Alaska Lumber Grading Program Handbook

Matthew Labrenz
Forest Product Specialist
UAF Cooperative Extension Service

Jeremy Douse
Deputy Director of Forestry
Division Operations Manager
Division Of Forestry & Fire Protection

UAF COOPERATIVE EXTENSION SERVICE
University of Alaska Fairbanks

ALASKA DIVISION OF FORESTRY & FIRE PROTECTION

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Contents

Introduction

The purpose of the Alaska Lumber Grading program (ALG) is to increase opportunities for Alaskans to use locally produced lumber for building homes.

The program enables eligible individuals who have demonstrated proficiency in the training to self-grade lumber they have sawn, which then may be accepted as an alternative to meet residential building code requirements for structural lumber in Alaska. Without such a program, Alaskans who are subject to building code requirements are restricted to using either "grade stamped" lumber or lumber that has been inspected by an authorized individual for load bearing uses in a house frame.

Senate Bill 87, "Lumber Grading," (Appendix 1) established the framework for Alaska's local use dimension lumber program. The governor signed the bill into law (AS 41.17.610 -.630) on Aug. 30th, 2023.

This handbook is the comprehensive program guide for record-keeping requirements, lumber grading rules, how to substitute ALG lumber for grade stamped lumber, and other conditions and information for producing, using, and selling ALG lumber.

Rationale for The Alaska Lumber Grading Program

In many cases, Alaskans have been prohibited from using lumber they have sawn from local timber for homebuilding because residential building codes require that structural lumber either has a grade stamp or has been inspected by a certified official. To fully understand the Alaska Lumber Grading program and how it works, it's necessary to have a basic understanding of the "grade stamp" lumber infrastructure, which is the primary system for grading structural lumber in North America.

Under the grademark system, dimension lumber standards and protocols are overseen by a committee of lumber industry experts called the American Lumber Standard Committee, Inc. (ALSC). Subsidiary regional accredited grading agencies throughout the country are responsible for determining the mechanical properties along with the grading rules for the species occurring in their region. This system provides a basis to ensure that a piece of lumber is adequate for its intended structural application within a house frame.

The International Residential Code (IRC), which specifies standards for residential construction materials and installation practices, requires that load-bearing lumber in a house frame either bears a grade mark (also called a "grade stamp") or that it be certified by an accredited inspector to ensure that any piece of load-bearing lumber is rated for its application. Although Alaska does not currently have a uniform statewide building code, many of Alaska's municipalities have adopted the IRC, typically with amendments for local conditions, as the local residential building code for 1-3 family dwellings. Also, the Alaska Housing Finance Corporation and other lenders require homes to meet the specifications of the IRC as a condition of borrowing for a home. When a homebuilder is required to build to the specifications of the IRC, whether by a municipality, housing authority, or lending institution, they are subject to its requirements to use grade mark lumber for load-bearing applications.

Producing grade mark lumber can be a challenge for small-scale sawmill businesses because of the costs associated with training employees, grading Bureau membership fees, regular third-party verification services, etc. Because most sawmills in Alaska cannot justify these costs, the amount of grade-stamped lumber produced in Alaska is very limited and therefore so is the ability to use local products in home construction—despite the state's available timber resources and known performance capabilities for 5 key softwood lumber species. As such, instead of contributing to the development of a sustainable resource and creating local economic opportunities, Alaska's homebuilding industry imports the vast majority of our lumber from Canada and the Pacific Northwest.

The Alaska Lumber Grading Program was established to provide an alternative to grade mark lumber for meeting building code requirements in homebuilding to allow and encourage more production of locally harvested structural lumber products.

Structural Lumber Grading Background

Different species of wood exhibit unique performance characteristics which are determined through an array of stress tests. This process results in data called “design values” which describe the stress limits of different species of wood. Design values form the basis for calculating allowable applications for different pieces of framing lumber as a function of species, grade, dimensions, spacing and other variables. Base design values for lumber are established through testing on clear wood samples of a standardized size. Deviations of grain direction from parallel with the edge of a board caused by various defects compromise its performance capability. Because of this, structural lumber of a given species is further subdivided based the natural and manufacturing defects observed in each piece of lumber using a sorting system called grading rules.

The Alaska Lumber Grading Program establishes dimension lumber grading rules that are linked to the design values for Sitka spruce, white spruce, western hemlock, mountain hemlock and Alaska yellow cedar. These design values were tested by the Western Wood Products Association and accepted for publication in 2005 by the American Lumber Standard Committee, Inc.

Although the Alaska lumber grading system closely approximates industry practices, it must be emphasized that lumber graded under the ALG program is not the same as “Grade Mark” or “Grade Stamp” lumber and may not be represented as such. Because it is not produced under an accredited lumber grading agency, there is no accredited body that can maintain supervisory inspection services, quality assurance or quality control. For the same reason, there is no special mark to be affixed to lumber that is produced under the Alaska Lumber Grading program.

Pieces or bundles of lumber graded under ALG rules may be marked in some other fashion not resembling industry grade marks to indicate the appropriate ALG program grade. An example of an acceptable marking scheme would be color-coding on the ends of the pieces of lumber.

General Rules and Procedures of the ALG Program

The Training

Any person above age 18 intending to produce dimension lumber in Alaska may obtain the Alaska Lumber Grading Program certificate by attending the one-day training and meeting the proficiency requirements. The training program will be offered at a minimum once a year (per A.S. 41.17.610). Typically, several trainings per year will be offered at locations in Interior, Southeast, and Southcentral, or as demand warrants.

The Certificate

Certified individuals may grade dimension lumber that the individual has sawn. As provided for by Alaska statute, the program does not permit individuals to grade lumber produced prior to obtaining certification, lumber sawn by anyone else including a co-worker, or lumber obtained from any other source. The certificate expires after 5 years from the date of issue and can be renewed by re-taking the training and passing the exam.

The Type of Lumber Covered Under this Program

This program is applicable to grading dimension lumber for structural applications in light-frame wood homes. Dimension lumber is lumber with a nominal thickness of 2 to 4 inches and a nominal width of 2 inches or greater. Under this program, lumber may be produced from the species included in the design value testing conducted by the Ketchikan Wood Technology Center in conjunction with the Western Wood Products Association and accepted by the American Lumber Standard Committee published in 2005. These species are: Sitka spruce, white spruce, western hemlock, mountain hemlock and Alaska yellow cedar.

Meeting the Requirements of Residential Building Codes

The graded product may be for personal use or be sold directly to end-users and may be accepted in place of lumber identified by a grade mark to meet the requirements of the IRC and other local residential building codes within Alaska. ALG grades correspond with specific accredited grading Bureau grades when used as a substitute for grade stamped lumber. The correspondence of the Alaska grades with accredited grading Bureau grades can be found in the section of this handbook titled “Designation of Grade Standards.”

Authorized building inspectors retain the authority to reject or require modifications to the use of structural lumber produced under this program.

Record-keeping Requirement When the Lumber is Sold

Written certification containing specific descriptive information about the lumber must be provided to the purchaser in any sale of ALG lumber. It is strongly recommended that the homeowner retain these records. The next section provides more details about what information is required to meet the record-keeping requirements.

Written Certification

It is a requirement of the Alaska Lumber Grading program that when ALG lumber is sold the producer provide a copy of their certificate of completion from the Alaska Lumber Grading training, **and** a written certification of the milled product. This document must include each of the following pieces of information:

1. The name of the ALG certified grader (and if desired the name of the sawmill business)
2. The date the lumber was sawn and, if different, the date the lumber was graded
3. The Alaska grade designation of the lumber
4. The species of the lumber or species grouping (see p. 10)
5. The moisture condition at the time of grading (see p.10)
6. The surface conditions of the product (see p. 11)
7. The sizes and tally of the lumber (see p. 12)

A template form for the written certification is provided in Appendix 2 of this handbook and in PDF form on the program website: https://www.uaf.edu/ces/lumber.

If a lumber order includes multiple grades, a separate written certification should be provided for each. The required minimum amount of information and suggested supplemental information to be certified in writing for each of these conditions is described in further detail in the following sections of this handbook.

Designation of Grade Standards

The Alaska Lumber Grading program provides alternatives to three accredited grading Bureau grades of dimension lumber within the Structural Light Framing, Structural Joists and Planks, and Stud classifications of dimension lumber.

Dimension lumber that is graded in accordance with the rules of this program may be accepted in place of grade stamped lumber for structural applications to meet the requirements of residential building codes in Alaska. Allowable grade substitutions are as follows:

ALG Grades and Correspondence to Accredited Grading Bureau Grades

1) The **Alaska Number 2 and Better Grade** shall be the substitute equivalent of the "Number 2 Grade" within the Structural Light Framing and Structural Joists and Planks classifications and at least equivalent to the "Standard Grade" within the Light Framing classification within accepted bureau grade rules for grade-stamped lumber used in residential construction in Alaska.

2) The **Alaska Stud Grade** shall be the substitute equivalent of the "Stud Grade" within the Stud classification within the accepted bureau grading rules for grade-stamped lumber used in residential construction in Alaska.

3) The **Alaska Number 3 Grade** shall be the substitute equivalent for the “Number 3 Grade” within the Structural Light Framing and Structural Joists and Planks classifications and also at least equivalent to the “Utility Grade” within the Light Framing classification within the accepted bureau grading rules for grade-stamped lumber used in residential construction in Alaska.

Alaska Dimension Lumber Grading Rules

Guidelines for using the Alaska Dimension Lumber Grading Rules

The overall requirements and limitations of the Alaska lumber grading rules have been simplified in certain cases. They are generally at least as restrictive (examples would be for shake, split, and slope of grain) and in some cases more restrictive than their industry counterpart grades (examples would be the limiting provisions for knots, holes, and unsound wood).

In the grading process, the entire piece of lumber must be examined, including a separate visual inspection of each wide and each narrow face. Any defect apparent on any face that exceeds the individual characteristics permitted or limiting provisions for the grade will exclude that piece of lumber from making the grade.

Take note of whether the grading rule is based on the *nominal* or the *actual* dimensions of the piece.

These grading rules apply exclusively to dimension lumber, defined under this program as nominal 2 inches to 4 inches thick, and nominal 2 inches or greater in width.

Appendix 3 provides definitions and important additional information for all defects. A summary table of the limiting characteristics for all grades appears in Appendix 4. Additional tables summarizing limiting characteristics for each defect can be found under Appendix 5.

Alaska Number 2 and Better

Nominal 2”-4” Thick, 2” and wider

Characteristics permitted and limiting provisions:

Knots – Sound, firm, encased and pith knots if tight and well-spaced, are permitted in sizes not to exceed the equivalent of 1/4 the nominal width of the piece.

Holes (any cause and includes unsound wood, unsound knots, loose knots, and not firmly fixed knots) —Not to exceed the equivalent of 1/4 the nominal width of the piece (or equivalent smaller holes per 2 lineal feet).

Unsound wood – Not permitted in nominal thicknesses over 2 inches. In 2-inch lumber to be considered as holes and included within the limiting provisions for holes.

White speck and honeycomb – Considered as holes and included within the limiting provisions for holes.

Wane – 1/3 the actual thickness and 1/3 the actual width on each face, combined not to exceed 1/2 the thickness or 1/2 the width at any point.

Shake – Shake through at ends, limited as splits. Away from ends, shakes (including through shakes) up to 2 feet long are permitted.

Splits – Equal in length to 1 1/2 (one and one half) times the nominal width of the piece.

Checks – Seasoning checks are not limited. Through checks at the end are limited as splits.

Slope of grain –1 in 8

Warp – Light. (See Appendix 6 for limits of crook, bow, cup and twist for different piece sizes.)

Skips (or Scant) – Heavy. Lumber may be completely or partly surfaced, or entirely rough. If surfaced, may have skips in places up to 1/8 inch deep, or if rough, may be scant in places up to 1/8 inch scant. The areas of skip (or scant) are not to exceed 2 feet in length in any one occurrence.

Manufacture – Manufacturing imperfections allowed– Admits heavy torn grain, heavy raised grain, heavy loosened grain; heavy machine bite; heavy machine gouge; heavy machine offset; heavy chip marks; knife and saw marks; heavy wavy dressing and sawing variation; and heavy mismatch.)

Alaska Stud

Nominal 2”-4” Thick, 2” and wider

Characteristics permitted and limiting provisions:

Knots – Well-spaced knots of any quality are permitted in sizes not to exceed the equivalent 1/3 the nominal width of the piece.

Holes (any cause – and includes unsound wood) – Not to exceed the equivalent of 1/3 the nominal width of the piece (or equivalent smaller holes per 2 lineal feet).

Unsound wood – Considered as holes and included within the limiting provisions for holes.

White speck and honeycomb – Considered as holes and included within the limiting provisions for holes.

Wane – May equal 1/3 the thickness and one-half the width, on each face, combined not to exceed 1/2 the thickness or 3/4 the width at any point.

Shake – Surface shakes permitted. If shake through at ends, limited as splits. Elsewhere through shakes permitted up to 1/3 the length, scattered along the length.

Splits – Equal in length to twice the nominal width of the piece.

Checks – Seasoning checks not limited. Through checks at end are limited as splits.

Slope of grain –1 in 4.

Warp – Light (see Appendix 6 for limit of crook, bow, cup and twist for different piece sizes.)

Skips (or Scant) – Heavy. (Lumber may be completely or partly surfaced, or entirely rough. If surfaced, may have skips in places up to 1/8 inch deep, or if rough, may be scant in places up to 1/8 inch scant. The areas of skip (or scant) are not to exceed 2 feet in length in any one place.)

Manufacture – Manufacturing imperfections allowed – Admits heavy torn grain, heavy raised grain, heavy loosened grain; heavy machine bite; heavy machine gouge; heavy machine offset; heavy chip marks; knife and saw marks; heavy wavy dressing and sawing variation; and heavy mismatch.

Alaska Number 3

Nominal 2”-4” Thick, 2” and wider

Characteristics permitted and limiting provisions:

Knots – Well-spaced knots of any quality are permitted in sizes not to exceed the equivalent of 1/3 the nominal width of the piece.

Holes – (Any cause and includes unsound wood) Not to exceed the equivalent of 1/3 the nominal width of the piece (or equivalent smaller holes per 2 lineal feet).

Unsound wood – Considered as holes and included within the limiting provisions for holes.

White speck and honeycomb – Considered as holes and included within the limiting provisions for holes.

Wane – 1/2 the thickness and 1/2 the width, on each face; combined not to exceed 3/4 the thickness or 3/4 the width at any point.

Shake – Surface shakes permitted. If shake through at ends, limited as splits. Elsewhere through shakes permitted up to 1/3 the length, scattered along the length.

Splits – Equal in length to twice the nominal width of the piece.

Checks – Seasoning checks not limited. Through checks at end are limited as splits.

Slope of grain –1 in 4.

Warp – Medium (Appendix 6 for limits of crook, bow, cup and twist for different piece sizes.)

Skips (or scant) – Heavy. (Lumber may be completely or partly surfaced, or entirely rough. If surfaced, may have skips in places up to 1/8 inch deep, or if rough, may be scant in places up to 1/8 inch scant. The areas of skip (or scant) are not to exceed 2 feet in length in any one place.)

Manufacture – Manufacturing imperfections allowed – Admits heavy torn grain, heavy raised grain, heavy loosened grain; heavy machine bite; heavy machine gouge; heavy machine offset; heavy chip marks; knife and saw marks; heavy wavy dressing and sawing variation; and heavy mismatch.

Designation of Species

The program provides for dimension lumber grading for species of Alaska softwoods for which design values have been tested by an accredited grading Bureau and approved by the ALSC. Species meeting these criteria include Alaska yellow cedar, western hemlock, mountain hemlock, Sitka spruce and white spruce. The Ketchikan Wood Technology Center tested lumber samples from these species in conjunction with the Western Wood Products Association to determine their mechanical properties. The resulting design values were submitted to the American Lumber Standard Committee, Inc., which formally approved them in 2005. (See Appendix 7, "Published Design Values in Key Grades and Sizes for Selected Species and Species Groups").

Three species groups were established in this testing: Alaska Spruce (including Sitka spruce and white spruce), Alaska Hemlock (including western hemlock and mountain hemlock), and Alaska Yellow Cedar (including Alaska yellow cedar).

To fulfill this record-keeping requirement, the common name of the species may be used, or the appropriate species group.

Designation of Moisture Content

Lumber produced under the Alaska Lumber Grading Program may be sold either in the dry or green moisture condition. Both dry and green lumber are suitable for use in construction, although it is not advised to mix green and dry lumber within a horizontal framing system such as floor joists as they acclimate to ambient moisture conditions at different rates.

Dimension lumber is considered "dry" if it has been dried to a maximum moisture content (MC) of 19% as measured on the oven dry (OD) basis. Green lumber is lumber that is above 19%. Partially air-dried (PAD) lumber is lumber that is above 19% but the drying process has begun. Lumber moisture content in the United States is expressed on the OD basis and reflects the weight of water in the piece expressed as a percentage of the bone-dry weight of wood (i.e., the weight of wood with no moisture whatsoever). In practice, for dimension lumber to be considered "dry" 95% of the pieces of lumber in the order are, on average, at or below 19% MC, and no more than 5% of the lumber may be at a MC more than 19% MC.

The drying process will effectively remove all the free water (primarily water that is in the cell lumen) in the wood, and about a third of the bound water (water that is in the cell wall itself). It is this removal of bound water that causes wood to shrink and warp in the drying process. Wood is constantly exchanging water with the atmosphere to come into equilibrium with the relative humidity and temperature of the air. Lumber moisture content may be estimated in several ways, but for construction purposes it is typically measured using a handheld moisture meter. These meters do not perform well at MC extremes but perform adequately in the ranges of interest. When the wood is at or above the Fiber Saturation Point (FSP) or the wood has a MC less than 6%, these moisture meters are not accurate.

Dimension lumber can be air-dried or kiln-dried. Kiln drying is much faster and provides good control of temperature, relative humidity and air flow but requires investment into the proper equipment. Though it can expedite the drying process, if done improperly, kiln drying can lead to stresses in the wood. In contrast, air drying is slow, particularly in Alaska, where much of the year is not well suited for air drying. Proper air drying requires covered space and best practices for stacking boards between stickers.

Two aspects that may be important are that the high temperatures normally used in kiln drying cause resin to "set" and insects and their larvae to be killed. For resinous species, it is often desirable to "set" the resin by evaporating the liquid component so it will not be sticky to handle or cause pitch to build on saws or planers. When the temperature is held for a long enough period, the resin will no longer flow.

Heat-treated lumber is a special designation for lumber specifically targeted to kill insect larvae and is regulated under the International Standards for Phytosanitary Measures No. 15 (ISPM 15). This additional designation may be included as part of the written certification only if the lumber has been treated by a certified heat treatment facility.

To fulfill this record-keeping requirement when lumber is sold, the lumber must be certified as being either "green" or "dry." Additional moisture condition information may be included as appropriate.

Designation of Wood Surface Conditions

Wood purchased in lumber yards or in retail outlets is typically dried and surfaced on all four sides to a standard thickness and width specified by the American Softwood Lumber Standard Voluntary Product Standard PS 20-05. Most people understand that a common size of lumber that we refer to as a 2x4 is actually 1.5" by 3.5" in the dry surfaced condition. What is not as well known is that a green 2x4 measures 1 9/16" by 3 9/16" with the slightly larger size providing an allowance for shrinkage. The 2x4 references the nominal dimension which has historically been the size of the board cut green from the log before any surfacing or drying.

Green surfacing of dimension lumber allows the precise sizing of green lumber that will be used in construction. An alternative method of achieving the same end is to directly saw to the standard green surfaced dimension. This is called Sawn-To-Size (STS) and the practice is permitted in the Alaska Lumber Grading Program. STS lumber that is being sold shall be indicated in the written certification the mill operator provides to the purchaser.

As a part of the written certification that the mill provides to the purchaser, a clear designation of the lumber as one of the following: "Surfaced Lumber," "Sawn-To-Size Lumber" or "Rough Lumber" is required.

Surfaced Lumber

Surfaced lumber (or dressed lumber) is generally considered lumber that has been surfaced by a machine to attain smoothness of surface and uniformity of size on one side (S1S), 2 sides (S2S), one edge (S1E), 2 edges (S2E) or a combination of sides and edges (S1S1E, S1S2E, S2S1E, S4S). Lumber that has a surfaced edge or side is classified as surfaced width or thickness on the surfaced face and classified

as rough width or thickness on the unsurfaced face. The term “Surfaced Lumber” generally refers to S4S within the Alaska Lumber Grading program.

Sawn-To-Size Lumber

This designation is lumber uniformly sawn to the dressed size for surfaced lumber, and not planed on the faces, for use requiring a rough texture or lumber uniformly manufactured to dressed surfaced sizes that may be rough, surfaced or partially surfaced on one or more faces. Some small manufacturers producing lumber are unlikely to have planer equipment allowing them to produce S4S lumber. For these producers it is expected they would saw to an actual thickness at least equaling the required minimum thicknesses for the green conditions.

Rough Lumber

Rough lumber is lumber that has been sawed, edged, and trimmed at least to the extent of showing saw or other primary manufacturing marks. The rough lumber designation is not the same as the sawn-to-size lumber designation even though the appearance may be similar. If the rough lumber is to be sold as “dry” it needs to be at least 1/8 inch greater than the standard dry surfaced size to allow for the removal of wood in surfacing. If it is to be sold as green, then the widths and thicknesses shall be specified on the written certification provided to the purchaser.

Designation of Lumber Sizes and Tally

Thickness and Width

Standard sizes (actual thickness and width) of “Surfaced Lumber” and “Sawn-To-Size Lumber” are to be considered the actual minimum sizes as specified for the Alaska lumber grades and in the American Softwood Lumber Standard Voluntary Product Standard PS 20-05 for lumber that is surfaced in the dry or green conditions as appropriate (see Appendix 8). Somewhat larger sizes may be used for the nominal thickness, the nominal width, or both, but the larger size shall be clearly specified on the written certification provided by the mill to the purchaser.

If “rough lumber” is to be sold as “dry lumber” the minimum dry rough dimensions (thickness and width) must be at least 1/8th inch greater than those required for the standard minimum size for dry surfaced lumber to allow for the removal of wood in surfacing (see Appendix 8). For any “rough lumber” that is to be sold as “green lumber” the actual green target dimensions shall be specified on the written certification that the mill provides to the purchaser.

Length

The standard lengths of lumber shall be 8 feet and greater in even two-foot length multiples (8, 10, 12, 14, 16, etc.) unless the purchase agreement specifically stipulates the use of one-foot standard length multiples or any standard length less than 8 feet. Any variance from the two-foot standard length starting at 8 feet will be specified in the written certification that the mill will provide the purchaser.

Trim Requirements

The standard trim requirements (unless otherwise specified in the purchase agreement) is that the lumber shall be trimmed for the removal of excessive spur and splintered ends but the lumber does not have to be double-end-trimmed. If double-end trimmed, the minimum length of lumber sold under the Alaska Lumber Grading Program shall not be less than the nominal length. If not double-end trimmed, there shall be at least sufficient overlength to easily square-trim the lumber to nominal length. Overall length should not be more than 12 inches greater than nominal length, unless otherwise specified. Any variance in trim practices shall be specified on the written certification that the mill will provide the purchaser.

Tally Reporting Requirements

Lumber sold under the Alaska Lumber Grading program that is being used in residential construction may be sold as a piece price, a price per board foot (BF) or a price per thousand board feet (MBF). Consequently, as part of the written certification that the mill provides the purchaser, there shall be a total tally of the lumber sold based on the number of pieces per nominal thickness, width and standard length in each grade grouping in the transaction and the total board feet including the total in each grade grouping. The formula for calculating the board foot contents of a piece is: the nominal width (in inches) multiplied by the nominal thickness (in inches) multiplied by the nominal (or standard) length in feet and dividing the total by 12 and rounding to the nearest $1/10^{th}$ board foot, then multiplying by the number of pieces.

$$\text{Board Feet (BF)} = \text{Width} \times \text{Thickness} \times \text{Length} \div 12$$

Example 1. Single 8-foot length of 2×4

Step 1: W × T × L

2 × 4 × 8 = 64

Step 2: Divide by 12

64/12 = 5.3 BF

Example 2. 37 boards, each 10-foot length of 2×8

Step 1: W x T x L

2 × 8 × 10 = 160

Step 2: Divide by 12

160/12 = 13.3 BF

Step 3: Multiply by number of boards

37 × 13.3 BF = 492.1 BF

A table of calculations for the board foot contents of common sizes of dimension lumber is provided in Appendix 9. Cubic measures of lumber shall not be permitted for sale of lumber used for residential construction.

When a mill provides a purchaser more than one grade of lumber, the lumber will be informally marked (such as color coding with a painted end) to indicate the different grades. The explanation of that differentiation will be on the written certification that the mill provides the purchaser.

Appendices

LAWS OF ALASKA

2023

Source
SB 87

Chapter No.
_____

AN ACT

Relating to a lumber grading training program and lumber grading certificates; relating to use of lumber graded and certified by a person holding a lumber grading training program certificate; and providing for an effective date.

_____

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

THE ACT FOLLOWS ON PAGE 1

AN ACT

Relating to a lumber grading training program and lumber grading certificates; relating to use of lumber graded and certified by a person holding a lumber grading training program certificate; and providing for an effective date.

*** Section 1.** AS 41.17 is amended by adding new sections to read:

Article 6A. Lumber Grading.

Sec. 41.17.610. Lumber grading training program. (a) The division shall establish a lumber grading training program to train mill operators to grade lumber.

(b) The training program must be offered at least once each year.

(c) The division shall prescribe the

(1) content of the training program;

(2) qualifications for instructors; and

(3) requirements for completing the training program, including requirements for issuing and renewing lumber grading certificates.

Sec. 41.17.620. Lumber grading certificates. (a) The division shall issue a lumber grading certificate to an individual who successfully completes the lumber grading training program established under AS 41.17.610. A certificate expires five years after the date of issuance. A certificate must include the date of issuance and expiration.

(b) The division may issue an initial lumber grading certificate to an individual who has not completed the lumber grading training program if the individual provides proof to the division that the individual

(1) holds a current certification from a lumber grading agency accredited by the American Lumber Standard Committee, Incorporated; or

(2) has a bachelor's or postgraduate degree in forest products or wood science and technology, or an equivalent degree as determined by the division.

(c) An individual holding a certificate, including an individual who received an initial certificate under (b) of this section, must successfully complete the lumber grading training program to renew the individual's lumber grading certificate.

(d) The division may revoke a lumber grading certificate for good cause, after giving the certificate holder notice of the reason for revocation and an opportunity for hearing. A certificate holder may appeal a revocation in writing to the state forester within 10 days after revocation.

Sec. 41.17.630. Use of graded and certified lumber. (a) Load-bearing dimensional lumber graded and certified in accordance with this section may be used in one-, two-, and three-family dwellings in this state.

(b) Load-bearing dimensional lumber graded and certified under this section must be milled in a manner that meets or exceeds the requirements of the applicable building code adopted for one-, two-, and three-family dwellings for the location where the lumber will be used or, if a building code for that location has not been adopted, the building code most broadly used in the state, as determined by the division.

(c) An individual holding a lumber grading certificate issued under AS 41.17.620 may grade load-bearing dimensional lumber that the individual mills. The individual shall provide written certification that the lumber meets the

requirements of (b) of this section. The certification must be

(1) on a form prescribed by the division;

(2) accompanied by a copy of the individual's lumber grading certificate.

(d) Load-bearing dimensional lumber graded and certified under this section may be used in a dwelling only if the individual holding the lumber grading certificate sells the lumber directly to a building contractor, the owner of the dwelling, or a person acting on behalf of the owner of the dwelling.

(e) Upon receiving written certification required by (c) of this section, an inspector authorized to review plans or inspect the dwelling under applicable local building codes may authorize the use of the lumber, reject the use of the lumber, or authorize the use of the lumber subject to more restrictive construction requirements, including requirements as to size, spacing, length of spans, and design.

*** Sec. 2.** This Act takes effect immediately under AS 01.10.070(c).

Appendix 2. Example of Certification Form

1) **Sawmill Business Name:**

2) **Grader Name:**

3) **Date Lumber was cut:**

4) **Date Lumber Was Graded:**

5) **Grade** The Alaska Local Use Lumber Grade for this certificate is (circle grade) and describe marking or paint (if used:

   Number 2 and better Stud Grade Number 3 Grade

   Describe markings or paint (if any):_____

6) **Species** (common names acceptable)

7) **Moisture Condition:** (circle one):

   Green Lumber Dry Lumber

   Additional Notes:

   If Green Lumber is PAD – explain:

   If Dry lumber has been kiln-dried – note type of kiln and maximum temperature/duration.

8) **Surface Conditions:** The Alaska Local Use lumber surface condition for this certificate is (circle one)

   Surfaced Lumber Sawn-To-Size Lumber Rough Lumber

   Optional additional information:

   Surfaced Lumber (circle) S4S (surfaced four sides) OR (fill in as appropriate) Surface on one side (S1S), two sides (S2S), one edge (S1E) two edges (S2E) or combination of sides and edges (S1S1E, S1S2E, S2S1E)

   Sawn-To-Size Lumber (circle) initially sawn-To-Size OR (fill in as appropriate)

   Resawn on one edge (S1E), two edges (S2E), one side (S1S), or two sides (S2S) or combination (S1S1E, S1S2E, S2S1E, S4S)

9) **Sizes and Tally** for other than rough lumber, The Alaska Local Use Lumber Sizes for this certificate is:

Standard Thickness and Width Standard Lengths

For rough lumber and non-standard sizes (and any non-standard lengths) provide actual sizes. Provide tally including number of pieces in sizes of thickness/width/length and total tally – use back of sheet or attached sheets if necessary.

Length	Dimensions	BDFT
		TOTAL:

Appendix 3. Definitions of Lumber Defects and Explanations

Knots

A knot is a portion of a branch or a limb that is overgrown by the tree and has become incorporated into the piece of lumber, that is further classified as to occurrence, form, quality and size as being:

a. A **sound** knot contains no decay while an **unsound** knot contains decay

b. A ***firm knot*** is solid across its face but contains incipient decay

c. An ***encased knot*** is a knot that is not intergrown with the growth rings of the surrounding wood.

d. A **pith knot** is sound in all respects except that it contains a pith hole that is not more than 0.25 inches in diameter.

e. A ***tight knot*** is so fixed (by growth, shape or position) that it retains its place, or is held in place in the piece while a ***loose knot*** or a ***not firmly fixed knot*** is one which is not so fixed by growth shape or position such that it will not be held tightly in place in the piece.

f. ***Well-spaced*** knots means that the sum of the sizes of all knots in any 6-inch length cannot exceed twice the size of the largest permitted knot, more than one knot of maximum size cannot be in any 6-inch piece and the combination of knots must not be serious. The presence of knot clusters where two or more knots are grouped together as a single unit (i.e. knots adjacent to each other) with the fibers of wood deflected around the entire unit should be considered as serious (in meeting the requirement for well-spaced knots) if the area of the knot cluster contained within a surrounding wood area would begin to approach the size limit for well-spaced knots within a six-inch piece.

g. ***Well-scattered knots*** are not in clusters and occur where each knot is separated from another knot by at least a distance equal to the diameter of the smaller of the two knots.

h. A ***round knot*** occurs as the result of the limb being cut in the manufacture of the board such that the limb is approximately at right angles to the long axis of the board (and the knot will appear as a cross-section on the face that is more or less “round”). A ***spike knot*** occurs as a result of the limb being cut either lengthwise or diagonally and the limb will appear as a cross-section on the face that resembles a “spike” that is significantly greater in one dimension than in the other. An ***oval knot*** is something between these two extremes, which occurs as the limb is cut in the manufacture of the board such that the limb is slightly more than a right angle to the long axis of the board and the knot will appear as a cross-section on the face, as more or less “oval.”

i. A ***red knot*** occurs as the result of the tree overgrowing a living branch and is intergrown with the surrounding wood. An ***intergrown knot*** is one where growth rings are partially or completely intergrown on at least one side with the surrounding wood. A ***watertight knot*** is one where growth rings are completely intergrown on one surface of the piece and the knot is sound

on that surface. In contrast, a ***black knot*** occurs as the result of the tree overgrowing a dead branch and is consequently not intergrown with the surrounding wood.

j. A ***star-checked kno***t has radial checks.

k. The ***size of a knot*** is measured directly as the diameter (in inches) for a round knot. For other than round knots the equivalent diameter size is calculated by averaging the measurements of the maximum width of the knot, in inches, on its narrow axis and the maximum length on its long axis.

l. A ***pin knot*** is not over 0.5 inches in diameter. A ***small knot*** is not over 0.75 inches in diameter. A ***medium knot*** is not over 1.5 inches in diameter. A ***large knot*** is over 1.5 inches in diameter.

Holes

A hole may extend completely or partially through the piece. A hole may result from various causes including mechanical actions, but are very commonly caused by insects in the case of smaller holes, and the sloughing of loose (black) knots. The sizes of holes are measured in the same fashion as knots. Size classification of holes are as follows:

a. A pin hole is not more than 1/16 inch in diameter.

b. A medium hole is larger than a pin hole but not more than ¼ inch in diameter.

c. A large hole is larger than a medium hole but not more than 1 inch in diameter.

d. A very large hole is more than 1 inch in diameter.

Unsound wood (decay)

Results from the attack of wood by any of a number of wood-destroying fungi that leave wood in a disintegrated condition. This is typically reflected by a loss of hardness and the softening of the wood fibers. Some examples include:

a. **Heart center decay**: Forms in the vicinity of the pith in a living tree, does not progress further after the tree is cut.

b. **White speck** is small white or sometimes brown spots caused by a fungus that forms in the living tree, and does not progress further in wood in service.

c. **Honeycomb** is similar to white speck but larger.

d. **Incipient decay** is the very early state of decay where disintegration of the fibers has just begun and the wood has discolored but has not yet disintegrated to the point that it is significantly softened. Incipient decay may be difficult to distinguish from stain, and if sound and not expected to advance or progress to a more disintegrated state, it is not considered as unsound for purposes of grading classification within the Alaska Local Use Lumber Grades. In contrast,

the onset of decay of any kind that leaves wood in a disintegrated condition, which typically presents as a loss of hardness and the softening of the wood fibers, must be considered as unsound wood.

Wane

Bark or the absence of wood from any cause but commonly at what would be the absence of wood due to the cambium layer being included on the edge or a face of a piece of lumber. Wane extended up to full width is allowed in an occasional piece in any Alaska Local Use Lumber Grade if it does not exceed the 1/8-inch depth limits for skips/scant, is away from the ends, and is less than one foot in length.

Shake

Is a lengthwise separation of the wood (primarily along the longitudinal axis) that occurs commonly between or sometimes across the growth rings (i.e. separation along the long axis between or across the annual growth rings).

a. A ***surface shake*** occurs on only one surface of the piece of lumber.

b. A ***through shake*** will extend from one surface face to an opposite or adjoining surface (e.g., completely through from one wide face to another or from a wide face to an edge face).

Splits

A split is a separation of the wood due to the tearing apart of the wood cells that occurs through the piece to the opposite or an adjacent surface.

Checks

A check is a separation of the wood that normally occurs across or through the wood growth rings (i.e., normally in the tangential or radial dimension). Usually a result of the drying process.

a. A surface check occurs on a width or thickness face of a piece.

b. A through check will extend from one surface face to an opposite or adjoining surface (e.g., completely through from one wide face to another, or from a wide face to an edge face).

Slope of Grain

Slope of grain is the deviation of the wood fiber from a line that is parallel to the edges of the piece (i.e. the grain of the wood is not parallel to the edge of the piece). The slope of grain deviation is expressed as a ratio, such as 1 in 8, representing there is 1 inch in deviation between the grain of the wood and the line parallel for every 8 inches of length.

Warp

Warp is any deviation from a true (or flat plane) surface. It includes twists, crook, bow and cup, separately or in combination. Warp restrictions are based on average form as it normally occurs, and variations from the average form (such as short kinks) should be considered and appraised according to equivalent effect. Two or more forms of warp in a single piece should be appraised according to combined effect. The Alaska Local Use Lumber Grades allow different amounts of warp for different

types between the different grades and sizes of dimension lumber. Depending on the Alaska Lumber Grade, warp that is termed as “Light" or “Medium” may be allowed, for the Number 2 and Better and the Stud Grades as compared to the Number 3 Grade. But what is allowed as “Light” warp for the Number 2 and Better and the Stud Grades, as compared to “Medium” warp for the Number 3 Grade, varies according to type of warp and lumber dimensions. Allowed limits for twist vary according to Grade and lumber length and width; allowed limits for crook vary according to Grade and limber length and width; allowed limits for bow vary according to Grade, lumber length and thickness; and allowed limits for cup vary according to width. These specific warp limits are included in Section 4 of the tables below. The different types of warp considered within the Alaska Lumber Grading program are as follows.

a. **Twist** is a deviation flatwise or a combination of flatwise and edgewise, in the form of a curve or spiral. It is measured as the point of distance that the edge of a piece is raised above a flat surface where both edges of the opposite end of the same piece are resting against the same flat surface.

b. **Crook** is a deviation edgewise from a straight line drawn from end to end of the piece (i.e., a straight line from end to end along an edge or a thickness face.) It is measured as the point of greatest distance from the straight line.

c. **Bow** is a deviation flatwise from a straight line drawn from end to end of the piece (i.e. a straight line from end to end along a wide face). It is measured as the point of greatest distance from the straight line.

d. **Cup** is a deviation in the face of a piece, from a straight line drawn from edge to edge of the piece (i.e., a straight line from edge to edge across the wide face). It is measured as the point of greatest distance from the straight line.

Skips

Skips occur in surfaced lumber in areas where the piece has failed to surface cleanly. A ***Heavy Skip*** is a skip that is not more than 1/8 inch deep.

Scant

Scant may occur in green or dry and in rough or surfaced lumber where the lumber is slightly less than the standard or required size. Within the Alaska Lumber Grades for “rough” dry or green lumber that is intended to be sawn-to-size for use without surfacing, some scant undersize may occur in some places on the piece and it is allowed in the same fashion and to the same degree (i.e., not to exceed 1/8 inch in depth and not to exceed 2 feet in length in any one place) for which skip is allowed in surface lumber.

Manufacture

All the ALG grades allow manufacturing imperfections of a modified Standard “F” which is to say that it is a modified version of the least restrictive of the standards accepted by accredited grading bureaus. This recognizes that sawn-to-size lumber in the green condition and other lumber that has not been kiln-dried and that has not been surfaced four sides will be used and sold under this program. This also recognizes that the nature of the mills that will likely produce such lumber will be limited with regard to

machine centers that will typically produce this lumber and simplifies the limitations for manufacturing imperfections.

Specifics for the characteristics of manufacturing imperfections permitted under the Alaska Lumber Grading program modified Standard “F” are as follows:

a) **Heavy torn grain** allowed not more than 1/8 inch (0.125 inch) in deep (torn grain is a surface irregularity where wood has been torn or broken out by surfacing).

b) **Heavy raised grain** allowed not more than 1/8 inch (0.125 inch) high (raised grain is a surface irregularity where latewood (or summerwood) rises above the earlywood (or springwood)).

c) **Heavy loosened grain** allowed not more than 1/8-inch (0.125 inch) separation (loosened grain is a grain separation or loosening between latewood and earlywood). Heavy machine bite allowed not more than 1/8 inch (0.125 inch) deep (machine bite is a depressed cut of the machine knives at the end of the piece).

d) **Heavy machine gouge** allowed not more than 1/8 inch (0.125 inch) deep (machine gouge is a groove cut by the machine below the desired line). Heavy machine offset allowed not more than 1/8 inch (0.125 inch) deep (machine offset is an abrupt dressing variation in the edge of the piece, usually near the end of the piece, that does not reduce the width of the wide surface).

e) **Heavy chip marks** allowed not more than 1/8 inch (0.125 inch) deep (chip marks are shallow depressions typically caused by shavings (i.e. “chips”) getting imbedded in the surface during the surfacing process).

f) **Knife marks and saw marks** allowed as readily visible and uneven to the touch (knife marks and saw marks are imprints of machine knives or saw blades on the surface of the piece).

g) **Heavy wavy dressing and sawing variation** allowed not more than 1/8 inch (0.125 inch) deep (wavy dressing is uneven dressing and sawing variation is thickness variation in a piece resulting from the variation of the saw and other elements of the machine centers within the sawmill).

h) **Heavy mismatch** allowed not more than 1/8 inch (0.125 inch) deep (mismatch is an uneven fi t in worked lumber when adjoining pieces do not meet tightly at all points of contact, and also where the surfaces of adjoining pieces are not in the same plane).

Appendix 4. Summary of limits of 8 characteristics permitted for the three Alaska Lumber Grades

Defect limits for the three Alaska lumber grades.				
Defect Type		AK #2 & BTR	AK Stud	AK #3
Knots	Max knot size	1/4th board width	1/3rd board width	
	Quality	Sound, fixed, Encased; no advanced decay	Any quality but not a hole	
	Spacing	Allowed 2 times maximum knot size within 6-inch section		
Holes or non-wane unsound wood	Max size	1/4 board width	1/3 board width	
	Spacing	Allowed equivalent of maximum hole size within 2 lineal feet		
Wane	Max from one edge	1/3rd Width, 1/3rd Thickness	½ Width, 1/3rd thickness	½ Width, ½ Thickness
	Total wane	½ Width, ½ Thickness	¾ Width, ½ thickness	¾ Width, ¾ Thickness
Split	Max length	1½ times board width	2 times board width	
Shake	End shake	Limited as splits		
	Through shake not at end	Allowed maximum 2' long	Allowed maximum 1/3 board length	
Slope of Grain	Deviation per length	1 in 8	1 in 4	
Warp	Severity	Light		Medium
Manufacturing	Severity	Heavy		

Appendix 5. Summary of Knots, Hole Size, Wane, Slope of Grain and Splits Limiting Provisions for Alaska Local Use Dimension Lumber

Table 5.1, Maximum Knot Size (or equivalent) for the three Alaska Local Use Lumber Grades.

Maximum Knot Size (or equivalent)			
	AK Number 2 and Better	AK Stud Grade	AK Number 3
Nominal Width	Sound firm encased and pith knots if tight and well-spaced	Any quality permitted if well-spaced	Any quality permitted if well-spaced
Inches	Inches	Inches	Inches
2	1/2	2/3	2/3
2.5	5/8	5/6	5/6
3	3/4	1	1
3.5	7/8	1 1/6	1 1/6
4	1	1 1/3	1 1/3
4.5	1 1/8	1 1/2	1 1/2
5	1 1/4	1 2/3	1 2/3
6	1 1/2	2	2
8	2	2 2/3	2 2/3
10	2 1/2	3 1/3	3 1/3
12	3	4	4
14	3 1/2	4 2/3	4 2/3
16	4	5 1/3	5 1/3

Table 5.2 Maximum hole size (or equivalent) per 2 linear feet for the three Alaska Local Use Lumber Grades (all unsound wood except wane included in “hole” limits, including unsound, loose and not firmly fixed knots).

Maximum size (or equivalent smaller holes per 2 linear feet)			
Nominal Width	Number 2 and Better	Stud Grade	Number 3
Inches	Inches	Inches	Inches
2	1/2	2/3	2/3
2.5	5/8	5/6	5/6
3	3/4	1	1
3.5	7/8	1 1/6	1 1/6
4	1	1 1/3	1 1/3
4.5	1 1/8	1 1/2	1 1/2
5	1 1/4	1 2/3	1 2/3
6	1 1/2	2	2
8	2	2 2/3	2 2/3
10	2 1/2	3 1/3	3 1/3
12	3	4	4
14	3 1/2	4 2/3	4 2/3
16	4	5 1/3	5 1/3

Table 5.3, Maximum Wane (or equivalent) for three Alaska Local Use Lumber Grades

Maximum Wane			
	AK Number 2 & Better	AK Stud	AK Number 3
Each Face	1/3 Thickness full length	1/3 Thickness full length	1/2 Thickness full length
Each Face	1/3 width full length	1/2 width full length	1/2 width full length
Combined Faces	Maximum 1/2 thickness any point	Maximum 1/2 thickness any point	Maximum 3/4 thickness any point
Combined Faces	Maximum 1/2 width any point	Maximum 3/4 width any point	Maximum 3/4 width any point

Table 5.4, Maximum Slope of Grain on three Alaska Local Use Lumber Grades

Maximum Slope of Grain		
AK Number 2 & Better	AK Stud	AK Number 3
1 in 8	1 in 4	1 in 4

Table 5.5, Maximum Splits for three Alaska Local Use Lumber Grades

Maximum Splits		
AK Number 2 & Better	AK Stud	AK Number 3
Length equal to 1.5 times width of piece	Length equal to 2 times width of piece	Length equal to 2 times width of piece

Appendix 6. Twist, Crook, Bow and Cup Tables for Alaska Local Use Lumber

Table 6.1, Twist limits by length and width.

	TWIST LIMITS BY LENGTH AND WIDTH						
	WIDTH IN INCHES (NOMINAL)						
Length in Feet	Twist	2 inch	3 &4 inch	5 & 6 inch	8 inch	10 inch	12 inch & <
4 foot	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
6 foot	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
8 foot	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
10 foot	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
12 foot	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
14 foot	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
16 foot	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
18 foot	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
20 foot and greater	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

Table 6.2, Crook limits by length and width.

CROOK LIMITS BY LENGTH AND WIDTH								
Length	CROOK	2 inch	3 inch	4 inch	5 - 6 inch	8 inch	10 inch	≥ 12 inches
4 foot	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
6 foot	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
8 foot	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
10 foot	Light	3/4	5/8	1/2	7/16	3/8	¼	3/16
	Medium	1 3/8	1	3/4	5/8	1/2	7/16	3/8
12 foot	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	¾	9/16
14 foot	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
16 foot	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
18 foot	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
20 foot	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
22 foot	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
24 foot and longer	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

Table 6.3 Bow Limits

BOW LIMITS BY LENGTH AND THICKNESS			
	THICKNESS IN INCHES (NOMINAL)		
Length in Feet	BOW	2 inch	3 and 4 inch
4 & 6 foot	Light	1/2	1/4
	Medium	3/4	3/8
8 foot	Light	3/4	3/8
	Medium	1	1/2
10 foot	Light	1 1/2	3/4
	Medium	2 3/4	1 3/8
12 foot	Light	2	1
	Medium	3	1 1/2
14 foot	Light	2 1/2	1 1/4
	Medium	4	2
16 foot and greater	Light	3 1/4	1 5/8

Table 6.4 Cup Limits

CUP LIMITS BY LENGTH AND WIDTH						
	WIDTH IN INCHES (NOMINAL)					
CUP	2 & 3 inch	4 inch	5 & 6 inch	8 inch	10 inch	12 inch
Light	1/32	1/32	1/16	1/8	3/16	1/4
Medium	1/32	1/16	1/8	3/16	1/4	3/8

Appendix 7. Design Values in Key Grades and Sizes For Selected Species and Species Groups.

Table 7.1: Alaska Yellow Cedar, size adjusted values for dimension lumber

Alaska Yellow Cedar									
Size 2" to 4" thick by	Grade	Extreme Fiber Stress in Bending, Fb			Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity
		2'&3" Thick		4" thick			Perpendicular to grain	Parallel to Grain	
		single	repetitive	single	Ft	Fv	Fc-Perp	Fc	E
2"-4" wide (2x2, 2X3,2X4, 3X3, 3X4, 4X4)	No. 2	1200	1380	1200	675	225	510	1150	1,300,000
	No. 3	715	820	715	375	225	510	660	1,200,000
	Stud	690	790	690	385	225	510	655	1,200,000
6" Wide (2X6, 3X6, 4X6)	No. 2	1040	1195	1040	585	225	510	1100	1,300,000
	No. 3	620	710	620	325	225	510	635	1,200,000
	Stud	625	720	625	350	225	510	625	1,200,000
8" Wide (2X8, 3X8, 4X8)	No. 2	960	1105	1040	540	225	510	1050	1,300,000
	No. 3 /Stud	570	655	620	300	225	510	605	1,200,000
10" Wide (2X10, 3X10, 4X10)	No. 2	880	1010	960	495	225	510	1000	1,300,000
	No. 3 /Stud	525	600	570	275	225	510	575	1,200,000
12" Wide (2X12, 3X12, 4X12)	No. 2	800	920	880	450	225	510	1000	1,300,000
	No. 3 /Stud	475	545	525	250	225	510	575	1,200,000
14" & Wider (2X14 & wider, 3X14 & wider, 4X14 & wider)	No. 2	720	830	800	405	225	510	900	1,300,000
	No. 3 /Stud	430	490	475	225	225	510	520	1,200,000

Information from the Western Wood Products Association "Tech Notes 20015-01"

Table 7.2: Alaska Hemlock, size adjusted values for dimension lumber

Alaska Hemlock									
Size 2" to 4" thick by	Grade	Extreme Fiber Stress in Bending, Fb			Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity
		2'&3" Thick		4" thick			Perpendicular to grain	Parallel to Grain	
		single	repetitive	single	Ft	Fv	Fc-Perp	Fc	E
2"-4" wide (2x2, 2X3,2X4, 3X3, 3X4, 4X4)	No. 2	1240	1425	1240	715	185	440	1210	1,500,000
	No. 3	715	820	715	415	185	440	690	1,400,000
	Stud	715	820	715	415	185	440	685	1,400,000
6" Wide (2X6, 3X6, 4X6)	No. 2	1070	1235	1075	620	185	440	1155	1,500,000
	No. 3	620	710	620	360	185	440	660	1,400,000
	Stud	650	750	650	375	185	440	650	1,400,000
8" Wide (2X8, 3X8, 4X8)	No. 2	990	1140	1075	570	185	440	1105	1,500,000
	No. 3 /Stud	570	655	620	330	185	440	630	1,400,000
10" Wide (2X10, 3X10, 4X10)	No. 2	910	1045	990	525	185	440	1050	1,500,000
	No. 3 /Stud	525	600	570	305	185	440	600	1,400,000
12" Wide (2X12, 3X12, 4X12)	No. 2	825	950	910	475	185	440	1050	1,500,000
	No. 3 /Stud	475	545	525	275	185	440	600	1,400,000
14" & Wider (2X14 & wider, 3X14 & wider, 4X14 & wider)	No. 2	745	855	825	430	185	440	945	1,500,000
	No. 3 /Stud	430	490	475	250	185	440	540	1,400,000

Information from the Western Wood Products Association "Tech Notes 20015-01"

Table 7.3: Alaska Spruce, size adjusted values for dimension lumber.

Alaska Spruce									
Size 2" to 4" thick by	Grade	Extreme Fiber Stress in Bending, Fb			Tension Parallel to Grain	Horizontal Shear	Compression		Modulus of Elasticity
		2'&3" Thick		4" thick			Perpendicular to grain	Parallel to Grain	
		single	repetitive	single	Ft	Fv	Fc-Perp	Fc	E
2"-4" wide (2x2, 2X3,2X4, 3X3, 3X4, 4X4)	No. 2	1315	1510	1315	750	160	330	1210	1400000
	No. 3	750	865	750	450	160	330	690	1300000
	Stud	745	855	745	440	160	330	710	1300000
6" Wide (2X6, 3X6, 4X6)	No. 2	1140	1310	1140	650	160	330	1155	1400000
	No. 3	650	750	650	390	160	330	660	1300000
	Stud	675	775	675	400	160	330	675	1300000
8" Wide (2X8, 3X8, 4X8)	No. 2	1050	1210	1140	600	160	330	1105	1400000
	No. 3 /Stud	600	690	650	360	160	330	630	1300000
10" Wide (2X10, 3X10, 4X10)	No. 2	965	1105	1050	550	160	330	1050	1400000
	No. 3 /Stud	550	635	600	330	160	330	600	1300000
12" Wide (2X12, 3X12, 4X12)	No. 2	875	1005	965	500	160	330	1050	1400000
	No. 3 /Stud	500	575	550	300	160	330	600	1300000
14" & Wider (2X14 & wider, 3X14 & wider, 4X14 & wider)	No. 2	790	905	875	450	160	330	945	1400000
	No. 3 /Stud	450	520	500	270	160	330	540	1300000

Information from the Western Wood Products Association "Tech Notes 20015-01"

Appendix 8. Nominal and Standard required thickness and width for the Alaska Lumber Grading Program.

Table 8.1, Standards for Minimum Thicknesses According to Surface Condition

Minimum Thickness (inches)				
	Minimum Dry Lumber Standard	Minimum Green Lumber Standard*	Minimum Standard	Minimum suggested
Nominal Thickness	Surfaced or Sawn-to-size	Surfaced or Sawn-to-size	Dry Rough Lumber	Green Rough Lumber*
2	1-1/2	1-9/16	1-5/8	1-11/16
2-1/2	2	2-1/16	2-1/8	2-3/16
3	2-1/2	2-9/16	2-5/8	2-3/4
3-1/2	3	3-1/16	3-1/8	3-1/4
4	3-1/2	3-9/16	3-5/8	3-13/16

***Note:** For green sawn-to-size and green rough lumber, these minimum suggested dimensions may not be adequate starting points. Based on species, the initial moisture content of the wood, and other factors, larger initial dimensions may be required to reach the target thickness after shrinkage due to drying. Minimum Thickness (inches)

Table 8.2, Standards for Minimum Widths According to Surface Condition

Minimum Width (inches)				
	Minimum Dry Lumber Standard	Minimum Green Lumber Standard*	Minimum Standard	Suggested Minimum*
Nominal Width	Surfaced or Sawn-to-size	Surfaced or Sawn-to-size	Dry Rough Lumber	Green Rough Lumber
In inches	In inches	In inches	In inches	In inches
2	1-1/2	1-9/16	1-5/8	1-11/16
2-1/2	2	2-1/16	2-1/8	2-3/16
3	2-1/2	2-9/16	2-5/8	2-3/4
3-1/2	3	3-1/16	3-1/8	3-1/4
4	3-1/2	3-9/16	3-5/8	3-13/16
4-1/2	4	4-1/16	4-1/8	4-5/16
5	4-1/2	4-10/16	4-5/8	4-7/8
6	5-1/2	5-10/16	5-5/8	5-7/8
8	7-1/4	7-1/2	7-3/8	7-11/16
10	9-1/4	9-1/2	9-3/8	9-3/4
12	11-1/4	11-1/2	11-3/8	11-7/8
14	13-1/4	13-1/2	13-3/8	13-15/16
16	15-1/4	15-1/2	15-3/8	16

***Note:** For green sawn-to-size and green rough lumber, these minimum suggested dimensions may not be adequate starting points. Based on the initial moisture content of the wood and other factors, larger initial dimensions may be required to reach the target width after shrinkage due to drying.

Appendix 9. Board Feet of 2” thick lumber of varying width and length.

Table 9, Board Feet of 2” thick lumber pieces.

Board Feet for 2” thick lumber					
Width (inches)	Length of board (feet)				
	8	10	12	16	20
2	2.7	3.3	4	5.3	6.7
4	5.3	6.7	8	10.7	13.3
6	8	10	12	16	20
8	10.7	13.3	16	21.3	26.7
10	13.3	16.7	20	26.7	33.3
12	16	20	24	32	40