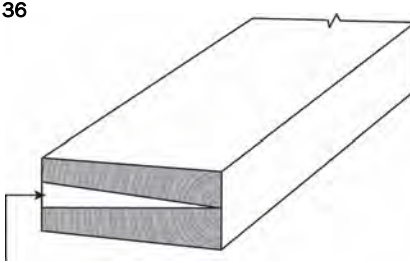
b) When a narrow face knot (spike knot) occupies less than 1/2 the narrow face (**Figures 35, 36,** and **37**).

FIGURE 35



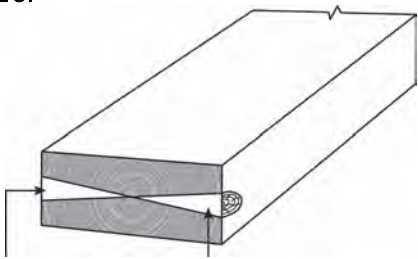
Narrow face (spike) knot occupying less than 1/2 the thickness of the narrow face is not considered an edge knot

FIGURE 36



Narrow face knot occupying less than 1/2 the thickness of the narrow face is not considered an edge knot

FIGURE 37



Combination narrow face knots are measured individually. If both are less than 1/2 the thickness of the narrow face, they are not considered edge knots

2.7.2 PARA. 128, SAW CUTS (SAW KERFS)

Saw cuts are depicted in NGR Interpretations, Figures 15 and 16.

Note: *Generally, no saw cuts shall be permitted in MGL.*

2.7.3 PARA. 128, TIMBER BREAKS

Timber breaks are not permitted in machine graded lumber.

2.7.4 PARA. 128a, RESIDUAL LUMBER

Examples for the limits on the assignment of grades in visual grading of residual lumber pieces that have been rejected from a machine grading process for a specific machine grade are as follows:

Example 1: An S-P-F facility is producing a 2x4, 1650Fb - 1.5E, MSR lumber grade. For residual lumber from this process, the assigned F_b and E for the visual grade must be less than the F_b and the process grade E of the MSR grade from which it was rejected.

To verify whether the residual lumber could be graded as NO. 2, the assigned values for S-P-F visual grade NO. 2 are compared. The size adjusted F_b for S-P-F, 2x4, NO. 2 grade is 1.5 x 875 psi = 1313 psi (see Paras. 901g & 902) and the assigned E is 1.4 (see Para. 902).

Both these values are less than the MSR lumber grade of 1650Fb - 1.5E, so the residual lumber from this process may be stamped visual grade NO. 2 provided that all limiting visual characteristics are met.

Example 2: A D Fir-L (N) facility is producing a 2x4, 1800Fb - 1.6E, MSR lumber grade. For residual lumber from this process, the assigned F_b and E for the visual grade must be less than the F_b and the machine grade E of the MSR grade from which it was rejected.

To verify whether the residual lumber could be graded as NO. 2, the assigned values for D Fir-L (N) visual grade NO. 2 are compared. The size adjusted F_b for D Fir-L (N), 2x4, NO. 2 grade is 1.5 x 850 psi = 1275 psi (see Paras. 901g and 902) and the assigned E is 1.6 (see Para. 902).

Although the assigned visual grade F_b is less than the MSR lumber grade, the assigned visual grade 1.6 E value is not. In this scenario, the residual lumber cannot be stamped NO. 2 unless the machine grading process average E is maintained and verified to be greater than the visual grade 1.6 E. Alternatively, the facility has the option of verifying that the visual grade E can be maintained at or above 1.6 E.

2.8 PARA. 130 - BEAMS & STRINGERS

Checks when checks on ends are deeper than that permitted for the grade, they shall be limited as splits.

Shake breaking into a face becomes a NO. 2 or lower grade depending on severity.

"or equivalent" means "away from ends" through shakes up to 4' long, well separated.

Soft Honeycomb limited as unsound wood

Splits are measured by average penetration.

Unsound Wood the size of a spot on unsound wood in a NO. 2 be held to 1/6 of the width, squared, of the face under consideration or equivalent longer.

2.9 PARA. 131 - POSTS & TIMBERS

2.9.1 PARA. 131 – GENERAL PROVISIONS

Checks when checks on ends are deeper than that permitted for the grade, they shall be limited as splits.

Shake when breaking into a face, becomes a NO. 2 or lower grade depending on severity.

Soft Honeycomb limited as unsound wood.

Splits are measured by average penetration.

Unsound Wood the size of a spot on unsound wood in a NO. 2 be held to 1/6 of the width, squared, of the face under consideration or equivalent longer.

2.9.2 PARA. 131d - STANDARD

Shake "or equivalent" means "away from ends" through shakes up to 4' long, well separated.

Unsound Wood individual spots shall not exceed an area 1/4 of the width, squared.

Knots may exceed 1/2 width on face provided knot does not exceed 50% total displacement.

2.9.3 PARA. 131e - UTILITY

Shake	if not through, a single shake may be full length if through, several, the length of individual through shakes shall not exceed 1/2 the length of the piece.
Unsound Wood	individual spots shall not exceed an area 1/2 of the width, squared.
Knots	may exceed 3/4 width on face provided knot does not exceed 75% total displacement.

2.9.4 POSTS & TIMBERS (P&T) GRADED UNDER PARA. 130

When P&T are graded under Para. 130 - Beams & Stringers (B&S) rules, the following knot limits shall apply:

a) For P&T faces greater than nominal 8", use the applicable grade/width knot sizes listed for the "edge of the wide face" under Para. 130 - B&S, and

b) For P&T faces less than nominal 8", use the applicable knot sizes for the grade/width listed under Para. 131 - P&T.

Example 1: For a nominal 8" x 10" P&T graded under Para. 130 – B&S, assuming all other characteristics are not limiting, use the "edge of wide face knot" sizes for the 8" width under the B&S grades to determine the B&S grade, regardless of where the knots are located on the piece.

Example 2: For a nominal 6" x 8" P&T graded under Para. 130 – B&S, assuming all other characteristics are not limiting, use the 6" width knot sizes under the P&T grades to determine the B&S grade, regardless of where the knots are located on the piece.

NOTES

PART 3: EUROPEAN UNION LUMBER EXPORT: VISUAL GRADE REQUIREMENTS ANNEX

1.0 INTRODUCTION

For export of structural lumber to the European Union, producers must, in addition to the NLGA Grading Rules, Paras. 120 to 124, also grade to the additional requirements of the CEN Standards referenced below:

EN 336 Structural timber – Sizes, permissible deviations

EN 338 Structural timber – Strength classes

EN 1912 Structural timber – Strength classes - Assignment of visual grades and species

EN 14081-1 Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements

All sections of the NLGA Grading Rules shall apply except for those specific sections listed in this Annex that exceed the NLGA minimum requirements. The following sections detail the additional requirements as applied by CLSAB.

1.1 SIZE TOLERANCES

In EN 336, provisions are made for dimensional deviation within two tolerance classes. These size tolerances are provided in Table 1.

Table 1 Size Tolerances

Thickness & Width	Tolerance Class 1	Tolerance Class 2
≤ 100 mm	(+3.0 and -1.0) mm	(+1.0 and -1.0) mm
> 100 mm up to 300 mm	(+4.0 and -2.0) mm	(+1.5 and -1.5) mm
> 300 mm	(+5.0 and -3.0) mm	(+2.0 and -2.0) mm

Note: *The Tolerance Class to which the lumber has been produced should be indicated on the contract documents. NLGA provisions shall apply to dressed lumber.*

1.2 MEASUREMENT

For the purpose of determination of cross-section deviations for lumber ordered to Tolerance Class 1 or 2, the reference moisture content is 20%.

The term "**Target Size**" may appear on order contracts. The EN 336 - Clause 3.1 definition for "**target size**" is: "size specified (at the reference moisture content), and to which the deviations, which would ideally be zero, are to be related."

1.3 RATE OF GROWTH (ALL SPECIES)

For NO. 2 and higher grades - restricted to medium (see Para. 350). All other grades - average ring width shall not exceed 10 mm.

1.4 BIOLOGICAL CHARACTERISTICS

No active insect infestation permitted.

Unsound wood (excluding white specks) - not permitted in NO. 2 and higher grades.

1.5 WANE

The allowable wane permitted shall not be greater than 1/3 of the thickness and/or width of the piece.

Note: *For reference, EN 14081-1, Annex A.2.1 states: "The maximum wane permitted shall not reduce the edge and face dimensions to less than 2/3 of the basic dimensions of the piece."*

The limits on wane are absolute. The following restrictions apply:

- no provisions for averaging wane over the length of the piece,
- no allowance for wane dips, and
- manufactured holes are treated equivalent to wane (not equivalent to a knot hole).

1.6 WARP (DISTORTION)

The maximum limits for warp (distortion) are provided in Table 2. The maximum distortion is measured over 2 m of length.

Table 2 Warp (Distortion)

Warp Type	Maximum Permissible Warp per Strength Class	
	C18 and lower	Above C18
Bow	20 mm	10 mm
Crook (Spring)	12 mm	8 mm
Twist	2 mm per 25 mm width	1 mm per 25 mm width
Cup	As per NLGA Grading Rules	

1.7 SHAKE, CHECKS, AND SPLITS (FISSURES)

At a minimum, the limiting characteristics for shake, checks, and splits (collectively referred to as fissures) are the same as the NLGA Grading Rules except in NO. 2 and Studs. For these grades, through shake shall not exceed 600 mm in any 1 m of length. See Table 3 for length limits.

Table 3 Maximum Length of Fissures by Strength Class

Fissure depth	C18 and lower	Above C18
Less than 1/2 the thickness	Ignored for all strength classes.	
Not through the thickness	No longer than 1.5 m or 1/2 the length of the piece, whichever is the lesser.	No longer than 1.0 m or 1/4 the length of the piece, whichever is the lesser.
Through the thickness	No longer than 1 m or 1/4 the length of the piece, whichever is the lesser. If at ends, a length not longer than 2 times the width of the piece.	Only permitted at the ends, with a length not longer than the width of the piece.

1.8 GRADE STAMP REQUIREMENTS

In addition to the grade-stamping requirements of the NLGA Grading Rules, Para. 39, structural lumber also graded in accordance with EN 14081-1 shall include the following information on the grade stamp:

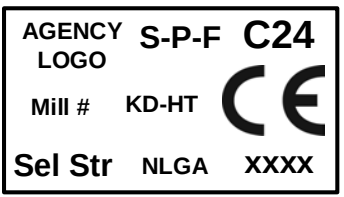
- Identification number of the Notified Body
- CEN Strength class (1)
- Seasoning state "**DRY GRADED**" or "**KD**" (2)
- If applicable, "**HT**" to indicate phytosanitary heat treatment.
- The stylized "**CE**" mark.

(1) *See Appendix 1 of this Annex for the species, grade, and CEN strength class equivalency matrix.*

(2) *The term "**KD**" is acceptable if cross-referenced to "**Dry Graded**" in the Declaration of Performance (DOP) that the manufacturer supplies with the product.*

Note: *This "dual" grade stamp allows for the acceptance of the lumber in both the North American and EU markets.*

Example of a Typical North American / EU Lumber Grade Stamp:



Note: *The "**xxxx**" is the identification number of the Notified Body and is positioned below the stylized "**CE**" mark.*

1.9 C20 STRENGTH CLASS - GRADE MARKING

As per Appendix 1 of this Annex, the "**C20**" designation may be applied to "**NO. 1 & Btr**" grade stamped S-P-F, D Fir-L (N), and Hem-Fir (N) lumber.

The following restrictions apply to sorting and grade-stamping "**NO. 1 & Btr**" lumber with a "**C20**" designation:

a) lumber shall be sorted from primary log breakdown mill run stock only,

b) during a production run, it is not permissible to simultaneously sort and/or grade stamp any other grades with any higher design values than the "**NO. 1**" grade, even if pieces would otherwise qualify. For example: Select Structural, some grades of MSR, MEL, lamination, scaffold plank, and decking, and

c) the "**NO. 1 & Btr**" combination grade stamp shall not be applied to regraded, remanufactured, pre-graded, or pre-sorted lumber.

APPENDIX 1: ASSIGNMENT OF CANADIAN SPECIES AND GRADES TO CEN STRENGTH CLASSES

Species Group / Species	Strength Class				
	C14	C16	C18	C20	C24
S-P-F	Const Stud	NO. 1 NO. 2		NO. 1 & Btr	Sel Str
D Fir-L (N)	Const Stud	NO. 1 NO. 2		NO. 1 & Btr	Sel Str
Hem-Fir (N)	Const Stud	NO. 1 NO. 2		NO. 1 & Btr	Sel Str
WR Cedar	NO. 1 NO. 2		Sel Str		
Sitka Spruce	NO. 1 NO. 2		Sel Str		