

GLOSSARY

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.

Note: *This Glossary also incorporates the “National Grading Rule (NGR) for Dimension Lumber - Glossary”. 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.*

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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 $\frac{1}{32}$ " wide or 4" long.
- d) **"Medium checks"** are not over $\frac{1}{32}$ " wide or 10" long.
- e) **"Large checks"** are more than $\frac{1}{32}$ " 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 (UN SOUND 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 applies to Southern Pine. Heart centre decay develops in the living tree and does not progress further after the tree is cut. (Not found in NLGA listed species.)
- b) **“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.*

- c) **“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.
- d) **“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.
- e) **“White specks”** are small white or brown pits or spots in wood caused by the fungus *“Phellinus 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.*

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 (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" & 1/4" respectively.

Note: *Lumber 4" or less in thickness is frequently shipped with eased edges unless otherwise specified.*

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.*

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**” (VG) or “**edge grain**” (EG) 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**” (FG) or “**slash grain**” (SG) lumber is a piece or pieces sawn approximately parallel to the annual growth rings so that all or some of the rings form an angle of less than 45 degrees with the surface of the piece.
- f) “**Mixed grain**” (MG) 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.

***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.

Note: The definition for **"slough knot"** included above is not an NGR definition.

717. KILD DRIED LUMBER

Lumber dried in a closed 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 is 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 $\frac{1}{8}$ " separation.

“**Very heavy**” loosened grain is over $\frac{1}{8}$ " 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 $\frac{1}{64}$ " in depth.

*(may be approximately 6" in length)

“**Light**” skip on face is not over $\frac{1}{32}$ " in depth.

*(may be 12" in length)

“**Light**” skip on edge is not over $\frac{1}{32}$ " in depth.

*(may be 2' in length)

“**Medium**” skip on face is not over $\frac{1}{16}$ " in depth.

*(may be 12" in length)

“**Medium**” skip on edge is not over $\frac{1}{16}$ " in depth.

*(may be 2' in length)

“**Heavy**” skip on face &/or edge is not over $\frac{1}{8}$ " in depth.

- f) “**Hit and miss**” skip is a series of skips not over $\frac{1}{16}$ " deep with surfaced areas between.

*(may be 4' in length)

Note: *The asterisked (*) portions for the definition of skips noted in e) and f) above are in addition to the National Grading Rule (NGR) definitions.*

- g) “**Hit or miss**” skip means completely or partly surfaced or entirely rough. Scantness may be $\frac{1}{16}$ ".
- 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 $\frac{1}{64}$ ".

“**Light**” mismatch is not over $\frac{1}{32}$ ".

“**Medium**” mismatch is not over $\frac{1}{16}$ ".

“**Heavy**” mismatch is not over $\frac{1}{8}$ ".

- 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 $\frac{1}{64}$ " deep.

“**Light**” machine bite is not over $\frac{1}{32}$ " deep.

“**Medium**” machine bite is not over $\frac{1}{16}$ " deep.

- "Heavy"** machine bite is not over $\frac{1}{8}$ " deep.
- "Very heavy"** machine bite is over $\frac{1}{8}$ " deep.
- k) **"Machine gouge"** is a groove cut by the machine below the desired surfacing line.
- "Very light"** machine gouge is not over $\frac{1}{64}$ " deep.
- "Light"** machine gouge is not over $\frac{1}{32}$ " deep.
- "Medium"** machine gouge is not over $\frac{1}{16}$ " deep.
- "Heavy"** machine gouge is not over $\frac{1}{8}$ " deep.
- "Very heavy"** machine gouge is over $\frac{1}{8}$ " 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 $\frac{1}{64}$ ".
- "Light"** machine offset is a variation not over $\frac{1}{32}$ ".
- "Medium"** machine offset is a variation not over $\frac{1}{16}$ ".
- "Heavy"** machine offset is a variation not over $\frac{1}{8}$ ".
- "Very heavy"** machine offset is a variation over $\frac{1}{8}$ ".
- 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 $\frac{1}{64}$ " deep.
- "Light"** chip marks are not over $\frac{1}{32}$ " deep.
- "Medium"** chip marks are not over $\frac{1}{16}$ " deep.
- "Heavy"** chip marks are not over $\frac{1}{8}$ " 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 $\frac{1}{64}$ " deep.
- "Light"** wavy dressing is not over $\frac{1}{32}$ " deep.
- "Medium"** wavy dressing is not over $\frac{1}{16}$ " deep.
- "Heavy"** wavy dressing is not over $\frac{1}{8}$ " deep.
- "Very heavy"** wavy dressing is over $\frac{1}{8}$ " deep.

722. MANUFACTURING IMPERFECTION CLASSIFICATION

- a) **Standard "A" Manufacture** admits very light torn grain; occasional very light chip marks; very light 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) **"Light"** 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 $\frac{3}{8}$ " in width and 15" in length.
- b) **"Small"** pitch streak is $\frac{1}{12}$ the width and $\frac{1}{6}$ the length of the piece.
- c) **"Medium"** pitch streak is $\frac{1}{6}$ the width and $\frac{1}{3}$ the length of the piece.
- d) **"Large"** pitch streak is not over $\frac{1}{4}$ the width by $\frac{1}{2}$ the length of the surface.
- e) **"Very large"** pitch streak is over $\frac{1}{4}$ the width by $\frac{1}{2}$ the length of the surface.
- f) **"Pitch 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 $\frac{1}{8}$ " wide and occupies on face surface not over $\frac{1}{4}$ square inch ($\frac{1}{8}$ " wide by 2" long, or $\frac{1}{16}$ " by 4").
- b) **"Small"** pith occupies not over $\frac{3}{4}$ square inch ($\frac{1}{4}$ " by 3", $\frac{3}{16}$ " by 4", $\frac{1}{8}$ " by 6", or $\frac{1}{16}$ " 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 - $\frac{1}{16}$ " in width and 3" in length, or $\frac{1}{8}$ " in width and 2" in length.
- b) **"Small"** pocket - $\frac{1}{16}$ " in width and 6" in length, or $\frac{1}{8}$ " in width and 4" in length, or $\frac{1}{4}$ " in width and 2" in length.
- c) **"Medium"** pocket - $\frac{1}{16}$ " in width and 12" in length, or $\frac{1}{8}$ " in width and 8" in length, or $\frac{3}{8}$ " 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 “**open**” pocket has an opening on opposite surfaces, and the through opening is considered the same as a through hole of equal size.

736. PLUGS AND FILLERS

Wood plugs and fillers are inserted into pieces of lumber to improve their appearance and usefulness.

Lumber containing plugs and fillers shall only be shipped when the order, 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 growth between the bark and the heartwood which contain the sap.

- a) “**Bright sapwood**” shows no stain and is not limited in any grade unless specifically stated in the grade description.
- b) “**Sapwood restrictions waived**” means that any restrictions in a rule on the amount of sapwood permitted in pieces graded under that rule are not to apply.
- c) “**Bright sapwood no defect**” (BSND) means that bright sapwood is permitted in each piece in any amount.
- 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.

739a. SAW-SIZED

Lumber uniformly sawn to the standard surface size but permitting in 20% of the pieces a manufacturing tolerance of $\frac{1}{32}$ " under. In addition, an oversize tolerance of $\frac{1}{8}$ " 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 $\frac{1}{32}$ " over size is permitted in NO. 2 & higher and Standard & higher grades, and in addition, a variation of $\frac{1}{32}$ " undersize in 20% of the pieces is permitted. In Stud, Utility and NO. 3 a variation of $\frac{1}{16}$ " 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 $\frac{1}{32}$ " wide.
- b) "**Medium**" shake is not over $\frac{1}{8}$ " 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, "**heart**" shake or "**heart check**" extends through the growth rings from or through the pith towards the surface of a piece and is distinguished from a 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.
- g) "**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 Sections 6.3.2.1 and 6.3.2.2 of PS 20.

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:

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", Para. 820d shall apply.

748. TRIM

- a) Trimming of lumber is the act of cross-cutting a piece to a given length. (See Para. 36)
- b) **"Double end trimmed (DET)"** lumber is trimmed square on both ends as per certified grading rules.

Note: As per the NGR Glossary, tolerances are specified in certified grade rules. 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.

Note: *This provision applies only to dimension lumber graded under the National Grading Rule for Dimension Lumber.*

752. WARP

Any deviation from a true or plane surface, including **“Bow”**, **“Crook”**, **“Cup”** and **“Twist”** or any combination thereof. Warp restrictions are based on the average form of warp as it occurs normally, and any variation from this average form, such as short kinks, shall be appraised according to its equivalent effect. Pieces containing two or more forms shall be appraised according to the combined effect in determining the amount permissible. In these rules, warp is classified as very light, light, medium and heavy, and applied to each width and length as set forth in the various grades in accordance with the following provisions and/or tables:

- a) **“Bow”** is a deviation flatwise from a straight line drawn from end to end of a piece. It is measured at the point of greatest distance from the straight line. The maximum amount of bow allowed in a grade is as follows:
- 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 allowed shall be that shown in Paras. 810a, b, and c.
- 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 shall be that shown in the following table.

CUP TABLES

Cup Classification	Nominal Face Width			
	2" & 3"	4"	5" & 6"	8"
Very light	1/32"	1/32"	1/32"	1/16"
Light	1/32"	1/32"	1/16"	1/8"
Medium	1/32"	1/16"	1/8"	3/16"
Heavy	1/16"	1/8"	3/16"	1/4"

Cup Classification	Nominal Face Width		
	10"	12"	14" & Wider
Very light	3/32"	1/8"	Proportionately more
Light	3/16"	1/4"	Proportionately more
Medium	1/4"	3/8"	Proportionately more
Heavy	3/8"	1/2"	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 allowed shall be that shown in Para. 810d.

754. COMBINATION GRADES

CSA 0141 and PS 20 permit grouping the highest two grades in a dimension grade category, and grade marking the combination as an **"& Better"** or **"& Btr"** grade. The combined grade is assigned the allowable property values of the lower grade unless allowable property values have been assigned to the combination.

Note: *The following paragraphs are excerpted from the ALSC NO. 1 & Better Policy and apply to the "NO. 1 & Btr" grade of D Fir-L (N) and Hem-Fir (N) dimension lumber for use in the U.S. only.*

In the case of **"NO. 1 & Btr"**, data collected for Douglas Fir-Larch, Douglas Fir-Larch (N), Hem-Fir and Hem-Fir (N) during the North American in-grade testing program permitted development of allowable property values unique to the **"NO. 1 & Btr"** combination grade. When the **"& Btr"** combination grade is assigned unique allowable properties, as in the case of **"NO. 1 & Btr"** Douglas Fir-Larch

(N) and Hem-Fir (N) and the material is stamped with a **“NO. 1 & Btr”** combination grade stamp, the allowable properties assigned to the combination grade shall apply. If, on the other hand, the lumber is grade-stamped with the individual grade designations, such as **“Select Structural”** and **“NO. 1”** rather than **“NO. 1 & Btr”**, the properties assigned to the individual grades apply.

The following grading restrictions apply to the **“NO. 1 & Btr”** combination grade for species that have been assigned unique allowable properties:

- a) Eligible material shall only be pulled by a mill performing the initial breakdown of logs, and
- b) The **“NO. 1 & Btr”** combination grade stamp shall not be applied to regraded, pre-graded, remanufactured, or pre-sorted material.

When Douglas Fir-Larch (N) and Hem-Fir (N) species combinations or their individual constituent species are grade-stamped **“NO. 1 & Btr”**, it is not permissible to simultaneously sort any other grades with any higher allowable property values than the **“NO. 1 & Btr”** combination grade even if pieces would otherwise qualify.

For example: Select Structural, some grades of MSR, MEL, lamination, scaffold plank, and decking are not permitted to be sorted and stamped when producing lumber stamped **“NO. 1 & Btr”**.

NOTES

TABLES

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 (in inches) 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 (in inches) 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 long- er*	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 long -er*	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 SIZES - FINISH, CLEARS, FLOORING, CEILING, SIDING & 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"	8 mm	2"	1-1/2"	38 mm
	1/2"	7/16"	11 mm	3"	2-1/2"	64 mm
	5/8"	9/16"	14 mm	4"	3-1/2"	89 mm
	3/4"	5/8"	16 mm	5"	4-1/2"	114 mm
	1"	3/4"	19 mm	6"	5-1/2"	140 mm
	1-1/4"	1"	25 mm	8"	7-1/4"	184 mm
	1-1/2"	1-1/4"	32 mm	10"	9-1/4"	235 mm
	2"	1-1/2"	38 mm	12"	11-1/4"	286 mm
	2" to 4"	1/2" off	13 mm off	Over 12"	3/4" off	19 mm off
Flooring	3/8"	5/16"	8 mm	2"	1-1/2"	38 mm
	1/2"	7/16"	11 mm	3"	2-1/2"	64 mm
	5/8"	9/16"	14 mm	4"	3-1/2"	89 mm
	3/4"	5/8"	16 mm	5"	4-1/2"	114 mm
	1"	3/4"	19 mm	6"	5-1/2"	140 mm
	1-1/4"	1"	25 mm			
	1-1/2"	1-1/4"	32 mm			
Ceiling	3/8"	5/16"	8 mm	3"	2-1/2"	64 mm
	1/2"	7/16"	11 mm	4"	3-1/2"	89 mm
	5/8"	9/16"	14 mm	5"	4-1/2"	114 mm
	3/4"	11/16"	17 mm	6"	5-1/2"	140 mm

**820a. (continued) STANDARD DRY SIZES - FINISH, CLEARS,
FLOORING, CEILING, SIDING & STEPPING**

Item	Nominal Thickness	Surfaced Thickness		Nominal Width	Surfaced Width	
		Imperial	Metric		Imperial	Metric
Siding (T&G) (1/4" or 6 mm tongue)	5/8"	9/16"	14 mm	4"	3-1/8"	79 mm
	1"	25/32"	18 mm	5"	4-1/8"	105 mm
				6"	5-1/8"	130 mm
				8"	6-7/8"	175 mm
				10"	8-7/8"	225 mm
				12"	10-7/8"	276 mm
Siding (Ship-lapped) (1/2" or 13 mm lap)	5/8"	9/16"	14 mm	4"	2-7/8"	73 mm
	1"	25/32"	18 mm	5"	3-7/8"	98 mm
	2"	1-1/2"	38 mm	6"	4-7/8"	124 mm
				8"	6-5/8"	168 mm
				10"	8-5/8"	219 mm
				12"	10-5/8"	270 mm
Stepping	1"	3/4"	19 mm	8"	7-1/4"	184 mm
	1-1/4"	1"	25 mm	10"	9-1/4"	235 mm
	1-1/2"	1-1/4"	32 mm	12"	11-1/4"	286 mm
	2"	1-1/2"	38 mm	Over 12"	1" off	25 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 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	8	11/32	9	2	1-1/2	38	1-9/16	40
	1/2	7/16	11	15/32	12	3	2-1/2	64	2-9/16	65
	5/8	9/16	14	19/32	15	4	3-1/2	89	3-9/16	90
	3/4	5/8	16	11/16	17	5	4-1/2	114	4-5/8	117
	1	3/4	19	25/32	20	6	5-1/2	140	5-5/8	143
	1-1/4	1	25	1-1/32	26	7	6-1/2	165	6-5/8	168
	1-1/2	1-1/4	32	1-9/32	33	8	7-1/4	184	7-1/2	190
						9	8-1/4	210	8-1/2	216
						10	9-1/4	235	9-1/2	241
						11	10-1/4	260	10-1/2	267
						12	11-1/4	286	11-1/2	292
						14	13-1/4	337	13-1/2	343
						16	15-1/4	387	15-1/2	394
Centre-Matched (1/4" or 6mm T&G)	1	3/4	19	25/32	20	4	3-1/8	79	3-3/16	81
	1-1/4	1	25	1-1/32	26	6	5-1/8	130	5-1/4	133
	1-1/2	1-1/4	32	1-9/32	33	8	6-7/8	175	7-1/8	181
Centre-Matched (3/8" or 10mm T&G)	2	1-1/2	38	1-9/16	40	4	3	76	3-1/16	78
	2-1/2	2	51	2-1/16	52	6	5	127	5-1/8	130
	3	2-1/2	64	2-9/16	65	8	6-3/4	171	7	178
	3-1/2	3	76	3-1/16	78	10	8-3/4	222	9	229
	4	3-1/2	89	3-9/16	90	12	10-3/4	273	11	279

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)	2	1-1/2	38	1-9/16	40	2	1-1/2	38	1-9/16	40
	2-1/2	2	51	2-1/16	52	3	2-1/2	64	2-9/16	65
	3	2-1/2	64	2-9/16	65	4	3-1/2	89	3-9/16	90
	3-1/2	3	76	3-1/16	78	5	4-1/2	114	4-5/8	117
	4	3-1/2	89	3-9/16	90	6	5-1/2	140	5-5/8	143
	4-1/2	4	102	4-1/16	103	7	6-1/2	165	6-5/8	168
						8	7-1/4	184	7-1/2	190
						9	8-1/4	210	8-1/2	216
						10	9-1/4	235	9-1/2	241
						11	10-1/4	260	10-1/2	267
Decking						12	11-1/4	286	11-1/2	292
						14	13-1/4	337	13-1/2	343
						16	15-1/4	387	15-1/2	394
Shiplap (3/8" Lap) (1/2" Lap optional)	1	3/4	19	25/32	20	4	3-1/8	79	3-3/16	81
						6	5-1/8	130	5-1/4	133
						8	6-7/8	175	7-1/8	181
						10	8-7/8	225	9-1/8	232
						12	10-7/8	276	11-1/8	283

* In Western R Cedar and Eastern W Cedar only, the minimum green sizes are: nominal **5"** - 4-9/16", **6"** - 5-9/16", **7"** - 6-9/16", **8"** - 7-3/8", **9"** - 8-3/8", **10"** - 9-3/8", **11"** - 10-3/8", **12"** - 11-3/8", **14"** - 13-7/16", and **16"** - 15-7/8".

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	25/32	20	2	1-1/2	38	1-9/16	40
	1-1/4	1	25	1-1/32	26	3	2-1/2	64	2-9/16	65
	1-1/2	1-1/4	32	1-9/32	33	4	3-1/2	89	3-9/16	90
	2	1-1/2	38	1-9/16	40	5	4-1/2	114	4-5/8	117
	2-1/2	2	51	2-1/16	52	6	5-1/2	140	5-5/8	143
	3	2-1/2	64	2-9/16	65	7	6-1/2	165	6-5/8	168
	3-1/2	3	76	3-1/16	78	8	7-1/4	184	7-1/2	190
	4	3-1/2	89	3-9/16	90	9	8-1/4	210	8-1/2	216
						10	9-1/4	235	9-1/2	241
						11	10-1/4	260	10-1/2	267
						12	11-1/4	286	11-1/2	292
						14	13-1/4	337	13-1/2	343
						16	15-1/4	387	15-1/2	394

* Nominal 5" and thicker pieces are surfaced 1/2" off in both thickness and width.

**820d. ALTERNATE SIZES - DIMENSION AND TIMBERS -
STANDARD SAWN (ROUGH GREEN)**

Nominal Size	Standard Sawn Size	Variation <u>Over</u> Standard Sawn Size	Variation <u>Under</u> 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" (127 mm) 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	13 mm off nominal	1/2" off nominal	13 mm off nominal
	7" to 15"	3/4" off nominal	19 mm off nominal	1/2" off nominal	13 mm off nominal
	16" and greater	1" off nominal	25 mm off nominal	1/2" off nominal	13 mm off nominal

Note: The term "**off nominal**" refers to the amount that is "less than nominal" size. (e.g., a nominal 8" 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'.

COMMONLY USED LUMBER ABBREVIATIONS

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	foot board measure
F_b	extreme fibre in bending
F_{Cperp}	compression perpendicular to grain
F_C	compression parallel to grain
FG (SG)	flat (slash) grain
FJ	fingerjoined
FLB	full-length bundling
Fig	flooring
FOB	free on board (at a named point)
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)	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
SG (FG)	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
VG	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

METRIC CONVERSION

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

<u>To convert:</u>	<u>Multiply by:</u>
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

<u>To convert:</u>	<u>Multiply by:</u>
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

DIMENSION 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	482.6
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

NOTES

GRADE STAMPING AGENCIES

The following list shows the contact information and grade stamp facsimiles of NLGA member Grading Agencies that are accredited by the CLSAB and ALSB 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

A.F.P.A.[®] 00
S-P-F NLGA
KD-HT 1

Canadian Mill Services Association

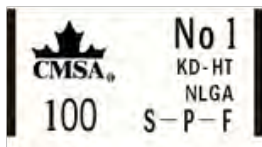
Suite 280, 500 - 6th Ave

New Westminster, BC V3L 1V3

Tel: (604) 523-1288

Website: www.canserve.org

E-mail: info@canserve.org



**Canadian Softwood Inspection Agency, Inc. and
Macdonald Inspection Services (a division of CSI)**

902 County Rd - 50 East

Harrow, ON N0R 1G0

Tel: (855) 714-2090

Website: www.canadiansoftwood.com

E-mail: info@canadiansoftwood.com



or



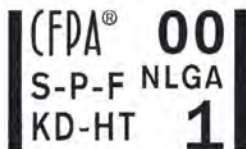
Central Forest Products Association Inc.

1200 Cook Dr.

Prince Albert, SK S6V 2R8

Tel: (306) 960-5914

E-mail: cfpainspections@sasktel.net



Council of Forest Industries

Suite 250 - 1855 Kirschner Road

Kelowna, BC V1Y 4N7

Tel: (250) 860-9663

Website: www.cofi.org

E-mail: info@cofi.org



KD-HT

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NLGA

or



KD-HT

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Maritime Lumber Bureau

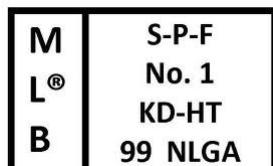
P.O. Box 459

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 AOG 2L0

Tel: (709) 533-2206

E-mail: nllpa@personainternet.com



Ontario Forest Industries Association (Home of CLA Grading and Inspection)

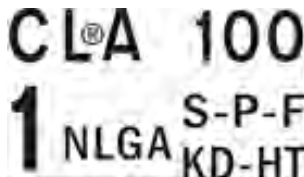
Suite 1704 - 8 King Street East

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

POM 2N0

Tel: (705) 898-1036

Website: www.olma.ca

E-mail: info@olma.ca

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Pacific Lumber Inspection Bureau

U.S. Office:

Suite 210, 1010 S. 336th St

Federal Way, WA 98003

Tel: (253) 835-3344

Canada Office:

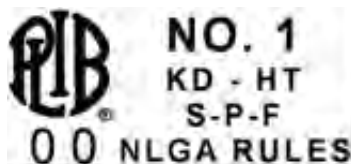
P.O. Box 19118

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



S-P-F
S-DRY
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NLGA

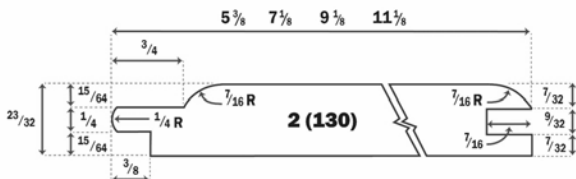
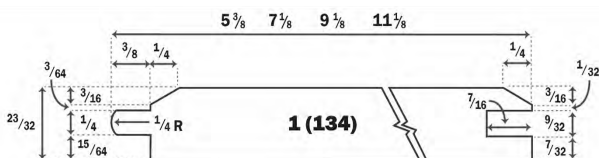
WORKED LUMBER PATTERNS

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.

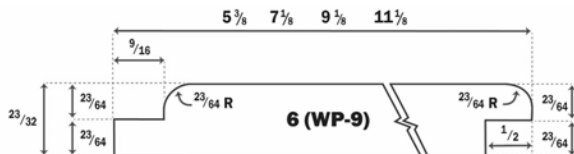
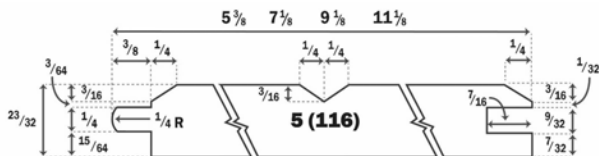
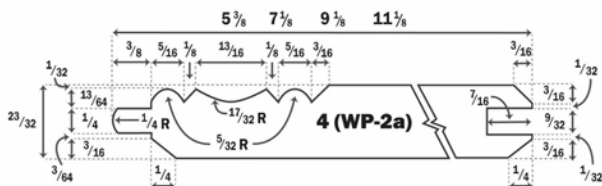
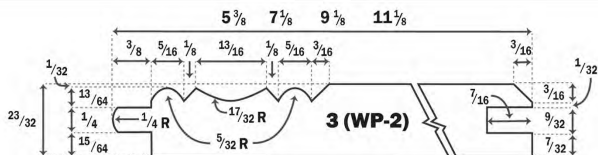
The number in parenthesis refers to a pattern designation taken from the originating grading Agency's moulding catalog. The letters "CLA" refer to the "Canadian Lumbermen's Association" (now administered by the Ontario Forest Industries Association). The letters "WP" refer to the "Western Wood Products Association".

Dimensions of patterns illustrated may vary according to manufacturer. When specifying, close attention must be given to sizes stated.

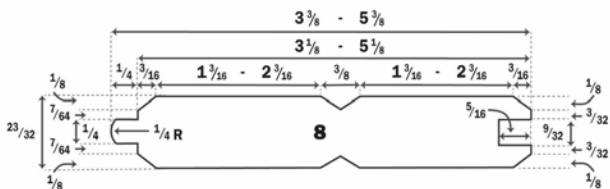
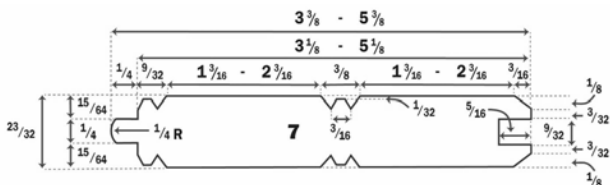
PANELLING



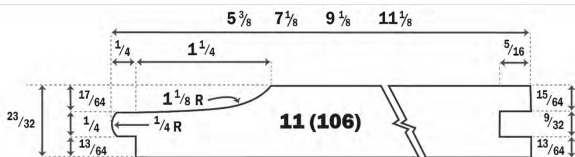
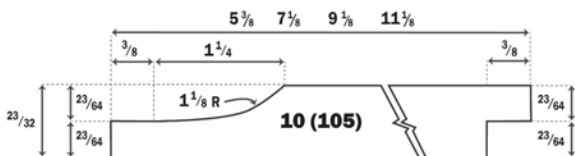
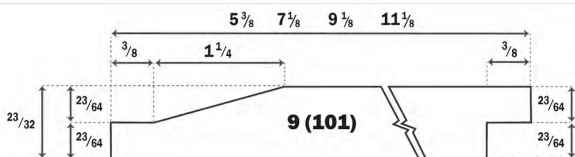
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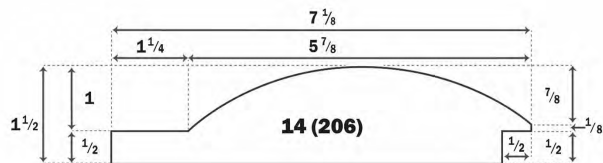
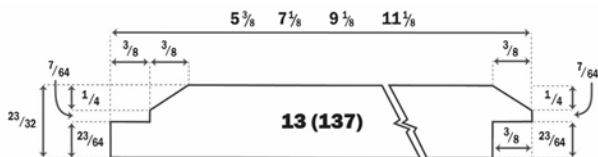
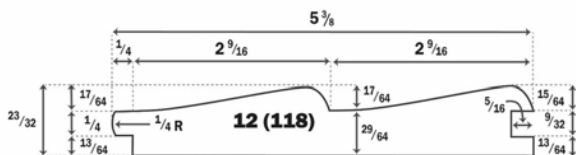
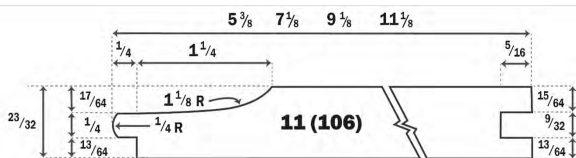
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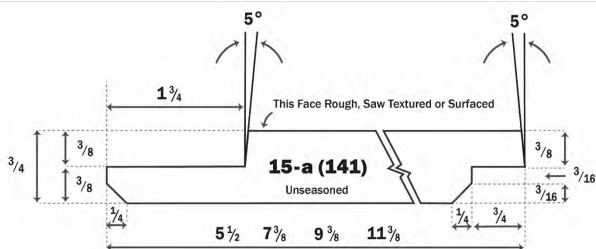
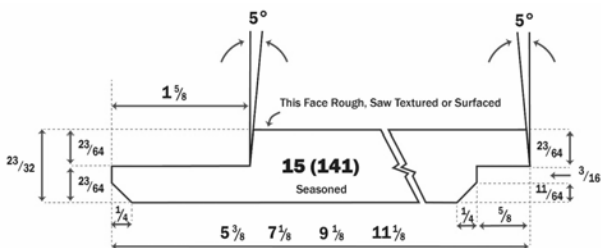
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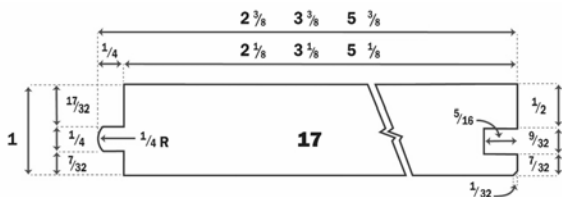
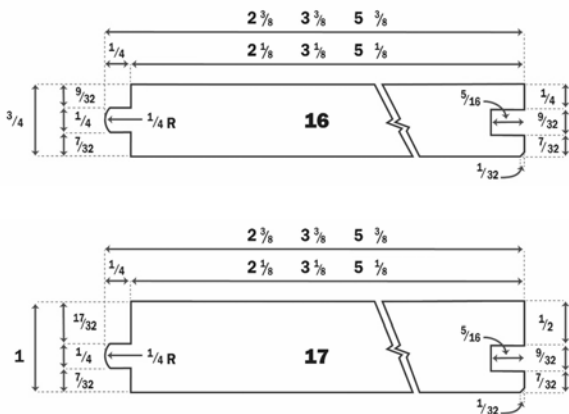
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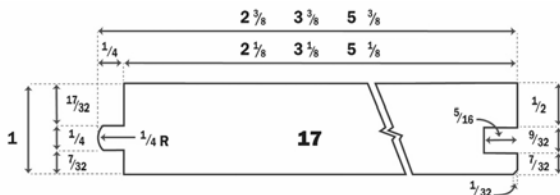
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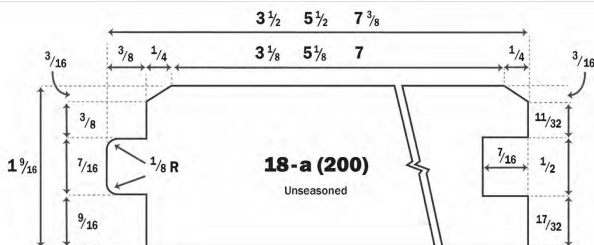
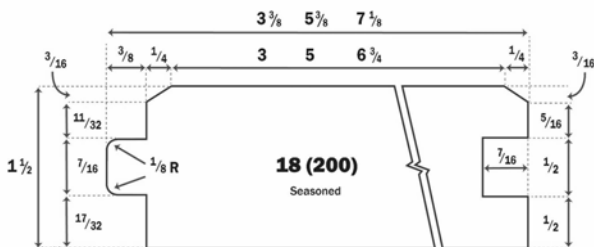
FLOORING



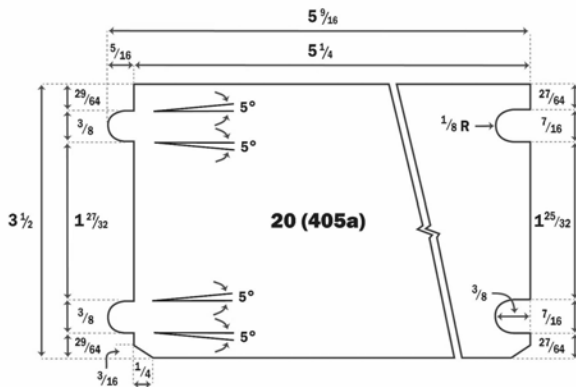
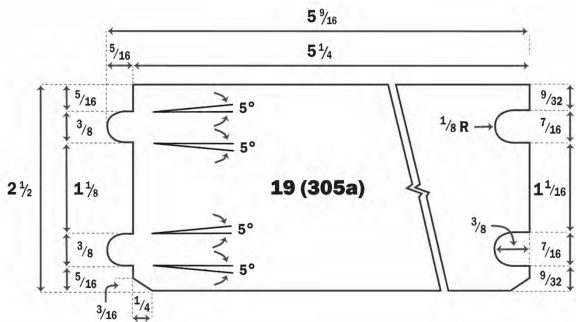
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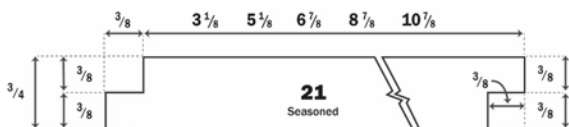
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DECKING (Continued)



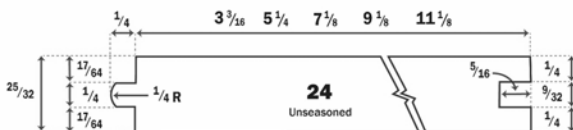
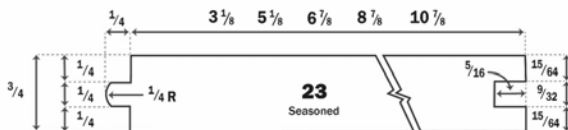
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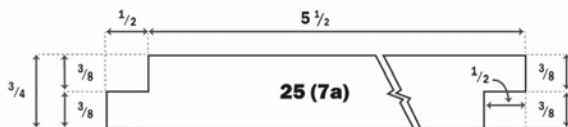
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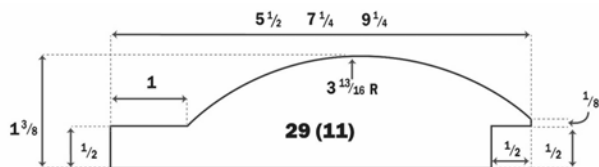
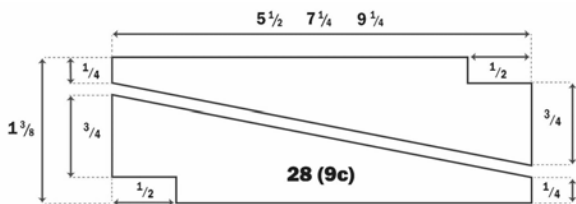
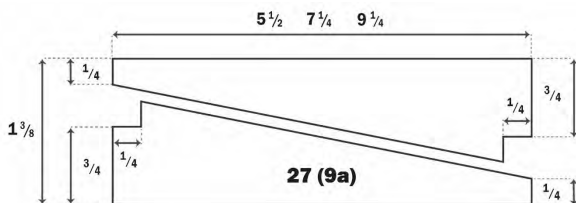
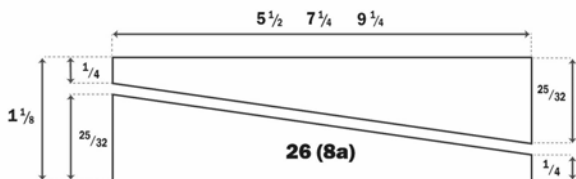
CENTREMATCH



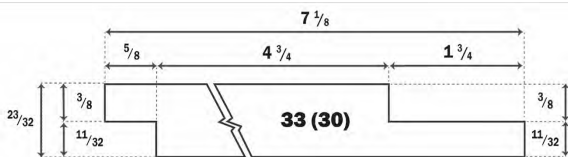
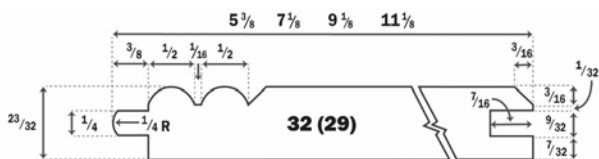
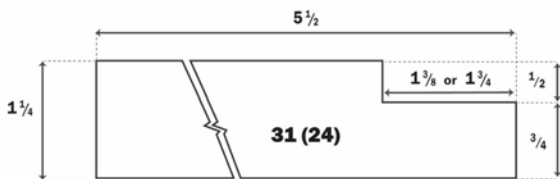
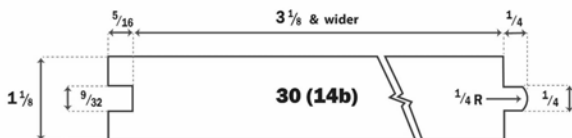
"CLA" PATTERNS



“CLA” PATTERNS (Continued)



"CLA" PATTERNS (Continued)



LUMBER DESIGN VALUES FOR USE IN THE U.S.

Approved by the
AMERICAN LUMBER STANDARD COMMITTEE, INC.
BOARD OF REVIEW

900. U.S. DESIGN VALUES - GENERAL

Recommended design procedures and allowable unit stresses for structural lumber manufactured under the NLGA Grading Rules have been developed for use in the United States.

Lumber design values are regularly reviewed to reflect the latest available information on the physical properties of wood. The recommended allowable unit stresses published in this document 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.

Recommended allowable unit stresses are developed in conformance to the American Softwood Lumber Standard, PS 20 and are given in Paras. 905a to 905o.

Load and Resistance Factor Design Values

The design values tabulated in Paras. 905i to 905o and 910, 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 design values by the factors listed in the following table:

Conversion Factors for ASD to LRFD Values

Extreme Fiber in Bending "F _b "	Tension Parallel to Grain "F _t "	Horizontal Shear "F _v "	Compression Perpendicular to Grain "F _{c_{perp}} "	Compression Parallel to Grain "F _c "	Modulus of Elasticity "E"
2.54	2.70	2.88	2.08	2.40	1.00

905. DESIGN VALUES FOR THE U.S.

905a. DESIGN VALUE ESTABLISHMENT AND APPLICATION

Recommended allowable unit stresses and adjustment factors found in Paras. 905b to 905o of the NLGA Grading Rules apply to lumber of NLGA species and species combinations (see Paras. 7, 7a and 7b) for use in the United States. The 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 allowable unit stresses shown herein are recommended for use in design for all normal construction. Higher and lower design stresses 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.

Recommended design values are assigned to six basic properties of wood. These are fibre stress in bending (F_b), tension parallel to grain (F_t), horizontal shear (F_v), compression parallel to grain ($F_{c\parallel}$), 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 fibre stress in bending (F_b), tension parallel to grain (F_t), compression parallel to grain ($F_{c\parallel}$) and horizontal shear (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 fibre stress in bending (F_b), tension parallel to grain (F_t), compression parallel to grain ($F_{c\parallel}$), and modulus of elasticity (E). The other two properties, and all properties for timbers, are based on tests of clear wood for the various species.

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 combinations 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 recommended “E” values for dimension lumber and decking shown in the tables of Paras. 905i to 905m apply to dry use of lumber manufactured in either dry or unseasoned condition.

Recommended “E” values for Beams & Stringers and for Posts & Timbers shown in the tables of Paras. 905n and 905o, 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. Table 905h compares “E” values for Select Structural grade, as an example.

In the NLGA Grading Rules, the various grades used for construction purposes are divided into size categories according to the principal end uses.

The allowable unit stresses for these major grade categories are tabulated in Paras. 905i to 905o. The tables show recommended design values for engineered use as single members, 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 current “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) as joists, rafters, or beams. Adjustment factors for pieces loaded on the wide face (flatwise use) are tabulated in Para. 905d.

905b. ENGINEERING DESIGN VALUES

The recommended 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.

905c. 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, that are adjacent or are spaced not more than 24-inches and are joined by floor, roof, or other load-distributing elements.

905d. 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 allowable 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" & 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

905e. EFFECT OF MOISTURE CONTENT ON DESIGN VALUES

The design values shown in the tables in Paras. 905i. to 905o., 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 design values shown in the tables in Paras. 905i to 905m shall be multiplied by the following adjustment factors:

Bending "F _b "	Tension "F _t "	Compression Parallel to Grain "F _c "	Horizontal Shear "F _v "	Compression Perpendicular to Grain "F _{cperp} "	Modulus of Elasticity "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 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. 905n. and 905o. shall be multiplied by the following adjustment factors:

Bending "F _b "	Tension "F _t "	Compression Parallel to Grain "F _c "	Horizontal Shear "F _v "	Compression Perpendicular to Grain "F _{cperp} "	Modulus of Elasticity "E"
1.00	1.00	0.91	1.00	0.67	1.00

905f. HORIZONTAL SHEAR DESIGN VALUES FOR LUMBER AND TIMBERS

Shear design values for lumber have been 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. 905i to 905o.

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: www.awc.org

905g. ADJUSTMENT FACTORS FOR WIDTH

- a) Tabulated 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 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" by 4" lumber.
- c) Tabulated design values for Stud grade apply to nominal 5" and 6" widths. For nominal 6" 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 property values for NO. 3 grade (Table 905i) and width adjustment factors as listed in Table 905g (a) above.

905h. 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” (Para. 124) grade.

See commentary in Para. 905a.

Select Structural Grade “E” Values *

Species Combination	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	1,700,000
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.

**905i. RECOMMENDED ALLOWABLE UNIT STRESSES:
STRUCTURAL LIGHT FRAMING AND JOISTS & PLANKS
(Para. 124) (in psi)**

Values are based on a nominal 2" x 12" basis. For size adjustment factors, see Para. 905g a).

Species Comb.	Grade	Extreme Fibre in Bending	Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity (million psi)
		"F _b "	"F _t "		Parallel to Grain	Perpendicular to Grain	
		"F _b "	"F _t "	"F _v "	"F _c "	"F _{cperp} "	"E"
D Fir-L (N)	Select Str	1350	825	180	1900	625	1.9
	NO. 1 & Btr	1150	750		1800		1.8
	NO. 1	850	500		1400		1.6
	NO. 2	850	500		1400		1.6
	NO. 3	475	300		825		1.4
Hem-Fir (N)	Select Str	1300	775	145	1700	405	1.7
	NO. 1 & Btr	1200	725		1550		1.7
	NO. 1	1000	575		1450		1.6
	NO. 2	1000	575		1450		1.6
	NO. 3	575	325		850		1.4
S-P-F	Select Str	1250	700	135	1400	425	1.5
	NO. 1	875	450		1150		1.4
	NO. 2	875	450		1150		1.4
	NO. 3	500	250		650		1.2
North Species	Select Str	975	425	110	1100	350	1.1
	NO. 1	625	275		850		1.1
	NO. 2	625	275		850		1.1
	NO. 3	350	150		500		1.0
Yellow Cedar (N)	Select Str	1200	725	175	1200	540	1.6
	NO. 1	800	475		1000		1.4
	NO. 2	800	475		1000		1.4
	NO. 3	475	275		575		1.2

905i. (continued) RECOMMENDED ALLOWABLE UNIT
STRESSES: STRUCTURAL LIGHT FRAMING AND JOISTS &
PLANKS (Para. 124) (in psi)

Species	Grade	Extreme Fibre in Bending	Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity (million psi)
					Parallel to Grain	Perpendicular to Grain	
		"F _b "	"F _t "	"F _v "	"F _c "	"F _{cperp} "	"E"
C Sitka	Select Str	1300	950	125	1200	455	1.7
	NO. 1	925	550		1100		1.5
	NO. 2	925	550		1100		1.5
	NO. 3	525	325		625		1.4
Norway Spruce (N)	Select Str	950	600	190	1100	410	1.5
	NO. 1	650	425		900		1.3
	NO. 2	650	425		900		1.3
	NO. 3	375	250		525		1.2

905j. RECOMMENDED ALLOWABLE UNIT STRESSES: LIGHT FRAMING (Para. 122) (in psi)

Values are based on a nominal 2" x 4" basis. For size adjustment factors, see Para. 905g b).

Species or Species Comb.	Grade	Extreme Fibre in Bending	Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity (million psi)
					Parallel to Grain	Perpendicular to Grain	
		"F _b "	"F _t "	"F _v "	"F _c "	"F _{c⊥} "	"E"
D Fir-L (N)	Const	950	575	180	1800	625	1.5
	Stand	525	325		1450		1.4
	Utility	250	150		950		1.3
Hem-Fir (N)	Const	1150	650	145	1750	405	1.5
	Stand	650	350		1500		1.4
	Utility	300	175		975		1.3
S-P-F	Const	1000	500	135	1400	425	1.3
	Stand	550	275		1150		1.2
	Utility	275	125		750		1.1
North Species	Const	700	325	110	1050	350	1.0
	Stand	400	175		875		0.9
	Utility	175	75		575		0.9
Yellow Cedar (N)	Const	925	550	175	1200	540	1.3
	Stand	525	300		1050		1.2
	Utility	250	150		675		1.1
Coast Sitka	Const	1050	650	125	1300	455	1.4
	Stand	600	350		1100		1.3
	Utility	275	175		725		1.2
Norway Spruce (N)	Const	725	475	190	1100	410	1.2
	Stand	400	275		925		1.1
	Utility	200	125		600		1.1

Note: Values for the Utility grade apply only to nominal 2" x 4" lumber.

905k. RECOMMENDED ALLOWABLE UNIT STRESSES: SELECT STRUCTURAL SCAFFOLD PLANK (Para. 180)

No width adjustment factors apply to these values.

Species or Species Combination	Nominal 2" Maximum Thickness ¹ Wet Service Condition ²		Nominal 3" Maximum Thickness ³ Wet Service Condition ⁴	
	Extreme Fibre in Bending "F _b " (psi)	Modulus of Elasticity "E" (million psi)	Extreme Fibre in Bending "F _b " (psi)	Modulus of Elasticity "E" (million psi)
	Single Member		Single Member	
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.

905I. RECOMMENDED ALLOWABLE UNIT STRESSES: STUDS
(Para. 121) (in psi)

Values based on a nominal 2" x 6" basis. For size adjustment factors, see Para. 905g c). For Studs wider than nominal 6", use the property values for NO. 3 grade in Para. 905i and width adjustment factors as listed in Para. 905g a).

Species or Species Combination	Grade	Extreme Fibre in Bending	Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity (million psi)
					Parallel to Grain	Perpendicular to Grain	
		"F _b "	"F _t "	"F _v "	"F _c "	"F _{cperp} "	"E"
D Fir-L (N)	Stud	650	400	180	900	625	1.4
Hem-Fir (N)	Stud	775	450	145	925	405	1.4
S-P-F	Stud	675	350	135	725	425	1.2
N Species	Stud	475	225	110	550	350	1.0
Y Cedar (N)	Stud	625	375	175	650	540	1.2
C Sitka	Stud	725	450	125	675	455	1.4
N Spruce (N)	Stud	500	325	190	575	410	1.2

**905m. RECOMMENDED ALLOWABLE UNIT STRESSES:
DECKING (Para. 127 only) (in psi)**

No width adjustment factors apply to these values.

Species or Species Combination	Grade	Extreme Fiber in Bending "F _b "	Compression Perpendicular to Grain "F _{c_{perp}} "	Modulus of Elasticity "E" (million psi)
		Single member		
D Fir-L (N)	Select	1750	625	1.8
	Commercial	1450		1.7
Hem-Fir (N)	Select	1350	405	1.5
	Commercial	1100		1.4
Hem-Tam (N)	Select	1500	555	1.3
	Commercial	1250		1.1
S-P-F	Select	1200	425	1.5
	Commercial	1000		1.3
W Hem (N)	Select	1500	410	1.6
	Commercial	1300		1.4
C Sitka	Select	1250	455	1.7
	Commercial	1050		1.5
P Pine	Select	1200	535	1.3
	Commercial	1000		1.1
W Cedar (N)	Select	1200	425	1.1
	Commercial	1050		1.0
WW Pine	Select	1100	375	1.4
	Commercial	925		1.3
Red Pine	Select	1150	440	1.3
	Commercial	975		1.2
EW Pine (N)	Select	900	350	1.2
	Commercial	775		1.1
North Species	Select	900	350	1.1
	Commercial	775		1.0
Coast Species	Select	1250	370	1.5
	Commercial	1050		1.4

Note 1: Allowable fibre stress in bending (F_b) applies only when the plank is used flatwise, e.g., when loaded on the wide face.

Note 2: See Paras. 905a to 905f for conditions of use and adjustment factors.

905n. **RECOMMENDED ALLOWABLE UNIT STRESSES: BEAMS
& STRINGERS (Para. 130) (in psi)**

Species or Species Comb.	Grade	Single member	Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity (million psi)
		Extreme Fibre in Bending			Parallel to Grain	Perpendicular to Grain	
		"F _b "	"F _t "	"F _v "	"F _c "	"F _{cperp} "	"E"
D Fir-L (N)	Select 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)	Select 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)	Select 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	Select 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)	Select 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	Select 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	Select Str	1100	725	130	750	535	1.1
	NO. 1 Str	925	500		625		1.1
	NO. 2 Str	600	300		400		0.9

**905n. (continued) RECOMMENDED ALLOWABLE UNIT
STRESSES: BEAMS & STRINGERS (Para. 130) (in psi)**

Species or Species Comb.	Grade	Single member	Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity (million psi)
		Extreme Fibre in Bending			Parallel to Grain	Perpendicular to Grain	
		"F _b "	"F _t "		"F _c "	"F _c perp"	
Western Cedars (N)	Select 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	Select 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	Select 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 stresses are provided for EW Pine (N), N. Aspen, Black Cottonwood, Northern Species and Coast Species.

Note 2: Allowable fibre stress in bending (F_b) applies only when the member is loaded on the narrow face (edgewise use).

Note 3: See Paras. 905a to 905f for conditions of use and adjustment factors.

905o. RECOMMENDED ALLOWABLE UNIT STRESSES: POSTS & TIMBERS (Para. 131) (in psi)

Species or Species Comb.	Grade	Single member	Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity (million psi)
		Extreme Fibre in Bending			Parallel to Grain	Perpendicular to Grain	
		"F _b "	"F _t "	"F _v "	"F _c "	"F _{cperp} "	"E"
D Fir-L (N)	Select 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)	Select 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)	Select 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	Select 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)	Select 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	Select 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	Select Str	1000	675	130	800	535	1.1
	NO. 1 Str	825	550		700		1.1
	NO. 2 Str	475	325		325		0.9

**905o. (continued) RECOMMENDED ALLOWABLE UNIT
STRESSES: POSTS & TIMBERS (Para. 131) (in psi)**

Species or Species Comb.	Grade	Single member	Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity (million psi)
		Extreme Fibre in Bending			Parallel to Grain	Perpendicular to Grain	
		"F _b "	"F _t "		"F _c "	"F _c perp"	
Western Cedars (N)	Select 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	Select 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	Select 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 stresses are provided for EW Pine (N), N. Aspen, Black Cottonwood, Northern Species and Coast Species.

Note 2: If Post & Timber sizes are graded to Beam & Stringer requirements, design values for Beams & Stringers apply.

Note 3: See Paras. 905a to 905f for conditions of use and adjustment factors.

910. DESIGN VALUES FOR MACHINE GRADED LUMBER

910a. SPECIFIC GRAVITY

Assigned specific gravity values vary depending on the Grade “E” values of machine graded lumber as follows:

Species Combination	Grade “E” (million psi)	Assigned Specific Gravity
D Fir-L (N)	1.2 to 1.9	0.49
	2.0 to 2.2	0.53
	2.3 and greater	0.57
S-P-F	1.2 to 1.7	0.42
	1.8 to 1.9	0.46
	2.0 and greater	0.50
Hem-Fir (N)	all Grade “E” values	0.46

Note: Specific gravity values assigned to all MSR/MEL grades are shown above, unless otherwise qualified by tests and designated on the grade stamp.

910b. HORIZONTAL SHEAR (F_v)

Assigned horizontal shear (F_v) values vary depending on the Grade “E” values of machine graded lumber as follows:

Species Combination	Grade “E” (million psi)	F_v value (psi)
D Fir-L (N)	1.2 to 2.2	180
	2.3 and greater	190
S-P-F	1.2 to 1.7	135
	1.8 to 1.9	160
	2.0 and greater	170
Hem-Fir (N)	all Grade “E” values	145

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):

$$F_v = (284.8 \times \text{Specific gravity value}) + 26.6$$

Note: Calculated values to be rounded to the nearest 5 psi.

910c. COMPRESSION PERPENDICULAR TO GRAIN ($F_{C\text{perp}}$)

Assigned compression perpendicular to grain ($F_{C\text{perp}}$) values vary depending on the Grade “E” values of machine graded lumber as follows:

Species Combination	Grade “E” (million psi)	$F_{C\text{perp}}$ value (psi)
D Fir-L (N)	1.2 to 1.9	625
	2.0 and greater	715
S-P-F	1.2 to 1.7	425
	1.8 to 1.9	525
	2.0 and greater	615
Hem-Fir (N)	all Grade “E” values	405

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):

$$F_{C\text{perp}} = (2243.8 \times \text{Specific gravity value}) - 473.8$$

Note: Calculated values to be rounded to the nearest 5 psi.

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” $F_{C\text{perp}}$ value with the following formula (as per ASTM D6570, Appendix X1.3.1):

$$F_{C\text{perp}.02} = (0.71 \times F_{C\text{perp}.04}) + 15$$

910d. DESIGN VALUES: MACHINE STRESS-RATED LUMBER (MSR) (Grade description as per Para. 128b) (in psi) (normal loading)

MSR Grade	Bending at Extreme Fibre "F _b "	Modulus of Elasticity "E"	Tension Parallel to Grain "F _t "	Compression Parallel to Grain "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: Grades of MSR may be produced with alternate design stress assignments as provided for in the NLGA Grading Rules.

Note: Allowable fibre stress in bending (F_b) applies only when the member is loaded on the narrow face (edgewise use). See Para. 905d 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 Fibre "F_b"	Modulus of Elasticity "E"	Tension Parallel to Grain "F_t"	Compression Parallel to Grain "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

910e. DESIGN VALUES: MACHINE EVALUATED LUMBER (MEL)
(Grade description as per Para. 128c) (in psi) (normal loading)

MEL Grade	Bending at Extreme Fibre " F_b "	Modulus of Elasticity " E "	Tension Parallel to Grain " F_t "	Compression Parallel to Grain " $F_{c\parallel}$ "
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 ($F_{c\parallel}$)	25
Compression Perpendicular to Grain ($F_{c\perp}$)	5

Note: Grades of MEL may be produced with alternate design stress assignments as provided for in the NLGA Grading Rules.

NLGA STANDARD GRADING RULES FOR CANADIAN LUMBER December 1, 2022

This version of the NLGA Standard Grading Rules for Canadian Lumber consists of 322 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, please visit the publication section of the NLGA website (www.nlga.org).



INTERPRETATIONS
and
EUROPEAN UNION LUMBER EXPORT - VISUAL GRADE
REQUIREMENTS ANNEX

Effective December 1, 2022

This version supersedes all prior editions, revisions, and supplements.

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PREFACE

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 to 124, and the additional requirements shown in this section.

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PART 1: INTERPRETATIONS OF THE NATIONAL GRADING RULE FOR DIMENSION LUMBER

1.0 GENERAL

The limiting provisions of the National Grading Rule 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 National Grading Rule Interpretations provide additional information to the grader/inspector in the application of the National Grading Rule. These interpretations have been approved by the National Grading Rule Committee and shall be considered a mandatory part of the National Grading Rule.

All measurements are based on actual size unless otherwise specified except 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'. 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 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

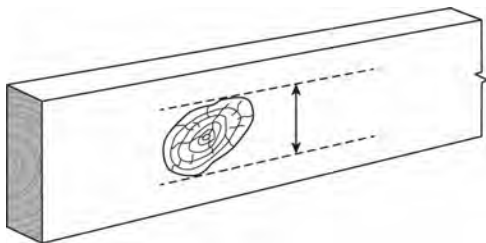
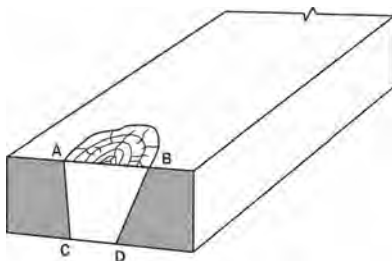


FIGURE 2



$$\text{Knot size} = (\text{Length AB} + \text{Length CD}) / 2$$

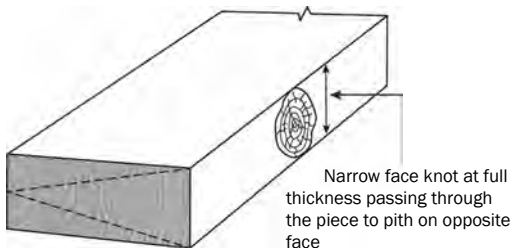
Except as otherwise provided in these interpretations for knots on narrow faces, the cross sectional area displacement shall not exceed that of the maximum knot allowed at the edge of the wide face (see chart below for allowable displacement percentages).

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	Util		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

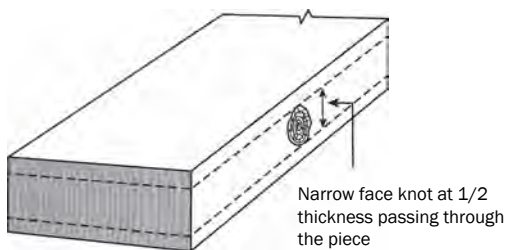
Figures 3a and **3b** illustrate examples of narrow face knots with 50% displacement.

FIGURE 3a



Narrow face knot considered at 50% displacement

FIGURE 3b

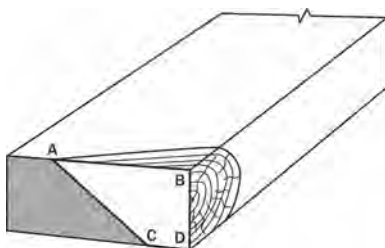


Narrow face knot considered at 50% displacement

1.9.2 SPIKE KNOTS

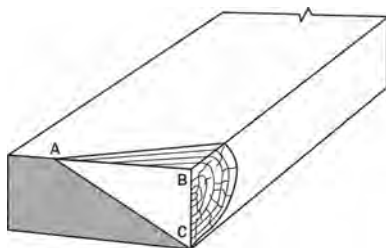
Narrow face knots (spike knots) shall be measured according to the formulas depicted in **Figures 4a, 4b and 4c**.

FIGURE 4a



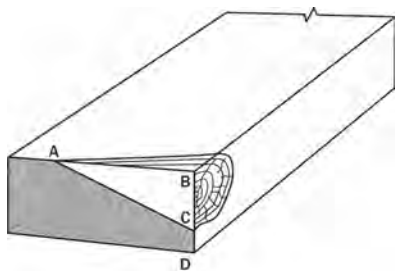
$$\text{Knot size} = (\text{Length AB} + \text{Length CD}) / 2$$

FIGURE 4b



$$\text{Knot size} = \text{Length AB} / 2$$

FIGURE 4c

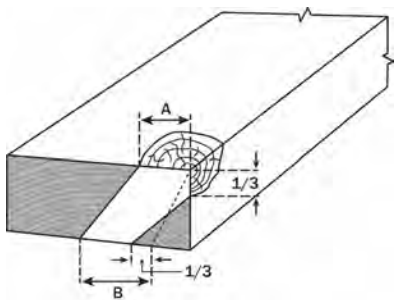


Knot size = (Length AB x Length BC) / 2 x Length BD

1.9.3 MULTI-FACE KNOTS

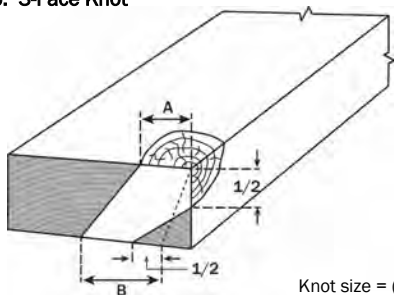
The measurement of wide face knots overlapping one or two edges is demonstrated in **Figures 5a, 5b and 5c**.

FIGURE 5a: 3-Face Knot



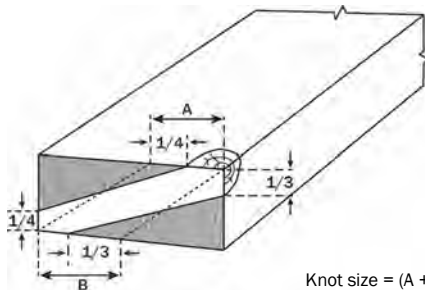
Knot size = (A + B) / 2

FIGURE 5b: 3-Face Knot



$$\text{Knot size} = (A + B) / 2$$

FIGURE 5c: 4-Face Knot

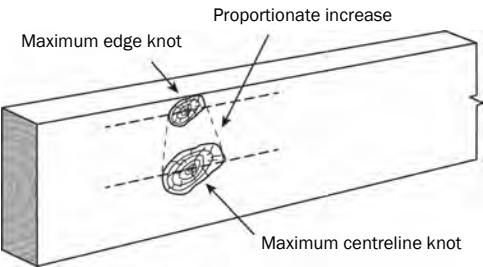


$$\text{Knot size} = (A + B) / 2$$

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 considered as located at the midpoint of its displacement (**Figures 7a and 7b**).

FIGURE 7a

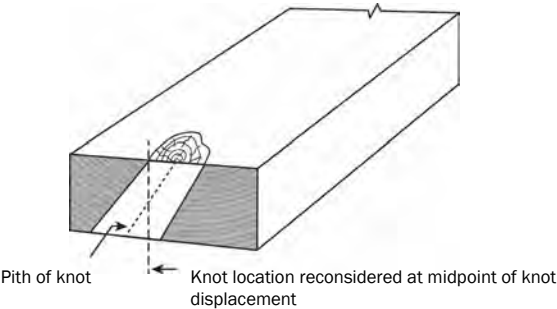
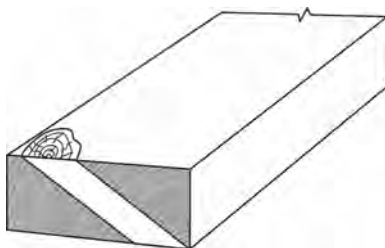


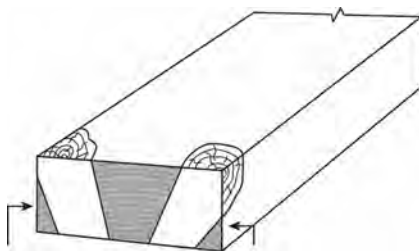
FIGURE 7b



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 $\frac{1}{2}$ the thickness (Figure 8).

FIGURE 8

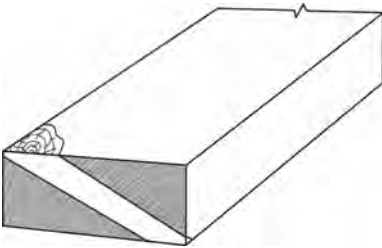


Knots overlapping less than or equal to $\frac{1}{2}$ the narrow face shall be increased proportionately to centerline knot size

Knots overlapping more than $\frac{1}{2}$ 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

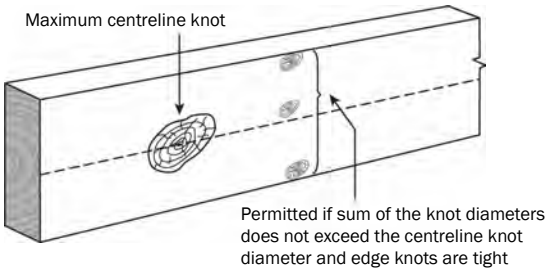


Diagonal knot involving both narrow faces is considered an edge knot

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**).

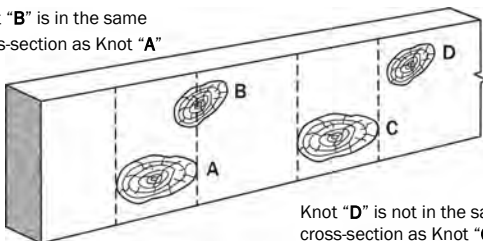
FIGURE 10



- 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

Knot "B" is in the same cross-section as Knot "A"



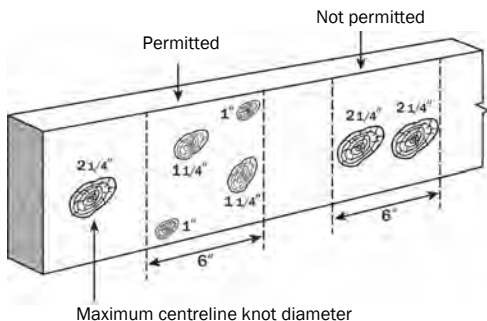
Knot "D" is not in the same cross-section as Knot "C"

- 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.

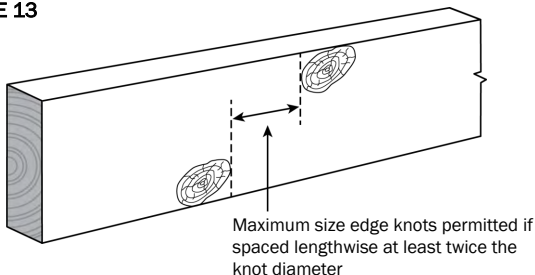
- d) The sum of the sizes of all knots within any 6" of length shall not exceed twice the diameter of the allowable centerline knot (see example in **Figure 12**). No two centerline knots of maximum size may appear in the same 6" of length.

FIGURE 12: Example for Select Structural 2x8



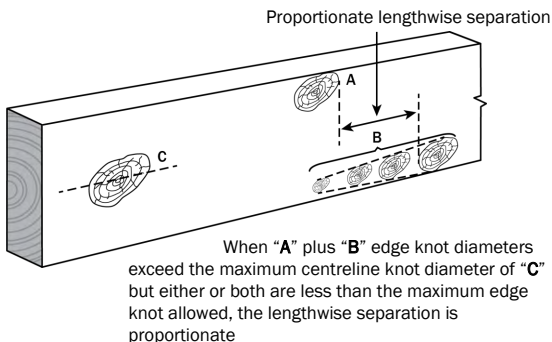
- e) Two maximum edge knots appearing on opposite edges shall be spaced at least a lengthwise distance equal to twice the size of the allowable edge knot (**Figure 13**).

FIGURE 13



- 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



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 pattern 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 $\frac{1}{4}$ " 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

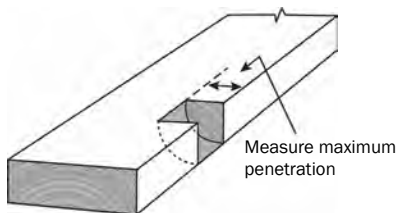
If through at the end, treat equivalent to a split. When away from ends, treat as shake.

1.12 SAW CUTS (SAW KERFS)

This characteristic occurs in two ways:

- a) The cut passes completely through the thickness and extends across a portion of the width (**Figure 15**).

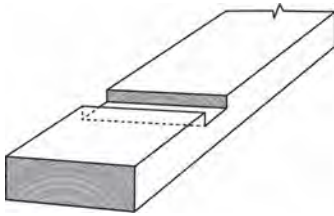
FIGURE 15



For **Figure 15** saw cuts, the maximum penetration across the width is restricted to $\frac{1}{2}$ the allowable edge knot size.

- b) The cut does not pass completely through the thickness and extends completely or partially across the width (**Figure 16**).

FIGURE 16



The saw cut depicted in **Figure 16** restricts the penetration to $\frac{1}{2}$ the equivalent edge knot displacement.

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) when 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 $\frac{3}{4}$ 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 $\frac{1}{6}$ the length of the piece in NO. 3, and Utility, and $\frac{1}{3}$ the length of the piece in Stud grade.

FIGURE 17: Whole Shake End

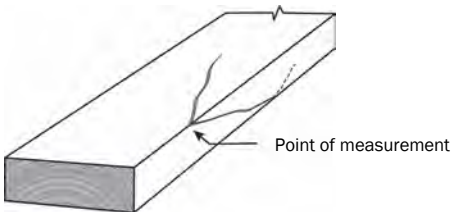
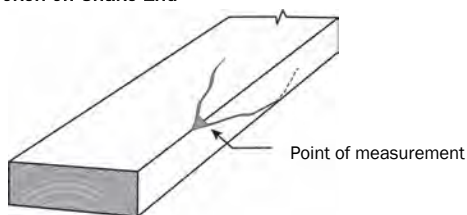


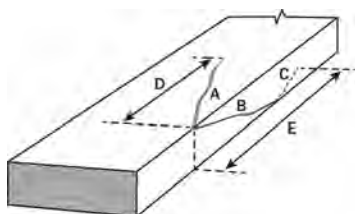
FIGURE 18: Broken-off Shake End



1.13.1 METHOD OF MEASURING SHAKE

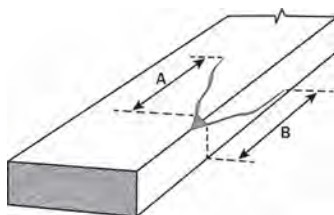
Shake limitations are stated in the grading rules. Measure shakes parallel to the wide face. (See examples in **Figures 19 to 22**)

FIGURE 19



$$\text{Shake length} = (\text{Length D} + \text{Length E}) / 2$$

FIGURE 20



$$\text{Shake length} = (\text{Length A} + \text{Length B}) / 2$$

FIGURE 21

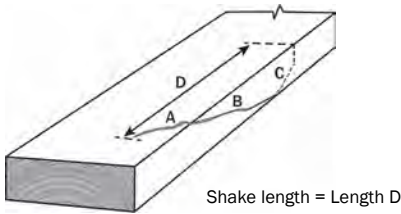
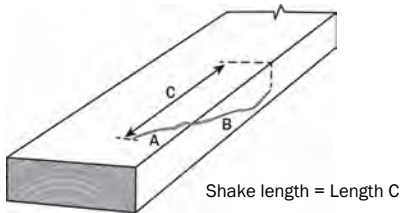


FIGURE 22



1.14 SKIPS

“Hit and Miss” skip is defined as a series of skips not over $\frac{1}{16}$ " 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 $\frac{1}{2}$ 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 & Construction, one medium skip 2' in length is not to be included in the limitation of “10% hit and miss”.

In NO. 3 & Utility, the maximum skip must never appear on both the wide face and narrow face in the same cross section.

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

Slope of Grain on 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

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.*

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 is restricted to not longer than twice the knot hole size in length.

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.

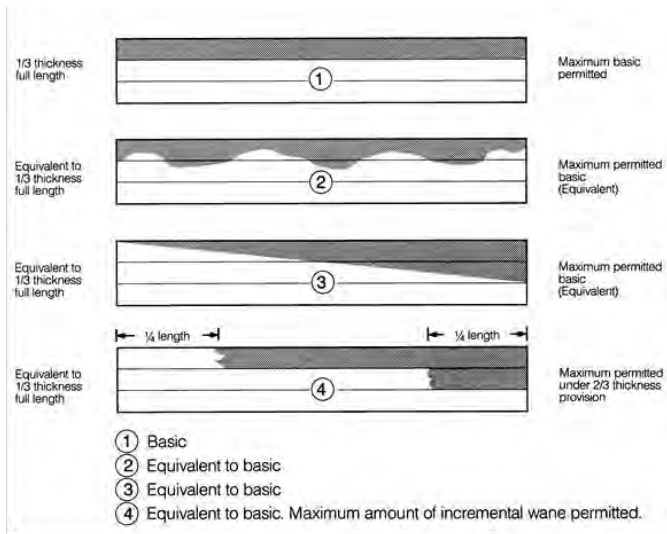
1.18 WANE

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. “**Away from ends**” means such wane shall not appear on the end section of the piece.

FIGURE 23: WANE EXAMPLES - THICKNESS - 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

PART 2: NLGA INTERPRETATIONS

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

2.1 PARA. 108 - INDUSTRIAL CLEARS

2.1.1 PARA. 108, FACES GRADED

For pieces 5" & narrower - the best face includes both edges. For pieces 6" & wider - the best face includes one edge.

Note: *A grader may combine the face with the edge which yields the highest grade, i.e., best face and worst edge.*

2.1.2 PARA. 108, BASIC SIZE

The description of characteristics permitted in the grades are based on a piece 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" x 12' (48 SU) would be one half (1/2) the basic size and thus would permit only one half (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 surface units) use the following formula:

$$\begin{array}{ccccc} \text{Surface Units (SU)} & & \text{Number of} & & \text{Number of} \\ \text{of Piece to be} & & \text{Characteristics} & & \text{Characteristics} \\ \text{Graded} & \times & \text{Permitted in} & = & \text{Permitted in} \\ \text{96 SU Basic Size} & & \text{Basic Size} & & \text{Piece to be Graded} \end{array}$$

EXAMPLE 1: In "D" Industrial Clear grade, four - 1" knots are permitted. In a piece of 6" x 12', therefore:

$$\begin{array}{ccccc} \text{Piece to be Graded} & & \text{Four - 1" Knots} & & \text{Three - 1" Knots} \\ \text{72 SU (6x12)} & \times & \text{Permitted in} & = & \text{Permitted in} \\ \text{96 SU (Basic Size)} & & \text{Basic Size} & & \text{Piece to be Graded} \end{array}$$

When the calculation gives an answer such as 2.5, then the grade permits characteristics whose combined total is equal to two (2) full size and 1 half size (0.5) characteristic, 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 6" x 10' (60 SU):

$$\begin{array}{ccccc} \text{Piece to be Graded} & & \text{8 - 1/2" Knots} & & \text{5 - 1/2" Knots} \\ \text{60 SU} & \times & \text{As Equivalent} & = & \text{or 2.5 total} \\ \text{96 SU (Basic Size)} & & \text{Smaller} & & \text{knot inches} \end{array}$$

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 eight (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.

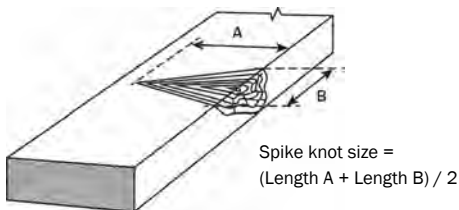
2.1.5 PARA. 108, KNOTS

2.1.5.1 PARA. 108, BASIC KNOT MEASUREMENT

Knots are measured using the average diameter method. (See Para. 320a)

- Round and oval knots are measured by averaging the largest and smallest diameters on the face they occur.
- Irregular knots are measured as the average dimension of the smallest rectangle which will enclose the knot.
- 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. $(5" + 1") \div 2 = 3"$ knot) (**Figure 24**).

FIGURE 24



2.1.5.2 PARA. 108, OTHER KNOT MEASUREMENTS

Single knots (**Figures 25, 26, 27 and 28**) are measured as average size on the wide face. The width of the knot on the edge cannot exceed the allowable knot size. The edge knot size in “D” Industrial Clear grade is disregarded.

FIGURE 25

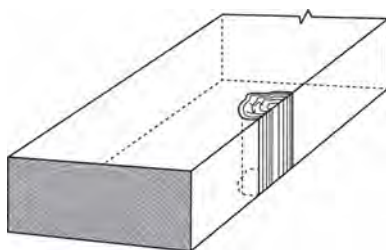


FIGURE 26

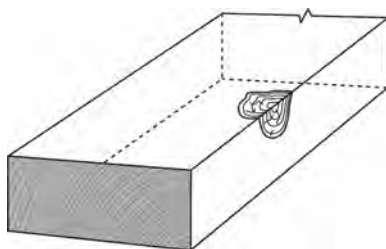


FIGURE 27

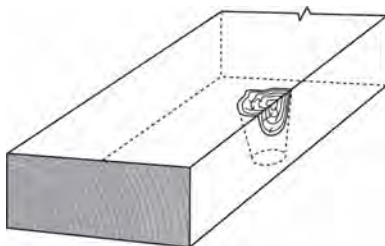
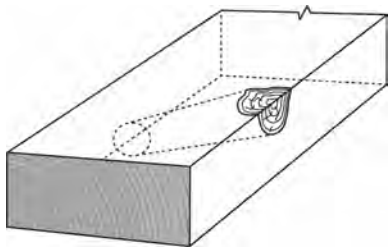


FIGURE 28



Two or more knots separated by any amount of clear wood, are counted as separate knots. Knots on the wide face are measured by average diameter. Knots on the narrow face are measured in width only (**Figure 29**). On wide faces, each spike knot is measured by averaging the length and widest width of the knot (**Figure 30**).

FIGURE 29

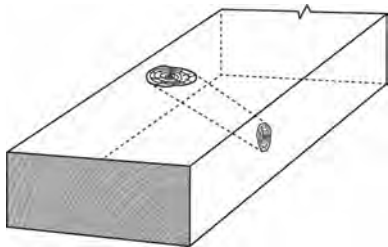
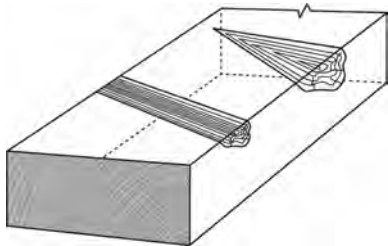


FIGURE 30



2.1.5.3 PARA. 108, EXAMPLE OF KNOT ALLOWANCES

Based on a basic size piece:

On the 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 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 (see Para. 718r).

The back of "D" Industrial Clear grade permits characteristics larger or more numerous knots. Thus, the back 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 2" x 8" - 12' (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 2" x 6" - 12' (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 - $\frac{1}{4}$ " x 2" pockets **or** two - $\frac{1}{16}$ " x 6" **or** twelve - $\frac{1}{8}$ " x 1" **or** one - $\frac{1}{16}$ " x 6" + one - $\frac{1}{8}$ " x 4" + one - $\frac{1}{4}$ " x 2"; etc., whose combined length is less than or equal to 12".

2.1.7 PARA. 108, SKIPS

Skips, when $\frac{1}{2}$ width or less, are permitted 2 x 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 face and the edge of "D" Industrial Clear grade is evaluated separately. "D" Industrial Clear grade wane on the face may be equivalented for width and length (total area governing). The thickness allowance may not be exceeded unless the wane will be accepted for the back.

50% more wane on the back 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 - Twice (2x) as much as crook permitted for 8" widths.

5/4 and **6/4** - One and a half (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" x 8' (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 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 x 12' pieces in otherwise high grade pieces (see chart in 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 Common back.

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" x 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 approx. 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 approx. 4 in 12'.

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'. 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', maximum 2 occurrences per 12' of length.

Splits Limited to 1/3 the length on face and 1/2 the length on back.

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 back - 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 side 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: 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, 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

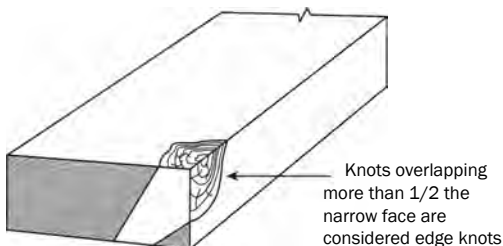
Knots partially or wholly at the edges of the wide faces, shall not occupy more of the net cross-section than those listed in Para. 128 and each knot at the edge of the wide faces is treated separately including knots in the same cross-section. Knots in the untested portion of lumber are described in Para. 128.

2.7.1.1 PARA. 128, EDGE KNOT CONDITIONS

For a knot to be considered an “**edge knot**”, one of the following conditions shall be present:

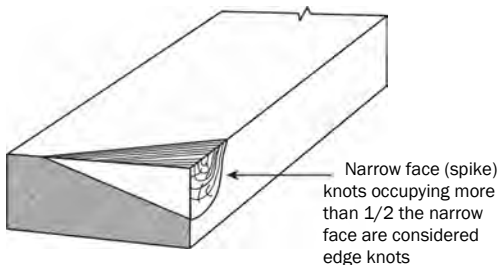
- a) When a wide face knot overlaps for more than $\frac{1}{2}$ the thickness of the narrow face (**Figure 31**).

FIGURE 31



- b) When a narrow face knot (spike knot) occupies more than $\frac{1}{2}$ the narrow face (**Figure 32**).

FIGURE 32



Note: Knots in Figures 31 and 32 cannot be re-located.

- c) 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 33 and 34).

Examples:

- i) A $3/4$ " wide face knot requires less than $1/8$ " of clear, straight grained wood between the knot and the nearest edge to be considered an edge knot.

(Calculation: $3/4" \times 1/6 = 3/24"$ or $1/8"$)

- ii) A $1-1/2$ " wide face knot would require less than $1/4$ " of clear wood between the knot and the nearest edge to be considered an edge knot.

(Calculation: $1\ 1/2" \times 1/6 = 3/2" \times 1/6 = 3/12"$ or $1/4"$).

FIGURE 33

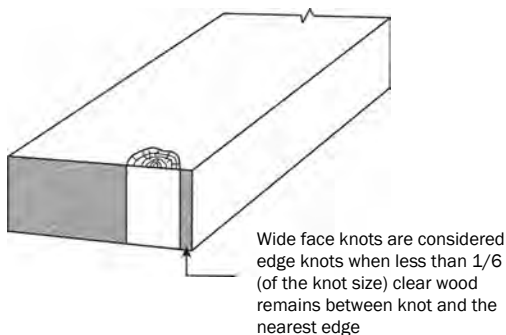
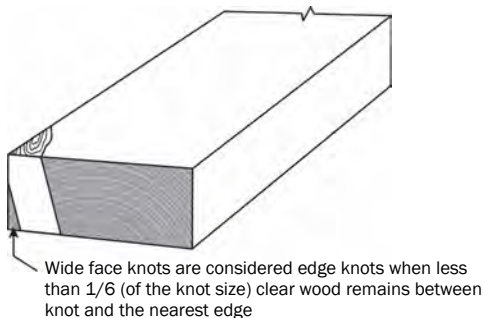


FIGURE 34



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 $\frac{1}{6}$ the size of the wide face knot of clear, straight grained wood between the knot and the nearest edge (**Figures 35 and 36**).

FIGURE 35

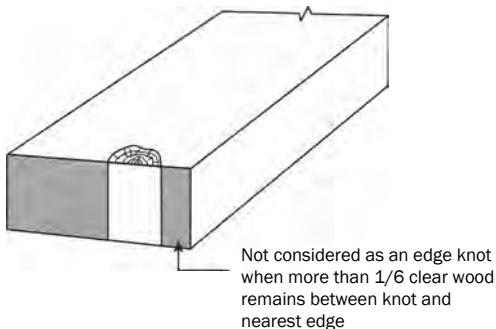
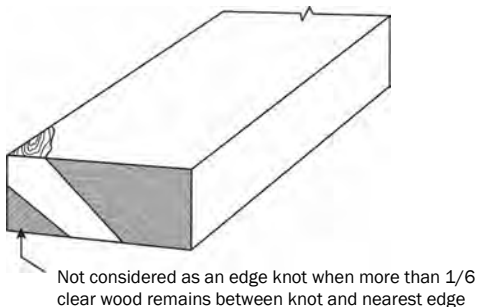


FIGURE 36



- b) When a narrow face knot (spike knot) occupies less than $\frac{1}{2}$ the narrow face (**Figures 37, 38 and 39**).

FIGURE 37

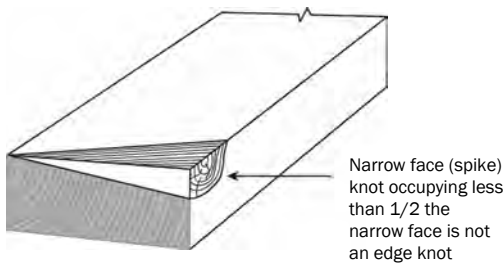


FIGURE 38

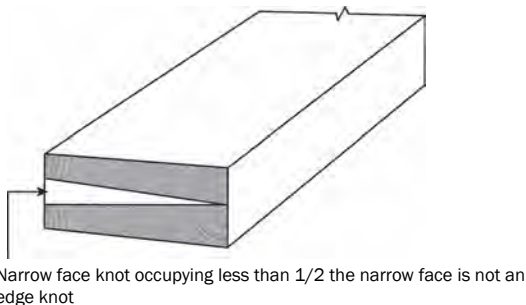
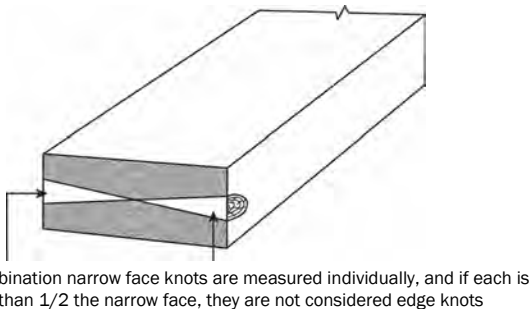


FIGURE 39



2.7.2 PARA. 128, SAW CUTS (SAW KERFS)

This characteristic occurs in two ways as depicted in Part 1, 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 $1.5 \times 875 \text{ psi} = 1313 \text{ psi}$ (see Paras. 905g and 905i) and the assigned E is 1.4 (see Para. 905i).

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 $1.5 \times 850 \text{ psi} = 1275 \text{ psi}$ (see Paras. 905g and 905i) and the assigned E is 1.6 (see Para. 905i).

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

When Posts & Timbers (P&T) are graded under Para. 130 - Beams & Stringers (B&S), 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.

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.

2.9.1 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.

2.9.2 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.

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:

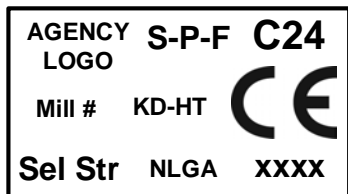
- Identification number of the Notified Body.
- CEN Strength class (e.g., C24). ⁽¹⁾
- Seasoning state “**DRY GRADED**” or “**KD**”. ⁽²⁾
- If applicable, “**HT**” to indicate phytosanitary heat treatment.
- The stylized “**CE**” mark.

⁽¹⁾ **Note:** See Appendix 1 for the species, grade, and CEN strength class equivalency matrix.

⁽²⁾ **Note:** 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, 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" and "C20" lumber:

- 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 Combination	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		

NOTES