## CANADIAN DIMENSION LUMBER



## CANADIAN STANDARD LUMBER AND <br> AMERICAN STANDARD LUMBER

Standard Grading Rules for Canadian Lumber (U.S. edition), published by the National Lumber Grades Authority, have been approved by the American Lumber Standards Committee, and Canadian grade-stamping agencies are part of the total ALS quality-control system. So it can be truly said that "Canadian Standard Lumber" equals "American Standard Lumber"; it conforms fully to size and grade requirements of the American Lumber Standards.

Grades of Canadian dimension lumber are identical to those in use throughout the United States and conform to all applicable requirements of American Softwood Lumber Standard PS 20-70. Species combinations, assigned stress values and spans tabulated herein have been developed in strict accordance with the applicable American standards as applied to species grown within Canada.

Complete information on allowable spans is contained in the National Forest Products Association publication Span Tables for Joists and Rafters which has been adopted by FHA and most building codes. The primary purpose of this booklet is to provide, in addition to data on Canadian species combinations and characteristics, a convenient reference for spans for Canadian dimension lumber, fully in accord with the FHA-approved span tables.

Data on physical properties are from NLGA Rules (U.S. Edition) and have been approved by the American Lumber Standards Committee on the advice of the U.S. Forest Products Laboratory. Allowable spans are calculated from these data. Such strength and stiffness properties are under constant review, and published data will be revised whenever research results so indicate. While care has been taken to ensure that information published in Canadian Dimension Lumber conforms to appropriate rules and standards, and to current commercial practice the Canadian Wood Council does not assume responsibility for errors or omissions in this publication, nor for specifications or work based on it.

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## Canadian Species Combinations

For purposes of identification and standardization of assigned design values, and because some species cannot be visually separated in lumber form, certain species are marketed together and given a common commercial designation on grade stamps. The 14 Canadian commercial species combinations and the characteristics of the woods therein are described below. These combinations are summarized in Table 1.

## Coast sitka spruce

Combination contains Coast sitka spruce (Picea sitchensis) only. A light, resilient wood of moderate strength that works and takes paint easily and holds nails well. Creamy white to light pink in color with large proportion of clear wood.

## Douglas fir-Larch (North)

Contains Douglas fir (Pseudotsuga menziesii) and Western larch (Larix occidentalis). Both woods similar in strength and weight. High degree of hardness and good resistance to decay. Good nail holding, gluing, and painting qualities. Color ranges from reddish-brown to yellowish-white.

## Eastern hemlock-Tamarack (North)

Includes Eastern hemlock (Tsuga canadensis) and Tamarack (Larix laricina). Moderately strong woods mostly used for general construction. Fairly hard and durable. Color range yellowish-brown to whitish.

## Eastern white pine (North)

This combination contains Eastern white pine (Pinus strobus) only. Softest of the Canadian pines, it works and finishes exceptionally well. Not as strong as most pines but does not tend to split or splinter. Good nail holding properties. Low shrinkage, better than all other Canadian species except the cedars. Takes stains, paints and varnishes well. Color of sapwood almost white; heartwood creamy white to light straw-brown.

## Hem-Fir (North)

Combination comprises Western hemlock (Tsuga heterophylla) and Amabilis fir (Abies amabilis). Light woods of moderate strength. They work easily, take paint well and hold nails well. Good gluing characteristics. Color range pale yellow-brown to white.

## Ponderosa pine

Combination contains Ponderosa pine (Pinus ponderosa) only. Moderately strong and easily worked to smooth uniform texture. Takes paints, stains and varnishes well. Seasons readily. Good nail holding qualities. Color variable from pale yellow sapwood to deep yellow to reddish brown heartwood. Considerable figure in heartwood.

## Red pine (North)

Contains Red pine (Pinus resinosa) only. A fairly strong and easy to work wood that takes a good finish and holds nails and screws well. Moderately durable; it seasons with little checking or cupping. Sapwood is thick, pale yellow color; heartwood pale brown to reddish.

## Spruce-Pine-Fir

The largest of the commercial combinations, comprising White spruce (Picea glauca), Red spruce (Picea rubens), Black spruce (Picea mariana), Engelmann spruce (Piceá
engelmannii), Lodgepole pine (Pinus contorta), Jack pine (Pinus banksiana), Alpine fir (Abies lasiocarpa) and Balsam fir (Abies ba/samea). Woods of similar characteristics, they have moderate strength, work easily, take paint easily and hold nails well. Generally white to pale yellow in color.

## Western cedars (North)

Includes Western red cedar (Thuja plicata) and Pacific coast yellow cedar (Chamaecyparis nootkatensis). Woods of disparate strength but similar exceptional resistance to decay. High in appearance qualities, they both work easily and take fine finishes. Each species has distinct and easily recognizable coloration; red cedar varies from reddishbrown heartwood to light sapwood and yellow cedar has a uniform warm yellow color.

## Western white pine

A one-species combination containing only Western white pine (Pinus monticola). Characteristics of the wood are very similar to those of Eastern white pine.

## Northern aspen

Technically hardwoods, this combination contains Quaking aspen (Populus tremuloides), Bigtooth aspen (Populus grandidentata) and Balsam poplar (Populus balsamifera). Light woods of comparatively low strength, they work easily, finish well and hold nails well. Generally light in colour, varying from almost white to greyish-white.

## Black cottonwood

Comprises Black cottonwood (Populus trichocarpa) only, a hardwood. Characteristics of the species are similar to those of the Northern aspen group, but it is lower in strength and stiffness.

## Northern species

This combination contains any Canadian softwood species included in NLGA Standard Grading Rules for Canadian Lumber, 1970 (with 1973 supplement).

## Coast species

Includes Douglas fir (Pseudotsuga menziesii), Western larch (Larix occidentalis), Western hemlock (Tsuga heterophylla), Amabalis fir (Abies amabilis) and Coast sitka spruce (Picea sitchensis). Characteristics of each species are given in previous species combinations.

## Sizes and Grades of Canadian Lumber

Standards for lumber are established to provide an orderly basis for its manufacture and use. Such standards are seldom static but evolve in keeping with changes in the social, economic and technical environments.
The grading rule published by the National Lumber Grades Authority, a Canadian agency, has been certified by the Canadian Lumber Standards Administrative Board and applies throughout Canada. The rule has been voluntarily adopted by all Canadian regional grading agencies. Canadian Standards Association Standard O141, Softwood Lumber, provides for new lumber sizes.
The Canadian NLGA grading rule has also been accepted by the Federal Housing Administration and the American Lumber Standards Committee. ALS accepts Canadian grading agencies on the same terms as American grading agencies, and certifies each agency directly, in cooperation with the Canadian Lumber Standards Administrative Board.

Sizes and grades of Canadian dimension lumber are completely in accord with U.S. size requirements in PS 20-70; Canadian grades for dimension lumber are identical to those published by U.S. rules-writing agencies.

Table 1. Commercial Species Combinations

| Commercial Species Combinations Designation | $\qquad$ |
| :---: | :---: |
| Coast sitka spruce | Coast sitka spruce |
| Douglas fir-Larch (North) | Douglas fir Western larch |
| Eastern hemlock <br> -Tamarack (North) | Eastern hemlock Tamarack |
| Eastern white pine (North) | Eastern white pine |
| Hem-Fir (North) | Western hemlock Amabilis fir |
| Ponderosa pine | Ponderosa pine |
| Red pine (North) | Red pine |
| Spruce-Pine-Fir | White spruce Red spruce Black spruce Engelmann spruce Lodgepole pine Jack pine Alpine fir Balsam fir |
| Western cedars (North) | Western red cedar Pacific coast yellow cedar |
| Western white pine | Western white pine |
| Northern aspen | Quaking aspen Bigtooth aspen Balsam poplar |
| Black cottonwood | Black cottonwood |
| Northern species | Any species included in this table except those in the Northern aspen and Black cottonwood species combinations |
| Coast species | Douglas fir <br> Western larch Western hemlock Amabalis fir Coast sitka spruce |

## Lumber Shrinkage and its Relationship to Lumber Size

A change in the size of a piece of lumber is related to the amount of water it absorbs or loses. For moisture contents (MC) from 0 to about $30 \%$, the moisture is held within the walls of the wood cells. At about $30 \% \mathrm{MC}$ the cell walls reach their capacity or fibre saturation point (fsp) and any additional water must be held in the cell cavities. Drying the lumber from a high level down to fsp results in no size change. Decreasing the MC below fsp initiates shrinkage which continues in proportion to the amount of water removed. When dimension lumber of commercially-used softwood species is dried from fsp to an average of $19 \%$ MC it shrinks about $2.35 \%$ in thickness and $2.80 \%$ in width. Most dimension lumber is used in locations where its average equilibrium MC is about $15 \%$.

Unseasoned lumber shrinks to a smaller size when used in dry locations such as houses and dry lumber swells if used in wet service conditions. The CSA standard provides for two sets of sizes to overcome this discrepancy. Unseasoned lumber, defined as lumber exceeding $19 \%$ MC, is dressed to a larger size than dry lumber. The difference in size is just enough so that when used in dry conditions, unseasoned lumber will shrink to be equivalent in size and load capacity to lumber that was surfaced dry.

The size differential between unseasoned and dry lumber is given in Table 2. Lumber sizes and section properties are shown in Table 3.

## Lumber Categories, Grades and Dimensions

The NLGA rule classifies dimension lumber into two width categories and five use categories. Dimension lumber up to $4^{\prime \prime}$ wide is classified as Structural Light Framing, Light Framing, or Stud. Dimension lumber 5" and wider is classified as Structural Joists and Planks. In addition, a single Appearance Framing category of $2^{\prime \prime}$ and wider dimension is designed for special uses where appearance is of prime importance. All grades are uniformly graded the full length of the piece and may be cut to shorter lengths without altering the grade.

The categories and grades of dimension lumber are:

## Structural Light Framing

(2" to 4" Thick, 2" to 4" Wide)

Select
Structural and No. 1

No. 2 Popular for most general construction uses.

No. 3 Appropriate for use in general construction where appearance is not a factor.

## Light Framing

(2" to 4" Thick, 2" to 4" Wide)
Construction Widely used for general framing purpoand Standard ses. Pieces are of good appearance but graded primarily for strength and serviceability.
Utility Widely used where a combination of good strength and economical construction is desired for such purposes as studding, blocking, plates, bracing and rafters.
Studs
(2" to 4" Thick, 2" to 6" Wide, $10^{\prime \prime}$ and Shorter)
Stud Special purpose grade intended for all stud uses including load-bearing walls.
Structural Joists and Planks
(2" to 4" Thick, 5" and Wider)
Select Intended primarily for use where high Structural strength, stiffness and good appearance and No. 1 are desired.
No. 2 Popular for most general construction uses.
No. 3 Appropriate for use in general construction where appearance is not a factor.

## Appearance Framing

(2" to 4" Thick, 2" and Wider)
Appearance For use in general housing and light construction where lumber permitting knots but of high strength and fine appearance is desired.

## Uniform Grading and Stamping

The function of lumber grading is to set quality control standards among mills manufacturing the same or similar lumber. Grading practices of Canadian mills are closely supervised by the Canadian Lumber Standards Administrative Board to assure uniformity. The resulting grades provide the specifier with a dependable measure for determining the value of lumber. The official grade stamp on a piece of lumber designates its assigned grade. Facsimiles of typical grade stamps of lumber associations and grading agencies certified by the Canadian Lumber Standards Administrative Board to grade stamp lumber in Canada are shown at the back of this book.
All species and most grades of dimension lumber conforming to the standards have strength values assigned for structural uses.

## Allowable Unit Stresses

Allowable unit stresses applicable to Canadian lumber used in the United States are published in the National Lumber Grades Authority grading rule. Unit stresses therein were derived by strict application of ASTM Standards D2555 and D245 in accordance with the requirements of American Softwood Lumber Standard PS 20-70, as applied to species grown within Canada.
Because of slight differences in basic clear wood values in ASTM D2555 for species growing in both Canada and the United States, calculated allowable unit stresses for a Canadian species or species combination are not always identical to those recommended for the corresponding
species grown and manufactured in the United States. Whenever calculated values for Canadian lumber exceed those listed in U.S. grading rules for the same species or species combination and grade, the Canadian values have been reduced to conform to the U.S. values.
Allowable unit stresses for Canadian dimension lumber ( $2^{\prime \prime}$ to $4^{\prime \prime}$ in nominal thickness) are given in Tables 7, 8,9 and 10.
Values given in Table 7 apply to dimension lumber of $2^{\prime \prime}$ to $4^{\prime \prime}$ width, except for construction, standard and utility grades. For these three grades, the values given apply only to dimension lumber of $4^{\prime \prime}$ width.
Table 8 provides values for dimension lumber of $2^{\prime \prime}$ and $3^{\prime \prime}$ widths for construction, standard and utility grades only. These sizes are included because of their application primarily in the mobile home industry.
Values given in Table 9 apply to dimension lumber 2 to 4 inches thick, 5 inches and wider.
Table 10 applies to decking 2 to 4 inches thick, 6 inches and wider.
Table 11 gives allowable unit stresses for select structural scaffold plank, of $1 \frac{1 / 4}{}$ inches or greater thickness and 8 inches or wider.
Additional information on design and use of Canadian lumber can be found in NLGA rules and the National Forest Products Association publication, National Design Specification for Stress-Grade Lumber.

## Spans

The allowable span is the clear distance between supports. Spans in the tables on pages 12 through 32 are given in feet and inches of horizontal projection of the member. For horizontal members such as floor and ceiling joists, the horizontal projection is the actual length of the member. For sloping members such as roof rafters, the horizontal projection must be converted into a distance measured parallel to the member in order to determine the actual length. The diagram on page 11 provides a quick method by which horizontal distance can be converted to sloping distance, or vice versa.
Spans have been determined on the same basis as those published by the National Forest Products Association in Span Tables for Joists and Rafters which has been adopted by FHA and most building codes. The primary purpose of this booklet is to provide a convenient reference for spans for Canadian dimension lumber fully in accord with the FHA-approved span tables.
Spans are based upon the use of lumber in dry conditions as in most covered structures. They have been calculated using the allowable unit stresses given in Tables 7 and 9 . Where spans are limited by extreme fiber stress in bending ( $F_{b}$ ), appropriate stress values have been used in each calculation: spans for floor and ceiling joists have been calculated using the tabulated $F_{b}$ value for repetitive member use; those for rafters using the tabulated $F_{b}$ value for repetitive member use modified for snow loading according to the provisions of Table 6.
For Northern species, allowable spans are the shortest allowable spans for any species in Tables 12 to 32 inclusive; for Coast species, the shortest allowable spans for ' Coast sitka spruce, Douglas fir-Larch (North) and Hem-Fir (North) species combinations.

Table 2. Size Differential Between Unseasoned and Dry Lumber

| Nominal <br> Dimension (in.) | Size Differential at Time of <br> Surfacing between Unseasoned <br> and Dry Lumber (in.) |
| :--- | :---: |
| $1^{1 / 2}$ or less | $1 / 32$ |
| 2 to $4^{1 / 2}$ | $1 / 16$ |
| 5 to 7 | $1 / 8$ |
| 8 or more | $1 / 4$ |

Table 3. Dimension Lumber Sizes and Section

| Nomi- <br> nal <br> Size <br> (in.) | Surfaced Green Net Size (in.) | Surfaced Dry |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Net Size (in.) | $\begin{aligned} & \text { Area } \\ & \left(\text { in. }^{2}\right) \end{aligned}$ | Section <br> Modulus (in. ${ }^{3}$ ) | Moment of Inertia (in. ${ }^{4}$ ) |
| $2 \times 2$ | $19 / 16 \times 1^{9 / 16}$ | $1^{1 / 2} \times 1^{1 / 2}$ | 2.25 | 0.56 | 0.42 |
| $2 \times 3$ | $19 / 16 \times 2^{9 / 16}$ | $1^{1 / 2} \times 2^{1 / 2}$ | 3.75 | 1.56 | 1.95 |
| $2 \times 4$ | $19 / 16 \times 3^{9 / 16}$ | $1^{1 / 2} \times 3^{1 / 2}$ | 5.25 | 3.06 | 5.36 |
| $2 \times 6$ | $1^{9 / 16} \times 55 / 8$ | $1^{1 / 2} \times 5^{1 / 2}$ | 8.25 | 7.56 | 20.80 |
| $2 \times 8$ | $1^{9 / 16 \times 7} \times{ }^{1 / 2}$ | $1^{1 / 2} \times{ }^{1 / 4}$ | 10.87 | 13.14 | 47.63 |
| $2 \times 10$ | $1^{9 / 16} \times{ }^{1 / 2}$ | $11 / 2 \times 9^{1 / 4}$ | 13.87 | 21.39 | 98.93 |
| $2 \times 12$ | $1^{9 / 16} \times 11^{1 / 2}$ | $1{ }^{1 / 2} \times 11^{1 / 4}$ | 16.87 | 31.64 | 177.98 |
| $3 \times 3$ | $2^{9 / 16} \times 2^{9 / 16}$ | $2^{1 / 2} \times 2^{1 / 2}$ | 6.25 | 2.60 | 3.26 |
| $3 \times 4$ | $2^{9 / 16} \times 3^{9 / 16}$ | $2^{1 / 2} \times 3^{1 / 2}$ | 8.75 | 5.10 | 8.93 |
| $3 \times 6$ | $2^{9 / 16 \times 5} \times{ }^{5 / 8}$ | $2^{1 / 2} \times 5^{1 / 2}$ | 13.75 | 12.60 | 34.66 |
| $3 \times 8$ | $2^{9 / 16} \times 7^{1 / 2}$ | $2^{1 / 2} \times{ }^{1 / 4}$ | 18.12 | 21.90 | 79.39 |
| $3 \times 10$ | $2^{9 / 16} \times 9^{1 / 2}$ | $2^{1 / 2} \times 9^{1 / 4}$ | 23.12 | 35.65 | 164.89 |
| $3 \times 12$ | $2^{9 / 16} \times 11^{1 / 2}$ | $2^{1 / 2} \times 11^{1 / 4}$ | 28.12 | 52.73 | 296.63 |
| $4 \times 4$ | $3^{9 / 16} \times 3^{9 / 16}$ | $3^{1 / 2} \times 3^{1 / 2}$ | 12.25 | 7.15 | 12.50 |
| $4 \times 6$ | $3^{9 / 16} \times 5^{5 / 8}$ | $3^{1 / 2} \times 5^{1 / 2}$ | 19.25 | 17.65 | 48.53 |
| $4 \times 8$ | $39 / 16 \times 7^{1 / 2}$ | $3^{1 / 2} \times 7^{1 / 4}$ | 25.37 | 30.66 | 111.15 |
| $4 \times 10$ | $3^{9 / 16} \times 9^{1 / 2}$ | $3^{1 / 2} \times{ }^{1 / 4}$ | 32.37 | 49.91 | 230.84 |
| $4 \times 12$ | $3^{9 / 16 \times 11^{1 / 2}}$ | $3^{1 / 2} \times 11^{1 / 4}$ | 39.37 | 73.83 | 415.28 |

Table 4. Finish Lumber Sizes

| Product | Thickness (in.) |  | Width (in.) |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Nominal | Actual Surfaced Dry | Nominal | Actual Surfaced Dry |
| Finish | 3/8 | 5/16 | 2 | $1^{1 / 2}$ |
|  | $1 / 2$ | $7 / 16$ | 3 | $2^{1 / 2}$ |
|  | $5 / 8$ | 9/96 | 4 | $3^{1 / 2}$ |
|  | $3 / 4$ | $5 / 8$ | 5 | 41/2 |
|  | 1 | 3/4 | 6 | $5^{1 / 2}$ |
|  | $1^{1 / 4}$ | 1 | 7 | $6^{1 / 2}$ |
|  | $1^{1 / 2}$ | $1^{1 / 4}$ | 8 | 71/4 |
|  | $1^{3 / 4}$ | $13 / 8$ | 9 | $8^{1 / 4}$ |
|  | 2 | $1^{1 / 2}$ | 10 | $9^{1 / 4}$ |
|  | $2^{1 / 2}$ | 2 | 11 | $10^{1 / 4}$ |
|  | 3 | $2^{1 / 2}$ | 12 | $11^{1 / 4}$ |
|  | $3^{1 / 2}$ | 3 | 14 | $13^{1 / 4}$ |
|  | 4 | $3^{1 / 2}$ | 16 | $15^{1 / 4}$ |

Table 5. Modification Factors for Allowable Unit Stresses for Lumber 2 to 4 Inches Thick for Various Service Conditions
(To be used in conjunction with dry section properties)

| Modification Factor | Service Condition |  |  |
| :---: | :---: | :---: | :---: |
|  | DRY <br> Where the moisture content will not exceed $19 \%$, such as in most covered structures | WET <br> Where the moisture content will exceed $19 \%$ for an extended period of time | $15 \%$ Mc <br> Where the moisture content will not exceed $15 \%$ at any time (Note: Values apply onty to lumber manufactured at maximum $15 \%$ MC) |
| Extreme Fiber in Bending | 1.00 | 0.86 | 1.08 |
| Tension Parallel to Grain | 1.00 | 0.84 | 1.08 |
| Horizontal Shear | 1.00 | 0.97 | 1.05 |
| Compression Perpendicular to Grain | 1.00 | 0.67 | 1.00 |
| Compression Parallel to Grain | 1.00 | 0.70 | 1.17 |
| Modulus of Elasticity | 1.00 | 0.97 | 1.05 |

Table 6. Modification Factors for Allowable Unit Stresses for Various Durations of Loading

| Duration <br> of <br> Loading | Modifica- <br> tion <br> Factor | Typical Applications |
| :--- | :---: | :--- |
| Continuous | 0.90 | Tanks, bins, retaining walls, <br> floors continuously subjected <br> to full design load; support of <br> dead loads |
| Normal | 1.00 | Most floors, bridges, miscel- <br> laneous structures; some re- <br> taining walls |
| 2-Month | 1.15 | Structures subjected to snow <br> loads; some temporary struc- <br> tures |
| 7-Day | 1.25 | Some concrete formwork <br> falsework |
| 1-Day | 1.33 | Wind and earthquake loads; <br> some concrete formwork |
| Instantan- <br> eous | 2.00 | Impact loads |

Note: Factors listed are in accordance with Clause 2.2 .5 of National Design Specification, 1977 edition. They are not cumulative and do not apply to modulus of elasticity. Typical applications shown are for the guidance of the designer. When the total design load is made up of loads acting for different durations, the most severe combination governs.

Table 7. Allowable Unit Stresses for Lumber 2 to 4 inches Thick, 2 to 4 inches Wide (4 inch Widths Only for Construction, Standard and Utility Grades)

| Species and Commercial Grade | Allowable Unit Stresses (pounds per square inch) |  |  |  |  |  | Modulus of Elasticity |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Extreme Fiber in Bending |  | Tension Parallel to Grain | Horizontal Shear | Compression Perpendicular to Grain | Compression Parallel to Grain |  |
|  | Engineered Uses (single) | Repetitivemember Uses |  |  |  |  |  |
| Coast sitka spruce |  |  |  |  |  |  |  |
| Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance <br> Construction <br> Standard <br> Utility <br> Stud | $\begin{array}{r} 1500 \\ 1250 \\ 1050 \\ 575 \\ 1250 \\ 750 \\ 425 \\ 200 \\ 575 \end{array}$ | $\begin{array}{r} 1700 \\ 1450 \\ 1200 \\ 675 \\ 1450 \\ 875 \\ 500 \\ 225 \\ 675 \end{array}$ | $\begin{aligned} & 875 \\ & 750 \\ & 625 \\ & 350 \\ & 725 \\ & 450 \\ & 250 \\ & 125 \\ & 350 \end{aligned}$ | 65 | 290 | $\begin{array}{r} 1100 \\ 875 \\ 700 \\ 425 \\ 1050 \\ 800 \\ 650 \\ 425 \\ 425 \end{array}$ | 1,700,000 <br> 1,700,000 <br> 1,500,000 <br> 1,300,000 <br> 1,700,000 <br> 1,300,000 <br> 1,300,000 <br> 1,300,000 <br> 1,300,000 |
| Douglas fir-Larch (North) |  |  |  |  |  |  |  |
| Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance <br> Construction <br> Standard <br> Utility <br> Stud | 2100 1750 1450 800 1750 1050 600 275 800 | $\begin{array}{r} 2400 \\ 2050 \\ 1650 \\ 925 \\ 2050 \\ 1200 \\ 675 \\ 325 \\ 925 \end{array}$ | $\begin{array}{r} 1200 \\ 1050 \\ 850 \\ 475 \\ 1050 \\ 625 \\ 350 \\ 175 \\ 475 \end{array}$ | 95 | 385 | $\begin{array}{r} 1550 \\ 1250 \\ 1000 \\ 600 \\ 1500 \\ 1150 \\ 925 \\ 600 \\ 600 \end{array}$ | $\begin{aligned} & 1,800,000 \\ & 1,800,000 \\ & 11,700,000 \\ & 1,500,000 \\ & 1,800,000 \\ & 1,500,000 \\ & 1,500,000 \\ & 1,500,000 \\ & 1,500,000 \end{aligned}$ |
| Eastern hemlock-Tamarack (North) |  |  |  |  |  |  |  |
| Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance <br> Construction <br> Standard <br> Utility <br> Stud | 1800 1500 1250 700 1300 900 500 250 700 | $\begin{array}{r} 2050 \\ 1750 \\ 1450 \\ 800 \\ 1500 \\ 1050 \\ 575 \\ 275 \\ 800 \end{array}$ | $\begin{array}{r} 1050 \\ 900 \\ 725 \\ 400 \\ 875 \\ 525 \\ 300 \\ 150 \\ 400 \end{array}$ | 85 | 365 | $\begin{array}{r} 1350 \\ 1050 \\ 850 \\ 525 \\ 1300 \\ 975 \\ 800 \\ 525 \\ 525 \end{array}$ | $\begin{aligned} & 1,300,000 \\ & 1,300,000 \\ & 1,100,000 \\ & 1,000,000 \\ & 1,300,000 \\ & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \end{aligned}$ |
| Eastern white pine (North) |  |  |  |  |  |  |  |
| Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance <br> Construction <br> Standard <br> Utility <br> Stud | $\begin{array}{r} 1350 \\ 1150 \\ 950 \\ 525 \\ 1200 \\ 700 \\ 375 \\ 175 \\ 525 \end{array}$ | $\begin{array}{r} 1550 \\ 1350 \\ 1100 \\ 600 \\ 1400 \\ 800 \\ 450 \\ 200 \\ 600 \end{array}$ | 800 675 550 300 675 400 225 100 300 | 65 | 220 | $\begin{array}{r} 1050 \\ 850 \\ 675 \\ 400 \\ 1000 \\ 750 \\ 625 \\ 400 \\ 400 \end{array}$ | $\begin{aligned} & 1,200,000 \\ & 1,200,000 \\ & 1,100,000 \\ & 1,000,000 \\ & 1,200,000 \\ & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \end{aligned}$ |
| Hem-Fir (North) |  |  |  |  |  |  |  |
| Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance <br> Construction <br> Standard <br> Utility <br> Stud | $\begin{array}{r} 1650 \\ 1400 \\ 1150 \\ 625 \\ 1400 \\ 825 \\ 450 \\ 225 \\ 625 \end{array}$ | $\begin{array}{r} 1900 \\ 1600 \\ 1300 \\ 725 \\ 1600 \\ 950 \\ 525 \\ 250 \\ 725 \end{array}$ | 975 <br> 825 <br> 675 <br> 375 <br> 825 <br> 475 <br> 275 <br> 125 375 <br> 375 | 75 | 245 | $\begin{array}{r} 1300 \\ 1000 \\ 800 \\ 500 \\ 1200 \\ 925 \\ 750 \\ 500 \\ 500 \end{array}$ | $\begin{aligned} & 1,500,000 \\ & 1,500,000 \\ & 1,400,000 \\ & 1,200,000 \\ & 1,500,000 \\ & 1,200,000 \\ & 1,200,000 \\ & 1,200,000 \\ & 1,200,000 \end{aligned}$ |
| Ponderosa pine |  |  |  |  |  |  |  |
| Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance Construction Standard Utility Stud | $\begin{array}{r} 1400 \\ 1200 \\ 1000 \\ 550 \\ 1200 \\ 725 \\ 400 \\ 200 \\ 550 \end{array}$ | $\begin{array}{r} 1650 \\ 1400 \\ 1150 \\ 625 \\ 1400 \\ 825 \\ 450 \\ 225 \\ 625 \end{array}$ | $\begin{aligned} & 825 \\ & 700 \\ & 575 \\ & 325 \\ & 700 \\ & 425 \\ & 225 \\ & 100 \\ & 325 \end{aligned}$ | 70 | 250 | $\begin{array}{r} 1050 \\ 850 \\ 675 \\ 400 \\ 850 \\ 775 \\ 625 \\ 400 \\ 400 \end{array}$ | $\begin{aligned} & 1,200,000 \\ & 1,200,000 \\ & 1,100,000 \\ & 1,000,000 \\ & 1,200,000 \\ & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \end{aligned}$ |
| Red pine (North) |  |  |  |  |  |  |  |
| Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance <br> Construction <br> Standard <br> Utility <br> Stud | $\begin{array}{r} 1400 \\ 1200 \\ 975 \\ 525 \\ 1200 \\ 700 \\ 400 \\ 175 \\ 525 \end{array}$ | $\begin{array}{r} 1600 \\ 1350 \\ 1100 \\ 625 \\ 1350 \\ 800 \\ 450 \\ 225 \\ 625 \end{array}$ | $\begin{aligned} & 800 \\ & 700 \\ & 575 \\ & 325 \\ & 675 \\ & 400 \\ & 225 \\ & 100 \\ & 325 \end{aligned}$ | 70 | 280 | $\begin{array}{r} 1050 \\ 825 \\ 650 \\ 400 \\ 925 \\ 750 \\ 600 \\ 400 \\ 400 \end{array}$ | $\begin{aligned} & 1,300,000 \\ & 1,300,000 \\ & 1,200,000 \\ & 1,000,000 \\ & 1,300,000 \\ & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \end{aligned}$ |


| Spruce-Pine-Fir |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Seiect Structural | 1450 | 1650 | 850 |  |  | 1100 | 1,500,000 |
| No. 1 | 1200 | 1400 | 725 |  |  | 875 | 1,500,000 |
| No. 2 | 1000 | 1150 | 600 |  |  | 675 | 1,300,000 |
| No. 3 | 550 | 650 | 325 |  |  | 425 | 1,200,000 |
| Appearance | 1200 | 1400 | 700 | 70 | 265 | 1050 | 1,500,000 |
| Construction | 725 | 850 | 425 |  |  | 775 | 1,200,000 |
| Standard | 400 | 475 | 225 |  |  | 650 | 1,200,000 |
| Utility | 175 | 225 | 100 |  |  | 425 | 1,200,000 |
| Stud | 550 | 650 | 325 |  |  | 425 | 1,200,000 |
| Western cedars (North) |  |  |  |  |  |  |  |
| Select Structurai | 1450 | 1700 | 850 |  |  | 1200 | 1,100,000 |
| No. 1 | 1250 | 1450 | 725 |  |  | 975 | 1,100,000 |
| No. 2 | 1000 | 1200 | 600 |  |  | 775 | 1,000,000 |
| No. 3 | 575 | 650 | 325 |  |  | 475 | 900,000 |
| Appearance | 1250 | 1450 | 725 | 70 | 285 | 1150 | 1,100,000 |
| Construction | 750 | 850 | 425 |  |  | 875 | 900,000 |
| Standard | 425 | 475 | 250 |  |  | 725 | 900,000 |
| Utility | 200 | 225 | 125 |  |  | 475 | 900,000 |
| Stud | 575 | 650 | 325 |  |  | 475 | 900,000 |
| Western white pine |  |  |  |  |  |  |  |
| Seiect Structural | 1350 | 1550 | 775 |  |  | 1100 | 1,400,000 |
| No. 1 | 1150 | 1300 | 675 |  |  | 875 | 1,400,000 |
| No. 2 | 925 | 1050 | 550 |  |  | 675 | 1,300,000 |
| No. 3 | 525 | 600 | 300 |  |  | 425 | 1,200,000 |
| Appearance | 1150 | 1300 | 650 | 65 | 235 | 1050 | 1,400,000 |
| Construction | 675 | 775 | 400 |  |  | 775 | 1,200,000 |
| Standard | 375 | 425 | 225 |  |  | 650 | 1,200,000 |
| Utility | 175 | 200 | 100 |  |  | 425 | 1,200,000 |
| Stud | 525 | 600 | 300 |  |  | 425 | 1,200,000 |
| Northern aspen |  |  |  |  |  |  |  |
| Select Structural | 1300 | 1500 | 750 |  |  |  |  |
| No. 1 | 1100 | 1250 | 650 |  |  | 675 | 1,400,000 |
| No. 2 | 900 | 1050 | 525 |  |  |  | 1,200,000 |
| No. 3 | 500 | 575 | 275 |  |  | 325 | 1,100,000 |
| Appearance | 1100 | 1250 | 650 | 60 | 195 |  | 1,400,000 |
| Construction | 650 | 750 | 375 |  |  | 600 | 1,100,000 |
| Standard | 350 | 425 | 200 |  |  | 500 | 1,100,000 |
| Utility | 175 | 200 | 100 |  |  | 325 | 1,100,000 |
| Stud | 500 | 575 | 275 |  |  | 325 | 1,100,000 |
| Black cottonwood |  |  |  |  |  |  |  |
| Select Structural | 1000 | 1200 | 600 |  |  |  |  |
| No. 1 | 875 | 1000 | 500 |  |  | 575 | 1,200,000 |
| No. 2 | 725 | 825 | 425 |  |  | 450 | 1,100,000 |
| No. 3 | 400 | 450 | 225 |  |  | 275 | 900,000 |
| Appearance | 875 | 1000 | 500 | 50 | 100 | 700 | 1,200,000 |
| Construction | 525 | 600 | 300 |  |  | 525 | -900,000 |
| Standard | 300 | 325 | 175 |  |  | 425 | 900,000 |
| Utility | 150 | 150 | 75 |  |  | 275 | 900,000 |
| Stud | 400 | 450 | 225 |  |  | 275 | 900,000 |
| Northern species |  |  |  |  |  |  |  |
| Select Structural |  |  |  |  |  | 1050 | 1,100,000 |
| No. 1 | 1150 | 1300 | 675 |  |  | 825 | 1,100,000 |
| No. 2 | 925 | 1050 | 550 |  |  | 650 | 1,000,000 |
| No. 3 | 525 | 600 | 300 |  |  | 400 | 900,000 |
| Appearance | 1000 | 1150 | 650 | 65 | 220 | 850 | 1,100,000 |
| Construction | 675 | 775 | 400 |  |  | 750 | 900,000 |
| Standard | 375 | 425 | 225 |  |  | 600 | 900,000 |
| Utility | 175 | 200 | 100 |  |  | 400 | 900,000 |
| Stud | 525 | 600 | 300 |  |  | 400 | 900,000 |
| Coast species |  |  |  |  |  |  |  |
| Select Structural | 1500 | 1700 | 875 |  |  | 1100 | 1,500,000 |
| No. 1 | 1250 | 1450 | 750 |  |  | 875 | 1,500,000 |
| No. 2 | 1050 | 1200 | 625 |  |  | 700 | 1,400,000 |
| No. 3 | 575 | 675 | 350 |  |  | 425 | 1,200,000 |
| Appearance | 1250 | 1450 | 725 | 65 | 245 | 1050 | 1,500,000 |
| Construction | 750 | 875 | 450 |  |  | 800 | 1,200,000 |
| Standard | 425 | 500 | 250 |  |  | 650 | 1,200,000 |
| Utility | 200 | 225 | 125 |  |  | 425 | 1,200,000 |
| Stud | 575 | 675 | 350 |  |  | 425 | 1,200,000 |

Notes: 1. Allowable unit stresses listed are for lumber surfaced dry or unseasoned when used at a moisture content of $19 \%$ or less, as in most covered structures, under normal loading conditions. See text and Tables 5 and 6 for adjustments for other conditions of loading.
2. Allowable unit stresses for Construction, Standard and Utility grades of Light Framing apply to 4" widths only.
3. For 5" and 6" widths of Stud grade lumber, use allowable unit stresses for No. 3 grade in the Structural Joists and Planks category (Table 9).

Table 8. Allowable Unit Stresses for Light Framing Lumber 2 and 3 inches Thick, 2 and 3 inches Wide (See Note below)

| Species and Commercial Grade | Allowable Unit Stresses (pounds per square inch) |  |  |  |  |  |  |  |  |  |  |  | Modulus of Elasticity <br> $2^{\prime \prime}$ to $3^{\prime \prime}$ <br> $2^{\prime \prime}$ to $3^{\prime \prime}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Extreme Fiber in Bending |  |  |  | Tension Parallel to Grain |  | Horizontal Shear |  | Compression Perpendicular to Grain |  | Compression Parallel to Grain |  |  |
|  | Engineered Uses (single) |  | Repetitivemember Uses |  |  |  |  |  |  |  |  |  |  |
|  | $2^{\prime \prime} \times 2^{\prime \prime}$ | $\begin{array}{l\|l} 2^{\prime \prime} \times & 3^{\prime \prime} \\ 3^{\prime \prime} \times & 3^{\prime \prime} \end{array}$ | $2^{\prime \prime} \times 2^{\prime \prime}$ | $\begin{aligned} & 2^{\prime \prime \prime} \times 3^{\prime \prime} \\ & 3^{\prime \prime} \times 33^{\prime \prime} \end{aligned}$ | 2' $\times 2$ ' | $\left\|\begin{array}{c} 2^{\prime \prime} \times 3^{\prime \prime} \\ 3^{\prime \prime} \times 33^{\prime \prime} \end{array}\right\|$ | 2' $\times 2$ ' | $\begin{aligned} & 2^{\prime \prime} \times 3^{\prime \prime} \\ & 3^{\prime \prime} \times 33^{\prime \prime} \end{aligned}$ | $2^{\prime \prime} \times 2^{\prime \prime}$ | $\begin{aligned} & 2^{\prime \prime} \times 3^{\prime \prime} \\ & 3^{\prime \prime} \times 3^{\prime \prime} \end{aligned}$ | 2" $\times 2$ 2' | $\begin{aligned} & 2^{\prime \prime} \times 3^{\prime \prime \prime} \\ & 3^{\prime \prime} \times 3^{\prime \prime} \end{aligned}$ |  |
| Coast sitka spruce |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | $\begin{aligned} & 675 \\ & 325 \\ & 100 \end{aligned}$ | $\begin{aligned} & 625 \\ & 400 \\ & 125 \end{aligned}$ | $\begin{aligned} & 800 \\ & 375 \\ & 125 \end{aligned}$ | $\begin{aligned} & 725 \\ & 450 \\ & 125 \end{aligned}$ | $\begin{array}{r} 375 \\ 175 \\ 50 \end{array}$ | $\begin{array}{r} 350 \\ 225 \\ 75 \end{array}$ |  | 65 |  | 90 | 800 650 275 | $\begin{aligned} & 800 \\ & 650 \\ & 300 \end{aligned}$ | $\begin{aligned} & 1,300,000 \\ & 1,300,000 \\ & 1,300,000 \\ & \hline \end{aligned}$ |
| Douglas fir-Larch (North) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | 950 450 125 | 875 550 150 | 1100 500 150 | 1000 625 175 | 500 225 75 | $\begin{aligned} & 500 \\ & 300 \\ & 100 \end{aligned}$ |  | 95 |  | 85 | 1150 925 375 | $\begin{array}{r} 1150 \\ 925 \\ 450 \end{array}$ | $\begin{aligned} & 1,500,000 \\ & 1,500,000 \\ & 1,500,000 \end{aligned}$ |
| Eastern hemlock-Tamarack (North) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | $\begin{aligned} & 850 \\ & 400 \\ & 125 \end{aligned}$ | $\begin{aligned} & 775 \\ & 500 \\ & 150 \end{aligned}$ | $\begin{aligned} & 975 \\ & 450 \\ & 150 \end{aligned}$ | $\begin{aligned} & 900 \\ & 575 \\ & 175 \end{aligned}$ | $\begin{array}{r} 450 \\ 225 \\ 75 \end{array}$ | $\begin{array}{r} 450 \\ 275 \\ 75 \end{array}$ |  | 90 |  | 65 | 975 800 325 | $\begin{aligned} & 975 \\ & 800 \\ & 375 \end{aligned}$ | $\begin{aligned} & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \end{aligned}$ |
| Eastern white pine (North) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | $\begin{aligned} & 650 \\ & 300 \\ & 100 \\ & \hline \end{aligned}$ | $\begin{aligned} & 600 \\ & 375 \\ & 100 \end{aligned}$ | $\begin{array}{r} 750 \\ 350 \\ 100 \\ \hline \end{array}$ | $\begin{aligned} & 675 \\ & 425 \\ & 125 \\ & \hline \end{aligned}$ | $\begin{array}{r} 350 \\ 150 \\ 50 \\ \hline \end{array}$ | $\begin{array}{r} 325 \\ 200 \\ 50 \\ \hline \end{array}$ |  | 65 |  | 20 | 800 650 275 | $\begin{aligned} & 800 \\ & 650 \\ & 325 \end{aligned}$ | $\begin{aligned} & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \\ & \hline \end{aligned}$ |
| Hem-Fir (North) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | $\begin{aligned} & 750 \\ & 350 \\ & 100 \end{aligned}$ | $\begin{aligned} & 675 \\ & 425 \\ & 125 \end{aligned}$ | $\begin{aligned} & 875 \\ & 400 \\ & 125 \end{aligned}$ | $\begin{array}{r} 775 \\ 500 \\ 125 \\ \hline \end{array}$ | $\begin{array}{r} 400 \\ 175 \\ 50 \end{array}$ | $\begin{array}{r} 375 \\ 225 \\ 50 \end{array}$ |  | 75 |  | 45 | $\begin{aligned} & 925 \\ & 750 \\ & 300 \end{aligned}$ | $\begin{aligned} & 925 \\ & 750 \\ & 350 \end{aligned}$ | $\begin{aligned} & 1,200,000 \\ & 1,200,000 \\ & 1,200,000 \end{aligned}$ |
| Ponderosa pine |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | $\begin{aligned} & 725 \\ & 325 \\ & 100 \end{aligned}$ | $\begin{aligned} & 650 \\ & 425 \\ & 125 \end{aligned}$ | $\begin{array}{r} 825 \\ 375 \\ 125 \end{array}$ | $\begin{aligned} & 750 \\ & 475 \\ & 150 \end{aligned}$ | $\begin{array}{r} 375 \\ 175 \\ 50 \end{array}$ | $\begin{array}{r} 375 \\ 225 \\ 50 \end{array}$ |  | 75 |  | 50 | 875 725 300 | $\begin{aligned} & 875 \\ & 725 \\ & 350 \end{aligned}$ | $\begin{aligned} & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \end{aligned}$ |
| Red pine (North) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | 625 300 100 | 575 375 100 | 725 350 100 | $\begin{aligned} & 675 \\ & 425 \\ & 125 \end{aligned}$ | $\begin{array}{r} 350 \\ 150 \\ 50 \end{array}$ | 325 200 50 |  | 70 |  | 80 | 725 600 250 | $\begin{aligned} & 725 \\ & 600 \\ & 300 \end{aligned}$ | $\begin{aligned} & 1,000,000 \\ & 1,000,000 \\ & 1,000,000 \end{aligned}$ |
| Spruce-Pine-Fir |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Uuility | 650 300 75 | 600 375 100 | 750 <br> 350 <br> 100 | 700 425 125 | 350 150 50 | 325 200 50 |  | 65 |  | 65 | $\begin{aligned} & 775 \\ & 650 \\ & 250 \end{aligned}$ | $\begin{aligned} & 775 \\ & 650 \\ & 300 \end{aligned}$ | $\begin{aligned} & 1,200,000 \\ & 1,200,000 \\ & 1,200,000 \end{aligned}$ |
| Western cedars (North) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | 675 <br> 325 <br> 100 | 625 <br> 400 <br> 125 | 775 350 100 | 700 <br> 450 <br> 125 | 350 175 50 | 350 225 75 |  | 70 |  | 85 | 875 725 300 | 875 725 350 | $\begin{aligned} & 900,000 \\ & 900,000 \\ & 900,000 \end{aligned}$ |
| Western white pine |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | 600 275 100 | 550 350 100 | 700 325 100 | 650 400 125 | 325 150 50 | $\begin{array}{r}325 \\ 200 \\ 50 \\ \hline\end{array}$ |  | 65 |  | 35 | $\begin{aligned} & 775 \\ & 650 \\ & 275 \end{aligned}$ | $\begin{aligned} & 775 \\ & 650 \\ & 300 \end{aligned}$ | $\begin{aligned} & 1,200,000 \\ & 1,200,000 \\ & 1,200,000 \end{aligned}$ |
| Northern aspen |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | $\begin{aligned} & 600 \\ & 275 \\ & 75 \end{aligned}$ | 525 325 100 | $\begin{array}{r}675 \\ 300 \\ 75 \\ \hline\end{array}$ | 625 375 100 | $\begin{array}{r} 300 \\ 125 \\ 25 \end{array}$ | $\begin{array}{r} 300 \\ 175 \\ 50 \end{array}$ |  | 60 |  | 95 | 600 500 200 | $\begin{aligned} & 600 \\ & 500 \\ & 225 \end{aligned}$ | $\begin{aligned} & 1,100,000 \\ & 1,100,000 \\ & 1,100,000 \end{aligned}$ |
| Black cottonwood |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | $\begin{array}{r} 475 \\ 225 \\ 75 \end{array}$ | $\begin{array}{r} 425 \\ 275 \\ 75 \\ \hline \end{array}$ | $\begin{array}{r} 550 \\ 250 \\ 75 \\ \hline \end{array}$ | 500 <br> 300 <br> 100 | $\begin{array}{r} 250 \\ 125 \\ 25 \\ \hline \end{array}$ | $\begin{array}{r} 250 \\ 150 \\ 50 \end{array}$ |  | 50 |  | 00 | 525 <br> 425 <br> 175 | $\begin{aligned} & 525 \\ & 425 \\ & 200 \end{aligned}$ | $\begin{aligned} & 900,000 \\ & 900,000 \\ & 900,000 \end{aligned}$ |
| Northern species |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | $\begin{array}{r} 600 \\ 275 \\ 75 \end{array}$ | $\begin{aligned} & 550 \\ & 350 \\ & 100 \end{aligned}$ | $\begin{aligned} & 700 \\ & 325 \\ & 100 \\ & \hline \end{aligned}$ | $\begin{aligned} & 650 \\ & 400 \\ & 125 \end{aligned}$ | $\begin{array}{r} 325 \\ 150 \\ 50 \\ \hline \end{array}$ | $\begin{array}{r} 325 \\ 200 \\ 50 \end{array}$ |  | 65 |  | 20 | $\begin{aligned} & 725 \\ & 600 \\ & 250 \end{aligned}$ | $\begin{aligned} & 725 \\ & 600 \\ & 300 \end{aligned}$ | $\begin{aligned} & 900,000 \\ & 900,000 \\ & 900,000 \end{aligned}$ |
| Coast species |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Standard Utility | 675 325 100 | 625 400 125 | 800 375 125 | 725 450 125 | 375 175 50 | 350 225 50 |  | 65 |  | 45 | 800 650 275 | $\begin{aligned} & 800 \\ & 650 \\ & 325 \end{aligned}$ | $\begin{aligned} & 1,200,000 \\ & 1,200,000 \\ & 1,200,000 \end{aligned}$ |

Note: Allowable unit stresses listed are for lumber surfaced dry or unspasoned when used at a moisture content of $19 \%$ or less, as in most covered structures, under normal loading conditions. See text and Tables 5 and 6 for adjustments for other conditions of loading.

Table 9. Allowable Unit Stresses for Lumber 2 to 4 inches Thick, 5 inches and Wider (See Note for Table 8)

| Species and Commercial Grade | Allowable Unit Stresses (pounds per square inch) |  |  |  |  |  | Modulus of Elasticity |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Extreme Fiber in Bending |  | Tension Parallel to Grain | Horizontal Shear | Compression Perpendicular to Grain | Compression Parallel to Grain |  |
|  | Engineered Uses (single) | Repetitivemember uses |  |  |  |  |  |
| Coast sitka spruce |  |  |  |  |  |  |  |
| Select Structural | 1300 | 1500 | 875 |  |  | 975 | 1,700,000 |
| No. 1 | 1100 | 1250 | 725 |  |  | 875 | 1,700,000 |
| No. 2 | 900 | 1050 | 475 | 65 | 290 | 750 | 1,500,000 |
| No. 3 | 525 | 600 | 275 |  |  | 475 | 1,300,000 |
| Appearance | 1100 | 1250 | 725 |  |  | 1050 | 1,700,000 |
| Douglas fir-Larch (North) |  |  |  |  |  |  |  |
| Select Structural | 1800 | 2050 | 1200 |  |  | 1400 | 1,800,000 |
| No. 1 | 1500 | 1750 | 1000 |  |  | 1250 | 1,800,000 |
| No. 2 | 1250 | 1450 | 650 | 95 | 385 | 1050 | 1,700,000 |
| No. 3 | 725 | 850 | 375 |  |  | 675 | 1,500,000 |
| Appearance | 1500 | 1750 | 1000 |  |  | 1500 | 1,800,000 |
| Eastern hemlock-Tamarack (North) |  |  |  |  |  |  |  |
| Select Structural | 1550 | 1750 | 1050 |  |  | 1200 | 1,300,000 |
| No. 1 | 1300 | 1500 | 875 |  |  | 1050 | 1,300,000 |
| No. 2 | 1050 | 1200 | 575 | 85 | 365 | 900 | 1,100,000 |
| No. 3 | 625 | 725 | 325 |  |  | 575 | 1,000,000 |
| Appearance | 1300 | 1500 | 875 |  |  | 1300 | 1,300,000 |
| Eastern white pine (North) |  |  |  |  |  |  |  |
| Select Structural | 1150 | 1350 | 775 |  |  | 950 | 1,200,000 |
| No. 1 | 1000 | 1150 | 675 |  |  | 850 | 1,200,000 |
| No. 2 | 825 | 950 | 450 | 65 | 220 | 700 | 1,100,000 |
| No. 3 | 475 | 550 | 250 |  |  | 450 | 1,000,000 |
| Appearance | 1000 | 1150 | 675 |  |  | 1000 | 1,200,000 |
| Hem-Fir (North) |  |  |  |  |  |  |  |
| Select Structural | 1400 | 1650 | 950 |  |  | 1150 |  |
| No. 1 | 1200 | 1400 | 800 |  |  | 1000 | 1,500,000 |
| No. 2 | 1000 | 1150 | 525 | 75 | 245 | 850 | 1,400,000 |
| No. 3 | 575 | 675 | 300 |  |  | 550 | 1,200,000 |
| Appearance | 1200 | 1400 | 800 |  |  | 1200 | 1,500,000 |
| Ponderosa pine |  |  |  |  |  |  |  |
| Select Structural | 1200 | 1400 | 825 |  |  | 950 | 1,200,000 |
| No. 1 | 1050 | 1200 | 700 |  |  | 850 | 1,200,000 |
| No. 2 | 850 | 975 | 450 | 70 | 250 | 700 | 1,100,000 |
| No. 3 | 500 | 575 | 250 |  |  | 450 | 1,000,000 |
| Appearance | 1050 | 1200 | 700 |  |  | 850 | 1,200,000 |
| Red pine (North) |  |  |  |  |  |  |  |
| Select Structural | 1200 | 1350 | 800 |  |  | 900 | 1,300,000 |
| No. 1 | 1000 | 1150 | 675 |  |  | 825 | 1,300,000 |
| No. 2 | 825 | 950 | 425 | 70 | 280 | 675 | 1,200,000 |
| No. 3 | 500 | 550 | 250 |  |  | 425 | 1,000,000 |
| Appearance | 1000 | 1150 | 675 |  |  | 925 | 1,300,000 |
| Spruce-Pine-Fir |  |  |  |  |  |  |  |
| Select Structural | 1250 | 1450 | 825 |  |  | 975 | 1,500,000 |
| No. 1 | 1050 | 1200 | 700 |  |  | 875 | 1,500,000 |
| No. 2 | 875 | 1000 | 450 | 70 | 265 | 725 | 1,300,000 |
| No. 3 | 500 | 575 | 275 |  |  | 450 | 1,200,000 |
| Appearance | 1050 | 1200 | 700 |  |  | 1050 | 1,500,000 |
| Western cedars (North) |  |  |  |  |  |  |  |
|  |  | 1450 | 850 |  |  | 1050 | 1,100,000 |
| No. 1 | 1050 | 1250 | 725 |  |  | 975 | 1,100,000 |
| No. 2 | 875 | 1000 | 475 | 70 | 285 | 800 | 1,000,000 |
| No. 3 | 525 | 600 | 275 |  |  | 525 | 900,000 |
| Appearance | 1050 | 1250 | 725 |  |  | 1150 | 1,100,000 |
| Western white pine |  |  |  |  |  |  |  |
| Select Structural | 1150 | 1300 | 775 |  |  | 975 | 1,400,000 |
| No. 1 | 975 | 1150 | 650 |  |  | 875 | 1,400,000 |
| No. 2 | 800 | 925 | 425 | 65 | 235 | 725 | 1,300,000 |
| No. 3 | 475 | 550 | 250 |  |  | 450 | 1,200,000 |
| Appearance | 975 | 1150 | 650 |  |  | 1050 | 1,400,000 |
| Northern species |  |  |  |  |  |  |  |
| Select Structural | 1150 | 1300 | 775 |  |  | 900 | 1,100,000 |
| No. 1 | 975 | 1150 | 650 |  |  | 825 | 1,100,000 |
| No. 2 | 800 | 925 | 425 | 65 | 220 | 675 | 1,000,000 |
| No. 3 | 475 | 550 | 250 |  |  | 425 | 900,000. |
| Appearance | 975 | 1150 | 650 |  |  | 850 | 1,100,000 |
| Coast species |  |  |  |  |  |  |  |
| Select Structural | 1300 | 1500 | 875 |  |  | 975 | 1,500,000 |
| No. 1 | 1100 | 1250 | 725 |  |  | 875 | 1,500,000 |
| No. 2 | 900 | 1050 | 475 | 65 | 245 | 750 | 1,400,000 |
| No. 3 | 525 | 600 | 275 |  |  | 475 | 1,200,000 |
| Appearance | 1100 | 1250 | 725 |  |  | 1050 | 1,500,000 |

Note: For $8 "$ widths use $90 \%$ of the above tension parallel to grain values for Select Structural and $80 \%$ of values for Nos 1,2 and 3 grades. For $10^{\prime \prime}$ and wider widths use $80 \%$ of above tension parallel to grain values for Select Structural and $60 \%$ of values for Nos 1,2 and 3 grades.

Table 10. Allowable Unit Stresses for Decking (Wall and Roof Plank) 2 to 4 inches Thick, 6 inches and Wider

| Species Combinations | Commercial Grade | Allowable Unit Stresses (pounds per square inch) |  |  | Modulus of Elasticity |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Extreme Fibre in Bending |  | Compression Perpendicular to Grain |  |
|  |  | Engineered Uses (single) | Repetitivemember Uses |  |  |
| Coast sitka spruce | Select Commercial | $\begin{aligned} & 1250 \\ & 1050 \end{aligned}$ | $\begin{aligned} & 1450 \\ & 1200 \end{aligned}$ | $\begin{aligned} & 290 \\ & 290 \end{aligned}$ | $\begin{aligned} & 1,700,000 \\ & 1,500,000 \end{aligned}$ |
| Douglas fir-Larch (North) | Select <br> Commercial | $\begin{aligned} & 1750 \\ & 1450 \end{aligned}$ | $\begin{aligned} & 2000 \\ & 1650 \end{aligned}$ | $\begin{aligned} & 385 \\ & 385 \end{aligned}$ | $\begin{aligned} & 1,800,000 \\ & 1,700,000 \end{aligned}$ |
| Eastern hemlock-Tamarack (North) | Select <br> Commercial | $\begin{aligned} & 1500 \\ & 1250 \end{aligned}$ | $\begin{aligned} & 1700 \\ & 1450 \end{aligned}$ | $\begin{aligned} & 365 \\ & 365 \end{aligned}$ | $\begin{aligned} & 1,300,000 \\ & 1,100,000 \end{aligned}$ |
| Eastern white pine (North) | Select <br> Commercial | $\begin{aligned} & 900 \\ & 775 \end{aligned}$ | $\begin{array}{r} 1050 \\ 875 \end{array}$ | $\begin{aligned} & 220 \\ & 220 \end{aligned}$ | $\begin{aligned} & 1,200,000 \\ & 1,100,000 \end{aligned}$ |
| Hem-Fir (North) | Select <br> Commercial | $\begin{aligned} & 1350 \\ & 1150 \end{aligned}$ | $\begin{aligned} & 1550 \\ & 1300 \end{aligned}$ | $\begin{aligned} & 245 \\ & 245 \end{aligned}$ | $\begin{aligned} & 1,500,000 \\ & 1,400,000 \end{aligned}$ |
| Ponderosa pine | Select <br> Commercial | $\begin{aligned} & 1200 \\ & 1000 \end{aligned}$ | $\begin{aligned} & 1450 \\ & 1250 \end{aligned}$ | $\begin{aligned} & 250 \\ & 250 \end{aligned}$ | $\begin{aligned} & 1,300,000 \\ & 1,100,000 \end{aligned}$ |
| Red pine (North) | Select Commercial | $\begin{array}{r} 1150 \\ 975 \end{array}$ | $\begin{aligned} & 1350 \\ & 1100 \end{aligned}$ | $\begin{aligned} & 280 \\ & 280 \end{aligned}$ | $\begin{aligned} & 1,300,000 \\ & 1,200,000 \end{aligned}$ |
| Spruce-Pine-Fir | Select Commercial | $\begin{aligned} & 1200 \\ & 1000 \end{aligned}$ | $\begin{aligned} & 1400 \\ & 1150 \end{aligned}$ | $\begin{aligned} & 265 \\ & 265 \end{aligned}$ | $\begin{aligned} & 1,500,000 \\ & 1,300,000 \end{aligned}$ |
| Western cedars (North) | Select <br> Commercial | $\begin{aligned} & 1200 \\ & 1050 \end{aligned}$ | $\begin{aligned} & 1400 \\ & 1200 \end{aligned}$ | $\begin{aligned} & 285 \\ & 285 \end{aligned}$ | $\begin{aligned} & 1,100,000 \\ & 1,000,000 \end{aligned}$ |
| Western white pine | Select <br> Commercial | $\begin{array}{r} 1100 \\ 925 \end{array}$ | $\begin{aligned} & 1300 \\ & 1050 \end{aligned}$ | $\begin{aligned} & 235 \\ & 235 \end{aligned}$ | $\begin{aligned} & 1,400,000 \\ & 1,300,000 \end{aligned}$ |
| Northern species | Select <br> Commercial | $\begin{aligned} & 900 \\ & 775 \end{aligned}$ | $\begin{array}{r} 1050 \\ 875 \end{array}$ | $\begin{aligned} & 220 \\ & 220 \end{aligned}$ | $\begin{aligned} & 1,100,000 \\ & 1,000,000 \end{aligned}$ |
| Coast species | Select <br> Commercial | $\begin{aligned} & 1250 \\ & 1050 \end{aligned}$ | $\begin{aligned} & 1450 \\ & 1200 \end{aligned}$ | $\begin{aligned} & 245 \\ & 245 \end{aligned}$ | $\begin{aligned} & 1,500,000 \\ & 1,400,000 \end{aligned}$ |

Notes: 1. Allowable unit stresses listed are for lumber surfaced dry or unseasoned when used at a moisture content of $19 \%$ or less, as in most covered structures, under normal loading conditions. See text and Tables 5 and 6 for adjustments for other conditions of loading.
2. Allowable unit stresses in bending apply only when plank is used flatwise.

Table 11. Allowable Unit Stresses for Select Structural Scaffold Plank $1 \frac{1}{4} \mathbf{4}$ inch and Thicker, 8 inches and Wider

| Species Combinations | Allowable Unit Stresses (pounds per square inch) <br> Extreme Fibre in Bending | Modulus of Elasticity |
| :--- | :---: | :---: |
| Coast sitka spruce | 1250 | $1,500,000$ |
| Douglas fir-Larch (North) | 1700 | $1,700,000$ |
| Eastern hemlock-Tamarack (North) | 1550 | $1,300,000$ |
| Eastern white pine (North) | 1150 | $1,300,000$ |
| Hem-Fir (North) | 1350 | $1,600,000$ |
| Ponderosa pine | 1300 | $1,200,000$ |
| Red pine (North) | 1150 | $1,100,000$ |
| Spruce-Pine-Fir | 1200 | $1,300,000$ |
| Western cedars (North) | 1200 | $1,100,000$ |
| Western white pine | 1100 | $1,300,000$ |

Note: Allowable unit stresses in bending apply only when plank is used flatwise; they also apply for wet service conditions.


HORIZONTAL DISTANCE IN FEET

To use the diagram select the known horizontal distance and follow the vertical line to its intersection with the radial line of the specified slope, then proceed along the arc to read the sloping distance. In some cases it may be desirable to interpolate between the one foot separations. The diagram also may be used to find the horizontal distance corresponding to a given sloping distance or to find the slope when the horizontal and sloping distances are known.

Example: With a roof slope of 8 in 12 and a horizontal distance of 20 feet the sloping distance may be read as 24 feet.
$\vec{N}$ Table 12. FLOOR JOISTS $\mathbf{- 3 0} \mathbf{~ p s f}$ live load. Sleeping rooms and attic floors. (Spans shown in light face type are based on a deflection limitation of $l / 360$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 10 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-0 \\ 12-0 \\ 11-6 \\ 8-8 \end{array}$ | $\begin{gathered} 10.11 \\ 10-10 \\ 10-0 \\ 7.6 \end{gathered}$ | $\begin{aligned} & 9-7 \\ & 8-11 \\ & 8-2 \\ & 8-2 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-10 \\ & 15-2 \\ & 11-6 \end{aligned}$ | $\begin{gathered} 14-5 \\ 14-4 \\ 13-2 \\ 9-11 \end{gathered}$ | $\begin{array}{r} 12.7 \\ 11-8 \\ 10.9 \\ 8.1 \end{array}$ | $\begin{aligned} & 20-3 \\ & 20-3 \\ & 19-4 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 18-5 \\ & 18.3 \\ & 16-9 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 16-1 \\ & 14-11 \\ & 13-8 \\ & 10-4 \end{aligned}$ | $\begin{aligned} & 24-8 \\ & 24-8 \\ & 23-6 \\ & 17-9 \end{aligned}$ | $\begin{aligned} & 22-5 \\ & 22-3 \\ & 20-5 \\ & 15-5 \end{aligned}$ | $\begin{aligned} & 19-7 \\ & 18-2 \\ & 16-8 \\ & 12-7 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12-3 \\ & 12-3 \\ & 12-0 \\ & 10-4 \end{aligned}$ | $\begin{gathered} 11-2 \\ 11-2 \\ 10.11 \\ 9.0 \end{gathered}$ | $\begin{aligned} & 9-9 \\ & 9-9 \\ & 9-7 \\ & 7-4 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 16-2 \\ & 15-10 \\ & 13-8 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 14-5 \\ & 11-10 \end{aligned}$ | $\begin{gathered} 12-10 \\ 12-10 \\ 12-7 \\ 9-8 \end{gathered}$ | $\begin{aligned} & 20-8 \\ & 20-8 \\ & 20-3 \\ & 17-5 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 18-5 \\ & 15-1 \end{aligned}$ | $\begin{aligned} & 16-5 \\ & 16-5 \\ & 16-1 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 25-1 \\ & 25-1 \\ & 24-8 \\ & 21-2 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 22-5 \\ & 18-4 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 19-7 \\ & 15-0 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack <br> (North) | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-0 \\ 11-0 \\ 10-5 \\ 9-7 \end{array}$ | $\begin{array}{r} 10-0 \\ 10-0 \\ 9-6 \\ 8-3 \end{array}$ | $\begin{aligned} & 8.9 \\ & 8.9 \\ & 8-3 \\ & 6.9 \\ & \hline \end{aligned}$ | $\begin{aligned} & 14-6 \\ & 14-6 \\ & 13-9 \\ & 12-7 \end{aligned}$ | $\begin{aligned} & 13-2 \\ & 13-2 \\ & 12-6 \\ & 10-11 \end{aligned}$ | $\begin{array}{r} 11-6 \\ 11-6 \\ 10-19 \\ 8-11 \end{array}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 17-6 \\ & \mathbf{1 6 - 1} \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 15-11 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 13-11 \\ & 11-4 \end{aligned}$ | $\begin{aligned} & 22.6 \\ & 22.6 \\ & 21.4 \\ & 19.7 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-4 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 17-11 \\ & 17-11 \\ & 16.11 \\ & 13-10 \end{aligned}$ |
| Hem-Fir (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-7 \\ 11-7 \\ 11-3 \\ 9.3 \end{array}$ | $\begin{array}{r} 10-6 \\ 10-6 \\ 10-3 \\ 8.0 \\ \hline \end{array}$ | $\begin{aligned} & 9-2 \\ & 9-2 \\ & 8-6 \\ & 6-6 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14-11 \\ & 12-2 \end{aligned}$ | $\begin{aligned} & 13-10 \\ & 13-10 \\ & 13-6 \\ & 10-6 \\ & \hline \end{aligned}$ | $\begin{array}{r} 12-1 \\ 12-1 \\ 11-3 \\ 8-7 \\ \hline \end{array}$ | $\begin{aligned} & 19-5 \\ & 19-5 \\ & 19-0 \\ & 15-6 \\ & \hline \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 17-8 \\ & 17.3 \\ & 13-5 \end{aligned}$ | $\begin{aligned} & 15-5 \\ & 15-5 \\ & 14-4 \\ & 11-0 \end{aligned}$ | $\begin{aligned} & 23-7 \\ & 23-7 \\ & 23-1 \\ & 18-10 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 21 \\ & 21-0 \\ & 16-4 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 17-5 \\ & 13-4 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-9 \\ 10-9 \\ 10-5 \\ 8-6 \\ \hline \end{array}$ | $\begin{aligned} & 9-9 \\ & 9-9 \\ & 9-6 \\ & 7-4 \\ & \hline \end{aligned}$ | $\begin{aligned} & 8-6 \\ & 8-6 \\ & 7-10 \\ & 6-0 \\ & \hline \end{aligned}$ | $\begin{aligned} & 14-2 \\ & 14-2 \\ & 13-9 \\ & 11-3 \\ & \hline \end{aligned}$ | $\begin{gathered} 12.10 \\ 12.10 \\ 12.6 \\ 9.9 \\ \hline \end{gathered}$ | $\begin{gathered} 19-3 \\ 11-3 \\ 10-4 \\ 7.11 \\ \hline \end{gathered}$ | $\begin{aligned} & 18-0 \\ & 18-0 \\ & 17-6 \\ & 14-4 \\ & \hline \end{aligned}$ | $\begin{aligned} & 16-5 \\ & 16.5 \\ & 15-11 \\ & 12.5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 14-4 \\ & 14-4 \\ & 13-2 \\ & 10-1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 21-11 \\ & 21-11 \\ & 21.4 \\ & 17.5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 19-4 \\ & 15-1 \end{aligned}$ | $\begin{aligned} & 17-5 \\ & 17-5 \\ & 16-0 \\ & 12-4 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-0 \\ 11-0 \\ 10-9 \\ 8-4 \end{array}$ | $\begin{array}{r} 10-0 \\ 10-0 \\ 9-6 \\ 7-3 \end{array}$ | $\begin{aligned} & 8-9 \\ & 8-6 \\ & 7-9 \\ & 5-11 \end{aligned}$ | $\begin{aligned} & 14-6 \\ & 14-6 \\ & 14-2 \\ & 11-0 \end{aligned}$ | $\begin{array}{r} 13-2 \\ 13-2 \\ 12-6 \\ 9-6 \end{array}$ | $\begin{array}{r} 11-6 \\ 11-3 \\ 10-2 \\ 7-9 \end{array}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 18-0 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 15-11 \\ & 12-2 \end{aligned}$ | $\begin{gathered} 14.8 \\ 14-4 \\ 13.0 \\ 9.11 \end{gathered}$ | $\begin{aligned} & 22-6 \\ & 22-6 \\ & 21-11 \\ & 17-0 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-5 \\ & 14-9 \end{aligned}$ | $\begin{aligned} & 17.11 \\ & 17-5 \\ & 15.10 \\ & 12.1 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-7 \\ 11-7 \\ 11-0 \\ \mathbf{8 - 6} \\ \hline \end{array}$ | $\begin{array}{r} 10-6 \\ 10-6 \\ 9-9 \\ 7-4 \\ \hline \end{array}$ | $\begin{aligned} & 9-2 \\ & 8-8 \\ & 7-11 \\ & 6-0 \\ & \hline \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14-6 \\ & 11-3 \end{aligned}$ | $\begin{gathered} 13-10 \\ 13-10 \\ 12-10 \\ 9.9 \\ \hline \end{gathered}$ | $\begin{gathered} 12-1 \\ 11-6 \\ 10.6 \\ 7-11 \end{gathered}$ | $\begin{aligned} & 19-5 \\ & 19-5 \\ & 18-6 \\ & 14-4 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 17-8 \\ & 16-4 \\ & 12-5 \end{aligned}$ | $\begin{aligned} & 15.5 \\ & 14-8 \\ & 13-4 \\ & 10-1 \end{aligned}$ | $\begin{aligned} & 23-7 \\ & 23-7 \\ & 22-6 \\ & 17-5 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 19-11 \\ & 15-1 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 17-9 \\ & 16-3 \\ & 12-4 \\ & \hline \end{aligned}$ |
| Western cedars (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-5 \\ 10-5 \\ 10-1 \\ 8-8 \\ \hline \end{array}$ | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 9-2 \\ & 7.6 \\ & \hline \end{aligned}$ | $\begin{aligned} & 8-3 \\ & 8-3 \\ & 7-11 \\ & 6-2 \\ & \hline \end{aligned}$ | $\begin{aligned} & 13-9 \\ & 13-9 \\ & 13-4 \\ & 11-6 \\ & \hline \end{aligned}$ | $\begin{gathered} 12-6 \\ 12-6 \\ 12-1 \\ 9-11 \end{gathered}$ | $\begin{gathered} 10-11 \\ 10-11 \\ \mathbf{1 0 . 6} \\ \mathbf{8 . 1} \\ \hline \end{gathered}$ | $\begin{aligned} & 17-6 \\ & 17-6 \\ & 17-0 \\ & 14-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 15-11 \\ & 15-5 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 13-11 \\ & 13-11 \\ & 13-4 \\ & 10-4 \end{aligned}$ | $\begin{aligned} & 21.4 \\ & 21-4 \\ & 20.8 \\ & 17.9 \end{aligned}$ | $\begin{aligned} & 19-4 \\ & 19-4 \\ & 18-9 \\ & \mathbf{1 5 - 5} \\ & \hline \end{aligned}$ | $\begin{aligned} & 16-11 \\ & 16-11 \\ & 16-3 \\ & 12-7 \\ & \hline \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 11-3 \\ 11-3 \\ 10-10 \\ 8-4 \end{gathered}$ | $\begin{array}{r} 10-3 \\ 10-3 \\ 9-4 \\ 7.3 \end{array}$ | $\begin{aligned} & 8-11 \\ & 8-6 \\ & 7-8 \\ & 5-11 \end{aligned}$ | $\begin{aligned} & 14-11 \\ & 14-11 \\ & 14-3 \\ & 11-0 \end{aligned}$ | $\begin{array}{r} 13-6 \\ 13-6 \\ 12-4 \\ 9-6 \end{array}$ | $\begin{gathered} 11-10 \\ 11-3 \\ 10-1 \\ 7.9 \end{gathered}$ | $\begin{aligned} & 19-0 \\ & 19-0 \\ & 18-2 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 17-3 \\ & 15-9 \\ & 12-2 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 14-4 \\ & 12-10 \\ & 9-11 \end{aligned}$ | $\begin{aligned} & 23-1 \\ & 23-1 \\ & 22-1 \\ & 17-0 \end{aligned}$ | $\begin{aligned} & 21-0 \\ & 21.0 \\ & 19.2 \\ & 14.9 \\ & \hline \end{aligned}$ | $\begin{aligned} & 18-4 \\ & 17-5 \\ & 15-7 \\ & 12-1 \end{aligned}$ |

Table 13. FLOOR JOISTS - 40 psf live load. All rooms except sleeping rooms and attic floors. (Spans shown in light face type are based on a deflection limitation of $l / 360$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 10 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10.11 \\ 10-11 \\ 10-3 \\ 7.9 \end{gathered}$ | $\begin{aligned} & 9-11 \\ & 9-9 \\ & 8-11 \\ & 8-9 \end{aligned}$ | $\begin{aligned} & 8-8 \\ & 7-11 \\ & 7-3 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 14-5 \\ & 14-5 \\ & 13-7 \\ & 10-3 \end{aligned}$ | $\begin{aligned} & 13-1 \\ & 12-10 \\ & 11-9 \\ & 8.11 \end{aligned}$ | $\begin{array}{r} 11-5 \\ 10-6 \\ 9-7 \\ 7-3 \end{array}$ | $\begin{aligned} & 18-5 \\ & 18-5 \\ & 17-4 \\ & 13-1 \end{aligned}$ | $\begin{aligned} & 16-9 \\ & 16-4 \\ & 15-0 \\ & 11-4 \end{aligned}$ | $\begin{array}{r} 14-7 \\ 13-4 \\ 12-3 \\ 9-3 \end{array}$ | $\begin{aligned} & 22-5 \\ & 22-5 \\ & 21-1 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 20-4 \\ & 19-11 \\ & 18-3 \\ & 13-9 \end{aligned}$ | $\begin{aligned} & 17-9 \\ & 16-3 \\ & 14-11 \\ & 11.3 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 11-2 \\ & 11-2 \\ & 10-11 \\ & 9.3 \end{aligned}$ | $\begin{gathered} 10.2 \\ 10.2 \\ 9.11 \\ \mathbf{8 . 0} \end{gathered}$ | $\begin{aligned} & 8-10 \\ & 8-10 \\ & 8-7 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 14-5 \\ & \mathbf{1 2 - 2} \end{aligned}$ | $\begin{aligned} & 13-4 \\ & 13-4 \\ & 13-1 \\ & 10.7 \end{aligned}$ | $\begin{array}{r} 11.8 \\ 11.8 \\ 11-\mathbf{3} \\ \mathbf{8 . 8} \end{array}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 18-5 \\ & 15-7 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 17-0 \\ & 16-9 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 14-11 \\ & 14.11 \\ & 14-5 \\ & 11-0 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 22-5 \\ & 18-11 \end{aligned}$ | $\begin{aligned} & 20-9 \\ & 20-9 \\ & 20-4 \\ & 16-5 \end{aligned}$ | $\begin{aligned} & 18-1 \\ & 18-1 \\ & 17-6 \\ & 13-5 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-0 \\ 10-0 \\ 9.6 \\ 8.7 \end{array}$ | $\begin{aligned} & 9-1 \\ & 9-1 \\ & 8-7 \\ & 7-5 \end{aligned}$ | $\begin{aligned} & 7-11 \\ & 7-11 \\ & 7-6 \\ & 6.1 \end{aligned}$ | $\begin{aligned} & 13-2 \\ & 13-2 \\ & 12-6 \\ & 11-3 \end{aligned}$ | $\begin{array}{r} 12-0 \\ 12.0 \\ 11-4 \\ 9.9 \end{array}$ | $\begin{aligned} & 10-6 \\ & 10-6 \\ & 9-11 \\ & \mathbf{8 - 0} \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 15.11 \\ & 14-5 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14-6 \\ & 12-5 \end{aligned}$ | $\begin{aligned} & 13.4 \\ & 13.4 \\ & 12.8 \\ & \mathbf{1 0 - 2} \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-4 \\ & 17-6 \end{aligned}$ | $\begin{aligned} & 18-7 \\ & 18.7 \\ & 17-7 \\ & 15-2 \end{aligned}$ | $\begin{aligned} & 16-3 \\ & 16-3 \\ & 15-4 \\ & 12-4 \end{aligned}$ |
| Hem-Fir (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-6 \\ 10-6 \\ 10-3 \\ \mathbf{8 - 3} \end{array}$ | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 9-4 \\ & 7-2 \end{aligned}$ | $\begin{aligned} & 8-4 \\ & 8-4 \\ & 7-7 \\ & 5-10 \end{aligned}$ | $\begin{aligned} & 13.10 \\ & 13-10 \\ & 13-6 \\ & 10.11 \end{aligned}$ | $\begin{array}{r} 12-7 \\ 12-7 \\ 12-3 \\ 9-5 \end{array}$ | $\begin{array}{r} 11.0 \\ 11.0 \\ 10.0 \\ 7.8 \end{array}$ | $\begin{aligned} & 17.8 \\ & 17.8 \\ & 17.3 \\ & 13.11 \end{aligned}$ | $\begin{aligned} & 16-0 \\ & 16-0 \\ & 15-8 \\ & 12-0 \end{aligned}$ | $\begin{aligned} & 14-0 \\ & 14-0 \\ & 12.10 \\ & 9.10 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 211-0 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 19.6 \\ & 19.6 \\ & 19.1 \\ & 14.7 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 17-0 \\ & 15.7 \\ & 11-11 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9.9 \\ & 9.9 \\ & 9.6 \\ & 7.7 \end{aligned}$ | $\begin{aligned} & 8-10 \\ & 8-10 \\ & 8-7 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 7-9 \\ & 7-9 \\ & 7-0 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 12-10 \\ & 12.10 \\ & 12.6 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 11-8 \\ 11.8 \\ 11-4 \\ 8-8 \end{array}$ | $\begin{array}{r} 10-2 \\ 10-2 \\ 9-3 \\ 7-1 \end{array}$ | $\begin{aligned} & 16-5 \\ & 16-5 \\ & 15-11 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 14-11 \\ & 14-11 \\ & 14-5 \\ & 11-1 \end{aligned}$ | $\begin{array}{r} 13-0 \\ 13-0 \\ 11-9 \\ 9.1 \end{array}$ | $\begin{aligned} & 19-11 \\ & 19.11 \\ & 19.4 \\ & 15.7 \end{aligned}$ | $\begin{aligned} & 18-1 \\ & 18-1 \\ & 17-7 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-10 \\ & 14-4 \\ & 11-0 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-0 \\ 10-0 \\ 9-9 \\ 7.5 \end{array}$ | $\begin{aligned} & 9-1 \\ & 9-1 \\ & 8-6 \\ & 6-5 \end{aligned}$ | $\begin{aligned} & 7-11 \\ & 7-7 \\ & 6-11 \\ & 5-3 \end{aligned}$ | $\begin{aligned} & 13-2 \\ & 13-2 \\ & 12-10 \\ & 9-10 \end{aligned}$ | $\begin{array}{r} 12-0 \\ 12.0 \\ 11-2 \\ 8-6 \end{array}$ | $\begin{gathered} 10-6 \\ 10-0 \\ 9-1 \\ 6-11 \end{gathered}$ | $\begin{aligned} & 16.10 \\ & 16.10 \\ & 16-5 \\ & 12.6 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14-3 \\ & 10-10 \end{aligned}$ | $\begin{aligned} & 13-4 \\ & 12-10 \\ & 11-8 \\ & 8-10 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-11 \\ & \mathbf{1 5 - 3} \end{aligned}$ | $\begin{aligned} & 18-7 \\ & 18.7 \\ & 17-4 \\ & 13-2 \end{aligned}$ | $\begin{aligned} & 16.3 \\ & 15.7 \\ & 14-2 \\ & 10-9 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-6 \\ 10-6 \\ 10-0 \\ 7.7 \end{array}$ | $\begin{aligned} & 9.6 \\ & 9.6 \\ & 8.8 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & \hline 8.4 \\ & 7.9 \\ & 7-1 \\ & 5-5 \end{aligned}$ | $\begin{aligned} & 13-10 \\ & 13-10 \\ & 13-2 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 12.7 \\ 12.7 \\ 11.6 \\ 8.8 \end{array}$ | $\begin{array}{r} 11-0 \\ 10.3 \\ 9-4 \\ 7-1 \end{array}$ | $\begin{aligned} & 17.8 \\ & 17-8 \\ & 16-10 \\ & 12.10 \end{aligned}$ | $\begin{aligned} & 16-0 \\ & 16-0 \\ & 14-8 \\ & 11-1 \end{aligned}$ | $\begin{gathered} 14.0 \\ 13.1 \\ 11-11 \\ 9.1 \end{gathered}$ | $\begin{aligned} & 21.6 \\ & 21.6 \\ & 20.6 \\ & \mathbf{1 5 - 7} \end{aligned}$ | $\begin{aligned} & 19.6 \\ & 19.6 \\ & 17.9 \\ & 13.6 \end{aligned}$ | $\begin{aligned} & 17.0 \\ & 15.11 \\ & 14.6 \\ & 11-0 \end{aligned}$ |
| Western cedars (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 9-2 \\ & 7-9 \end{aligned}$ | $\begin{aligned} & 8.7 \\ & 8-7 \\ & 8-4 \\ & 6-9 \end{aligned}$ | $\begin{aligned} & \hline 7-6 \\ & 7-6 \\ & 7-1 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 12-6 \\ & 12-6 \\ & 12-1 \\ & 10-3 \end{aligned}$ | $\begin{gathered} 11-4 \\ 11-4 \\ 11-0 \\ \mathbf{8 . 1 1} \end{gathered}$ | $\begin{aligned} & 9-11 \\ & 9-11 \\ & 9-4 \\ & 7-3 \end{aligned}$ | $\begin{aligned} & 15.11 \\ & 15.11 \\ & 15-5 \\ & 13.1 \end{aligned}$ | $\begin{aligned} & 14-6 \\ & 14-6 \\ & 14-0 \\ & 11-4 \end{aligned}$ | $\begin{gathered} 12-8 \\ 12-8 \\ 11-11 \\ 9.3 \end{gathered}$ | $\begin{aligned} & 19-4 \\ & 19.4 \\ & 18.9 \\ & \mathbf{1 5 - 1 1} \end{aligned}$ | $\begin{aligned} & 17.7 \\ & 17.7 \\ & 17-0 \\ & 13-9 \end{aligned}$ | $\begin{aligned} & 15-4 \\ & 15-4 \\ & 14-6 \\ & 11-3 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-3 \\ 10.3 \\ 9-8 \\ 7-5 \end{array}$ | $\begin{aligned} & 9-4 \\ & 9-4 \\ & 8-4 \\ & 6-5 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 7.7 \\ & 8-10 \\ & 5-3 \end{aligned}$ | $\begin{gathered} 13-6 \\ 13.6 \\ 12.9 \\ 9.10 \end{gathered}$ | $\begin{array}{r} 12-3 \\ 12-3 \\ 11-0 \\ 8-6 \end{array}$ | $\begin{gathered} 10-8 \\ 10.0 \\ 9-0 \\ 6.11 \end{gathered}$ | $\begin{aligned} & 17-3 \\ & 17-3 \\ & 16-3 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 15.8 \\ & 15.8 \\ & 14.1 \\ & \mathbf{1 0 - 1 0} \end{aligned}$ | $\begin{aligned} & 13-7 \\ & 12.10 \\ & 11-6 \\ & 8.10 \end{aligned}$ | $\begin{aligned} & 21.0 \\ & 21-0 \\ & 19.9 \\ & 15.3 \end{aligned}$ | $\begin{aligned} & 19-1 \\ & 19-1 \\ & 17-1 \\ & 13-2 \end{aligned}$ | $\begin{aligned} & 16.7 \\ & 15.7 \\ & 14-0 \\ & 10.9 \end{aligned}$ |

$\stackrel{\rightharpoonup}{\perp}$ Table 14. CEILING JOISTS - Drywall Ceiling - 10 psf live load. No future sleeping rooms and no attic storage, roof slopes 3 in 12 or less. (Spans shown in light face type are based on a deflection limitation of $l / 240$. Spans
shown in bold face type are limited by allowable extreme fiber stress in bending and include a 5 psf dead load.)

| Species | Grade |  | $2 \times 4$ |  | Grade | $2 \times 4$ |  |  | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (in.) |  |  |  | Joist Spacing ( inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Max. | Span (ft | in.) |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Appearance Construction Standard Utility | $\begin{aligned} & 12.8 \\ & 10.11 \\ & 8.3 \\ & 5.6 \end{aligned}$ | $\begin{gathered} 11.6 \\ 9-5 \\ 7-2 \\ 4-10 \end{gathered}$ | $\begin{aligned} & 9-11 \\ & 7-9 \\ & 5-10 \\ & 3-11 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-8 \\ 12-8 \\ 12-2 \\ 9-7 \end{array}$ | $\begin{array}{r} 11-6 \\ 11.6 \\ 11.0 \\ 8.4 \end{array}$ | $\begin{gathered} 10-0 \\ 9-11 \\ 9-0 \\ 6-9 \end{gathered}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & \mathbf{1 8 - 9} \\ & \mathbf{1 4 - 2} \end{aligned}$ | $\begin{aligned} & 18-1 \\ & 17-9 \\ & 16-3 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 14-6 \\ & 13-3 \\ & 10-1 \end{aligned}$ | $\begin{aligned} & 26-3 \\ & 26-3 \\ & 24-9 \\ & 18-9 \end{aligned}$ | $\begin{aligned} & 23-10 \\ & 23.5 \\ & 21-5 \\ & 16-3 \end{aligned}$ | $\begin{aligned} & 20-10 \\ & 19-1 \\ & 17-6 \\ & 13-3 \end{aligned}$ | $\begin{aligned} & 33-5 \\ & 33-5 \\ & 31-7 \\ & 23-11 \end{aligned}$ | $\begin{aligned} & 30-5 \\ & 29-10 \\ & 27-4 \\ & 20-8 \end{aligned}$ | $\begin{aligned} & 26-6 \\ & 24-5 \\ & 22.4 \\ & 16-11 \end{aligned}$ |
| Douglas fir-Larch (North) | Appearance Construction Standard Utility | $\begin{gathered} 12-11 \\ 12.2 \\ 9.7 \\ 6.8 \end{gathered}$ | $\begin{array}{r} 11-9 \\ 11-0 \\ 8-4 \\ 6-9 \end{array}$ | $\begin{array}{r} 10.3 \\ 9-0 \\ 6-9 \\ 4.8 \end{array}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12.11 \\ & 12.11 \\ & 12.8 \\ & 11-3 \end{aligned}$ | $\begin{array}{r} 11.9 \\ 11.9 \\ 11.6 \\ \mathbf{9 . 9} \end{array}$ | $\begin{gathered} 10-3 \\ 10-3 \\ 10-0 \\ 7-11 \end{gathered}$ | $\begin{aligned} & 20-3 \\ & 20-3 \\ & 19-11 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 18-5 \\ & 18-5 \\ & 18-1 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 16-1 \\ & 16-1 \\ & 15.7 \\ & 11-11 \end{aligned}$ | $\begin{aligned} & 26-9 \\ & 26-9 \\ & 26-3 \\ & 22-3 \end{aligned}$ | $\begin{aligned} & 24.3 \\ & 24-3 \\ & 23.10 \\ & 19-4 \end{aligned}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 20-7 \\ & 15-9 \end{aligned}$ | $\begin{aligned} & 34-1 \\ & 34-1 \\ & 33-5 \\ & 28-6 \end{aligned}$ | $\begin{aligned} & 31-0 \\ & 31-0 \\ & 30-5 \\ & 24-7 \end{aligned}$ | $\begin{aligned} & 27.1 \\ & 27.1 \\ & 26-3 \\ & 20-1 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Appearance Construction Standard Utility | $\begin{aligned} & 11.7 \\ & 10.7 \\ & 8.10 \\ & 6.1 \end{aligned}$ | $\begin{array}{r} 10-6 \\ 9-8 \\ 7.8 \\ 6-4 \end{array}$ | $\begin{aligned} & 9-2 \\ & 8-5 \\ & 6-3 \\ & 4-4 \end{aligned}$ | Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance | $\begin{aligned} & 11-7 \\ & 11.7 \\ & 10-11 \\ & 10-5 \\ & 11.7 \end{aligned}$ | $\begin{gathered} 10-6 \\ 10-6 \\ 9-11 \\ 9-0 \\ 10.6 \end{gathered}$ | $\begin{aligned} & 9-2 \\ & 9-2 \\ & 8-8 \\ & 7-5 \\ & 9-2 \end{aligned}$ | $\begin{aligned} & 18-2 \\ & 18-2 \\ & 17-2 \\ & \mathbf{1 5 - 7} \\ & 18-2 \end{aligned}$ | $\begin{aligned} & 16-6 \\ & 16-6 \\ & 15.7 \\ & 13.6 \\ & 16-6 \end{aligned}$ | $\begin{aligned} & 14-5 \\ & 14-5 \\ & 13.8 \\ & 11-0 \\ & 14-5 \end{aligned}$ | $\begin{aligned} & 24-0 \\ & 24-0 \\ & 22.8 \\ & 20-7 \\ & 24-0 \end{aligned}$ | $\begin{aligned} & 21-9 \\ & 21-9 \\ & 20-7 \\ & 17-10 \\ & 21-9 \end{aligned}$ | $\begin{aligned} & 19-0 \\ & 19-0 \\ & 18-0 \\ & 14.7 \\ & 19.0 \end{aligned}$ | $\begin{aligned} & 30-7 \\ & 30-7 \\ & 28-11 \\ & 26-3 \\ & 30-7 \end{aligned}$ | $\begin{aligned} & 27-9 \\ & 27-9 \\ & 26-3 \\ & 22-9 \\ & 27-9 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 24-3 \\ & 22-11 \\ & 18-7 \\ & 24-3 \\ & \hline \end{aligned}$ |
| Hem-Fir (North) | Appearance Construction Standard Utility | $\begin{gathered} 12.2 \\ 11.3 \\ 8.5 \\ 6-10 \end{gathered}$ | $\begin{gathered} 11-0 \\ 9-10 \\ 7-4 \\ 5.1 \end{gathered}$ | $\begin{aligned} & 9-8 \\ & 8-0 \\ & 6-0 \\ & 4-2 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12-2 \\ & 12-2 \\ & 11-10 \\ & 9-11 \end{aligned}$ | $\begin{array}{r} 11-0 \\ 11-0 \\ 10-9 \\ \mathbf{8 - 7} \end{array}$ | $\begin{aligned} & 9.8 \\ & 9.8 \\ & 9-5 \\ & 7-0 \end{aligned}$ | $\begin{aligned} & 19-1 \\ & 19-1 \\ & 18-8 \\ & 15-1 \end{aligned}$ | $\begin{aligned} & 17-4 \\ & 17-4 \\ & 16-11 \\ & 13-1 \end{aligned}$ | $\begin{aligned} & 15-2 \\ & 15-2 \\ & 13-11 \\ & 10-8 \end{aligned}$ | $\begin{aligned} & 25-2 \\ & 25-2 \\ & 24-7 \\ & 19-10 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 22-4 \\ & 17-2 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 18.4 \\ & 14.0 \end{aligned}$ | $\begin{aligned} & 32-1 \\ & 32-1 \\ & 31-4 \\ & 25-4 \end{aligned}$ | $\begin{aligned} & 29-2 \\ & 29-2 \\ & 28-6 \\ & 21-11 \end{aligned}$ | $\begin{aligned} & 25-5 \\ & 25-5 \\ & 23-6 \\ & 17-11 \end{aligned}$ |
| Ponderosa pine | Appearance Construction Standard Utility | $\begin{aligned} & 11.3 \\ & 10-7 \\ & 7.10 \\ & 5.6 \end{aligned}$ | $\begin{gathered} 10-3 \\ 9-2 \\ 6-9 \\ 4-10 \end{gathered}$ | $\begin{aligned} & 8-11 \\ & 7-6 \\ & 5-6 \\ & 3-11 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 11.3 \\ 11.3 \\ 10.11 \\ \mathbf{9 - 3} \end{gathered}$ | $\begin{aligned} & 10-3 \\ & 10-3 \\ & 9.11 \\ & 8-0 \end{aligned}$ | $\begin{aligned} & 8-11 \\ & 8-11 \\ & 8-8 \\ & 6-6 \end{aligned}$ | $\begin{aligned} & 17.8 \\ & 17-8 \\ & 17.2 \\ & 13.11 \end{aligned}$ | $\begin{aligned} & 16-1 \\ & 16-1 \\ & 15-7 \\ & 12-0 \end{aligned}$ | $\begin{aligned} & 14.1 \\ & 14.1 \\ & 12.10 \\ & 9-10 \end{aligned}$ | $\begin{aligned} & 23-4 \\ & 23-4 \\ & 22-8 \\ & 18-4 \end{aligned}$ | $\begin{aligned} & 21.2 \\ & 21-2 \\ & 20-7 \\ & \mathbf{1 5 - 1 0} \end{aligned}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 16-10 \\ & 12-11 \end{aligned}$ | $\begin{aligned} & 29.9 \\ & 29.9 \\ & 28-11 \\ & 23.5 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-1 \\ & 26-3 \\ & 20-3 \end{aligned}$ | $\begin{aligned} & 23-8 \\ & 23.8 \\ & 21.6 \\ & 16.6 \end{aligned}$ |
| Red pine | Appearance Construction Standard Utility | $\begin{aligned} & 11-7 \\ & 10-5 \\ & 7.10 \\ & 5-6 \end{aligned}$ | $\begin{gathered} 10-6 \\ 9-0 \\ 6-9 \\ 4-10 \end{gathered}$ | $\begin{aligned} & 9-2 \\ & 7-5 \\ & 5-6 \\ & 3-11 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11.7 \\ 11.7 \\ 11.3 \\ 9-3 \end{array}$ | $\begin{array}{r} 10-6 \\ 10-6 \\ 10-3 \\ 8-0 \end{array}$ | $\begin{aligned} & 9-2 \\ & 9-2 \\ & 8.8 \\ & 6.6 \end{aligned}$ | $\begin{aligned} & 18-2 \\ & 18-2 \\ & 17-8 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 16-6 \\ & 16.6 \\ & 15-6 \\ & 11.9 \end{aligned}$ | $\begin{gathered} 14-5 \\ 13-11 \\ 12-8 \\ 9.7 \end{gathered}$ | $\begin{aligned} & 24-0 \\ & 24-0 \\ & 23-4 \\ & 17.11 \end{aligned}$ | $\begin{aligned} & 21-9 \\ & 21-9 \\ & 20-6 \\ & 15-6 \end{aligned}$ | $\begin{aligned} & 19-0 \\ & 18-4 \\ & 16-8 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 30-7 \\ & 30-7 \\ & 29-9 \\ & \mathbf{2 2 - 1 0} \end{aligned}$ | $\begin{aligned} & 27-9 \\ & 27-9 \\ & 26-0 \\ & 19-10 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 23-6 \\ & 21-3 \\ & 16-2 \end{aligned}$ |
| Spruce-Pine-Fir | Appearance Construction Standard Utility | $\begin{array}{r} 12.2 \\ 10.9 \\ \mathbf{6 . 0} \\ 5.6 \end{array}$ | $\begin{gathered} 11.0 \\ 9-4 \\ 7.0 \\ 4-10 \end{gathered}$ | $\begin{aligned} & 9-8 \\ & 7.7 \\ & 5-8 \\ & 3-11 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-2 \\ 12-2 \\ 11-7 \\ 9-5 \end{array}$ | $\begin{array}{r} 11-0 \\ 11-0 \\ 10-6 \\ \mathbf{8 - 2} \end{array}$ | $\begin{aligned} & 9-8 \\ & 9-8 \\ & 8.10 \\ & 6-8 \end{aligned}$ | $\begin{aligned} & 19-1 \\ & 19-1 \\ & 18-2 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 17.4 \\ & 17.4 \\ & 15.11 \\ & 12.0 \end{aligned}$ | $\begin{gathered} 15.2 \\ 14.2 \\ 13-0 \\ 9.10 \end{gathered}$ | $\begin{aligned} & 25-2 \\ & 25-2 \\ & 24-0 \\ & 18-4 \end{aligned}$ | $\begin{aligned} & 22.10 \\ & 22-10 \\ & 20-11 \\ & 15.10 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 18.9 \\ & 17.1 \\ & 12-11 \end{aligned}$ | $\begin{aligned} & 32-1 \\ & 32-1 \\ & 30-7 \\ & 23-5 \end{aligned}$ | $\begin{aligned} & 29-2 \\ & 29-2 \\ & 26-8 \\ & 20-3 \end{aligned}$ | $\begin{aligned} & 25-5 \\ & 23-11 \\ & 21-10 \\ & 16-6 \end{aligned}$ |
| Western cedars (North) | Appearance Construction Standard Utility | $\begin{gathered} 10-11 \\ 10-3 \\ 8-0 \\ 5-6 \end{gathered}$ | $\begin{aligned} & 9-11 \\ & 9-4 \\ & 7-0 \\ & 4-10 \end{aligned}$ | $\begin{aligned} & 8-8 \\ & 7.7 \\ & 5.8 \\ & 3-11 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10-11 \\ 10-11 \\ 10-7 \\ 9-5 \end{gathered}$ | $\begin{aligned} & 9-11 \\ & 9-11 \\ & 9-8 \\ & \mathbf{8 - 2} \end{aligned}$ | $\begin{aligned} & 8-8 \\ & 8-8 \\ & 8-5 \\ & 6-8 \end{aligned}$ | $\begin{aligned} & 17-2 \\ & 17-2 \\ & 16-8 \\ & \mathbf{1 4 - 2} \end{aligned}$ | $\begin{aligned} & 15-7 \\ & 15-7 \\ & 15-2 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 13-8 \\ & 13-8 \\ & 13.0 \\ & 10.1 \end{aligned}$ | $\begin{aligned} & 22-8 \\ & 22-8 \\ & 22-0 \\ & 18-9 \end{aligned}$ | $\begin{aligned} & 20.7 \\ & 20.7 \\ & 19.11 \\ & 16-3 \end{aligned}$ | $\begin{aligned} & 18-0 \\ & 18-0 \\ & 17-1 \\ & 13-3 \end{aligned}$ | $\begin{aligned} & 28.11 \\ & 28-11 \\ & 28-0 \\ & \mathbf{2 3 - 1 1} \end{aligned}$ | $\begin{aligned} & 26-3 \\ & 26-3 \\ & 25-5 \\ & 20-8 \end{aligned}$ | $\begin{aligned} & 22-11 \\ & 22-11 \\ & 21-10 \\ & 16-11 \end{aligned}$ |
| Western white pine | Appearance Construction Standard Utility | $\begin{gathered} 11-10 \\ 10-3 \\ 7-7 \\ 5-3 \end{gathered}$ | $\begin{aligned} & 10-9 \\ & 8-11 \\ & 6.7 \\ & 4.6 \end{aligned}$ | $\begin{aligned} & 9.5 \\ & 7.3 \\ & 5.5 \\ & 3.8 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 11.10 \\ 11.10 \\ 11.7 \\ 9.0 \end{gathered}$ | $\begin{gathered} 10-9 \\ 10.9 \\ 10-4 \\ 7.10 \end{gathered}$ | $\begin{aligned} & 9-5 \\ & 9-5 \\ & 8-5 \\ & 6-5 \end{aligned}$ | $\begin{aligned} & 18-8 \\ & 18-8 \\ & 17-8 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 16.11 \\ & 16.11 \\ & 16.3 \\ & 11-9 \end{aligned}$ | $\begin{aligned} & 14-9 \\ & 13.11 \\ & 12.6 \\ & 9.7 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24.7 \\ & 23-3 \\ & 17-11 \end{aligned}$ | $\begin{aligned} & 22-4 \\ & 22-4 \\ & 20-2 \\ & 15-6 \end{aligned}$ | $\begin{aligned} & 19-6 \\ & 18-4 \\ & 16.5 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 31.4 \\ & 31.4 \\ & 29.8 \\ & 22.10 \end{aligned}$ | $\begin{aligned} & 28-6 \\ & 28-6 \\ & 26-8 \\ & 19-10 \end{aligned}$ | $\begin{aligned} & 24-10 \\ & 23-5 \\ & 21-0 \\ & 16-2 \end{aligned}$ |

Table 15. CEILING JOISTS - Drywall Ceiling - 20 psf live load. No future sleeping rooms but limited storage available. (Spans shown in light face type are based on a deflection limitation of $l / 240$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 10 psf dead load.)

| Species | Grade | $2 \times 4$ |  |  | Grade | $2 \times 4$ |  |  | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (in.) |  |  |  | Joist Spacing ( inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Max. Span ( ft - in.) |  |  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Appearance Construction Standard Utility | $\begin{aligned} & 9-11 \\ & 7.9 \\ & 5.10 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8-7 \\ & 8-8 \\ & 5-1 \\ & 3-5 \end{aligned}$ | $\begin{aligned} & 7-0 \\ & 5.5 \\ & 4-2 \\ & 2.9 \end{aligned}$ | Select Structural No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10-0 \\ 9-11 \\ 9-0 \\ 6-9 \end{gathered}$ | $\begin{aligned} & 9-1 \\ & 8-7 \\ & 7-10 \\ & 5-10 \end{aligned}$ | $\begin{aligned} & 7-7 \\ & 7.0 \\ & 6-5 \\ & 4-10 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 14-6 \\ & 13-3 \\ & 10-1 \end{aligned}$ | $\begin{array}{r} 13.9 \\ 12.7 \\ 11.6 \\ 8.8 \end{array}$ | $\begin{array}{r} 11-3 \\ 10-3 \\ 9-5 \\ 7.1 \end{array}$ | $\begin{aligned} & 20-10 \\ & 19-1 \\ & 17.6 \\ & 13-3 \\ & \hline \end{aligned}$ | $\begin{aligned} & 18-2 \\ & 16-7 \\ & 15-2 \\ & 11-6 \end{aligned}$ | $\begin{gathered} 14-10 \\ 13-6 \\ 12.5 \\ 9-4 \end{gathered}$ | $\begin{aligned} & 26-6 \\ & 24-5 \\ & 22.4 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 23-2 \\ & 21-1 \\ & 19-4 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 18.11 \\ & 17.3 \\ & 15-10 \\ & 11.11 \end{aligned}$ |
| Douglas fir-Larch (North) | Appearance Construction Standard Utility | $\begin{array}{r} 10-3 \\ 9-0 \\ 6-9 \\ 4-8 \end{array}$ | $\begin{aligned} & 9-4 \\ & 7-10 \\ & 5-10 \\ & 4-1 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 6-5 \\ & 4-10 \\ & 3-4 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10-3 \\ 10-3 \\ 10-0 \\ 7-11 \end{gathered}$ | $\begin{aligned} & 9-4 \\ & 9-4 \\ & 9-1 \\ & 6-10 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 8-1 \\ & 7-6 \\ & 5-7 \end{aligned}$ | $\begin{aligned} & 16-1 \\ & 16-1 \\ & 15-7 \\ & 11-11 \end{aligned}$ | $\begin{aligned} & 14-7 \\ & 14-7 \\ & 13-6 \\ & 10-4 \end{aligned}$ | $\begin{array}{r} 12-9 \\ 12-2 \\ 11-0 \\ 8-5 \\ \hline \end{array}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 20-7 \\ & 15-9 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 17-10 \\ & 13-8 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16-0 \\ & 14.7 \\ & 11-2 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-1 \\ & 26-3 \\ & 20-1 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24-7 \\ & 22-9 \\ & 17-5 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 20-5 \\ & 18-7 \\ & 14-3 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Appearance Construction Standard Utility | $\begin{aligned} & 9-2 \\ & 8-5 \\ & 6-3 \\ & 4-4 \end{aligned}$ | $\begin{aligned} & 8-4 \\ & 7-4 \\ & 5-5 \\ & 3-9 \end{aligned}$ | $\begin{aligned} & 7.2 \\ & 6-0 \\ & 4.5 \\ & 3.1 \end{aligned}$ | Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance | $\begin{aligned} & 9-2 \\ & 9-2 \\ & 8-8 \\ & 7-5 \\ & 9-2 \end{aligned}$ | $\begin{aligned} & 8-4 \\ & 8-4 \\ & 7-11 \\ & 6-5 \\ & 8-4 \end{aligned}$ | $\begin{aligned} & 7-3 \\ & 7-3 \\ & 6-11 \\ & 5-3 \\ & 7-2 \end{aligned}$ | $\begin{aligned} & 14.5 \\ & 14.5 \\ & 13.8 \\ & 11.0 \\ & 14.5 \end{aligned}$ | $\begin{array}{r} 13-1 \\ 13-1 \\ 12-4 \\ 9-7 \\ 13-1 \end{array}$ | $\begin{aligned} & 11-5 \\ & 11-3 \\ & 10-1 \\ & 7-10 \\ & 11-3 \end{aligned}$ | $\begin{aligned} & 19-0 \\ & 19-0 \\ & 18-0 \\ & 14-7 \\ & 19-0 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 17-3 \\ & 16-3 \\ & 12-7 \\ & 17-3 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 14-10 \\ & 13-3 \\ & 10-3 \\ & 14-10 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 24-3 \\ & 22-11 \\ & 18-7 \\ & 24-3 \end{aligned}$ | $\begin{aligned} & 22-1 \\ & 22-1 \\ & 20-8 \\ & 16-1 \\ & 22-1 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 18.11 \\ & 16-11 \\ & 13-2 \\ & 18.11 \end{aligned}$ |
| Hem-Fir (North) | Appearance Construction Standard Utility | $\begin{aligned} & 9.8 \\ & 8-0 \\ & 6-0 \\ & 4-2 \end{aligned}$ | $\begin{aligned} & 8-9 \\ & 7-0 \\ & 5-2 \\ & 3-7 \end{aligned}$ | $\begin{aligned} & 7-5 \\ & 5.8 \\ & 4-3 \\ & 2-11 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-8 \\ & 9-8 \\ & 9-5 \\ & 7-0 \end{aligned}$ | $\begin{aligned} & 8-9 \\ & 8-9 \\ & 8-2 \\ & 6-1 \end{aligned}$ | $\begin{aligned} & 7-8 \\ & 7-5 \\ & 6-8 \\ & 5-0 \end{aligned}$ | $\begin{aligned} & 15-2 \\ & 15-2 \\ & 13-11 \\ & 10-8 \end{aligned}$ | $\begin{array}{r} 13-9 \\ 13-3 \\ 12-0 \\ 9-3 \end{array}$ | $\begin{gathered} 11-9 \\ 10-10 \\ 9.10 \\ 7.6 \end{gathered}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 18-4 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 18-2 \\ & 17-6 \\ & 15-10 \\ & 12-2 \end{aligned}$ | $\begin{aligned} & 15-6 \\ & 14-4 \\ & 12-11 \\ & 9-11 \end{aligned}$ | $\begin{aligned} & 25-5 \\ & 25-5 \\ & 23-5 \\ & 17-11 \end{aligned}$ | $\begin{aligned} & 23-2 \\ & 22-4 \\ & 20-3 \\ & 15-6 \end{aligned}$ | $\begin{aligned} & 19-10 \\ & 18-3 \\ & 16-6 \\ & 12-8 \end{aligned}$ |
| Ponderosa pine | Apcearance Construction Standard Utility | $\begin{aligned} & 8-11 \\ & 7-6 \\ & 5-6 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 6-8 \\ & 4-10 \\ & 3.5 \end{aligned}$ | $\begin{aligned} & 6-11 \\ & 5-4 \\ & 3-11 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-11 \\ & 8-11 \\ & 8-8 \\ & 8-6 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 8-1 \\ & 7-8 \\ & 5-8 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 6-11 \\ & 6-3 \\ & 4-7 \end{aligned}$ | $\begin{aligned} & 14-1 \\ & 14-1 \\ & 12-10 \\ & 9-10 \end{aligned}$ | $\begin{array}{r} 12-9 \\ 12-4 \\ 11-1 \\ 8-6 \end{array}$ | $\begin{gathered} 10.10 \\ 10-1 \\ 9-1 \\ 6-11 \end{gathered}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 16-10 \\ & 12-11 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-3 \\ & 14-7 \\ & 11-3 \end{aligned}$ | $\begin{gathered} 14-4 \\ 13-3 \\ 11-11 \\ 9-2 \end{gathered}$ | $\begin{aligned} & 23-8 \\ & 23-8 \\ & 21-6 \\ & 16-6 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 20-8 \\ & 18-8 \\ & 14-4 \end{aligned}$ | $\begin{aligned} & 18.3 \\ & 16-11 \\ & 15-3 \\ & 11-8 \end{aligned}$ |
| Red pine | Appearance Construction Standard Utility | $\begin{aligned} & 9-2 \\ & 7-5 \\ & 5-6 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8-4 \\ & 6-5 \\ & 4-10 \\ & 3-5 \end{aligned}$ | $\begin{aligned} & 6-9 \\ & 5-3 \\ & 3-11 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-2 \\ & 9-2 \\ & 8-8 \\ & 6-6 \end{aligned}$ | $\begin{aligned} & 8-4 \\ & 8-4 \\ & 7-6 \\ & 5-8 \end{aligned}$ | $\begin{aligned} & 7-3 \\ & 6-9 \\ & 6-1 \\ & 4-7 \end{aligned}$ | $\begin{aligned} & 14-5 \\ & 13-11 \\ & 12-8 \\ & 9.7 \end{aligned}$ | $\begin{gathered} 13-1 \\ 12-0 \\ 10-11 \\ 8-4 \end{gathered}$ | $\begin{gathered} 10-8 \\ 9-10 \\ 8-11 \\ 6-10 \end{gathered}$ | $\begin{aligned} & 19-0 \\ & 18-4 \\ & 16-8 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 17-2 \\ & 15-10 \\ & 14-5 \\ & 11.0 \end{aligned}$ | $\begin{gathered} 14-0 \\ 12.11 \\ 11.9 \\ 9.0 \end{gathered}$ | $\begin{aligned} & 24-3 \\ & 23-5 \\ & 21-3 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 21-11 \\ & 20-3 \\ & 18-5 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 17-11 \\ & 16-6 \\ & 15-0 \\ & 11.5 \end{aligned}$ |
| Spruce-Pine-Fir | Appearance Construction Standard Utility | $\begin{aligned} & 9.8 \\ & 7-7 \\ & 5-8 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8-5 \\ & 6-7 \\ & 4-11 \\ & 3-5 \end{aligned}$ | $\begin{aligned} & 6-11 \\ & 5-5 \\ & 40 \\ & 2.9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-8 \\ & 9-8 \\ & 8-10 \\ & 6-8 \end{aligned}$ | $\begin{aligned} & 8-9 \\ & 8-5 \\ & 7-8 \\ & 5-9 \end{aligned}$ | $\begin{aligned} & 7-6 \\ & 6-11 \\ & 6-3 \\ & 4-8 \end{aligned}$ | $\begin{gathered} 15-2 \\ 14-2 \\ 13-0 \\ 9-10 \end{gathered}$ | $\begin{array}{r} 13-6 \\ 12.4 \\ 11-3 \\ 8-6 \end{array}$ | $\begin{gathered} 11-0 \\ 10-1 \\ 9-2 \\ 6-11 \end{gathered}$ | $\begin{aligned} & 19-11 \\ & 18-9 \\ & 17-1 \\ & 12-11 \end{aligned}$ | $\begin{aligned} & 17-10 \\ & 16-3 \\ & 14-10 \\ & 11-3 \end{aligned}$ | $\begin{array}{r} 14-7 \\ 13-3 \\ 12-1 \\ 9-2 \end{array}$ | $\begin{aligned} & 25-5 \\ & 23-11 \\ & 21-10 \\ & 18-6 \end{aligned}$ | $\begin{aligned} & 22-9 \\ & 20-8 \\ & 18-11 \\ & 14-4 \end{aligned}$ | $\begin{aligned} & 18-7 \\ & 16-11 \\ & 15-5 \\ & 11-8 \end{aligned}$ |
| Western cedars (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8-8 \\ & 7-7 \\ & 5-8 \\ & 3-11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 7-11 \\ & 6-7 \\ & 4-11 \\ & 3-5 \end{aligned}$ | $\begin{aligned} & 6-11 \\ & 5-5 \\ & 4-0 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-8 \\ & 8-8 \\ & 8-5 \\ & 6-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 7-11 \\ & 7-11 \\ & 7-8 \\ & 5-9 \end{aligned}$ | $\begin{aligned} & 6.11 \\ & 6-11 \\ & 6-5 \\ & 4-8 \end{aligned}$ | $\begin{aligned} & 13-8 \\ & 13.8 \\ & 13-0 \\ & 10-1 \end{aligned}$ | $\begin{array}{r} 12-5 \\ 12.5 \\ 11-3 \\ \mathbf{8 - 8} \end{array}$ | $\begin{gathered} 10-10 \\ 10-3 \\ 9.2 \\ 7-1 \\ \hline \end{gathered}$ | $\begin{aligned} & 18-0 \\ & 18-0 \\ & 17-1 \\ & 13-3 \end{aligned}$ | $\begin{aligned} & 16-4 \\ & 16-4 \\ & 14-10 \\ & 11.6 \end{aligned}$ | $\begin{array}{r} 14-3 \\ 13-6 \\ 12-1 \\ 9-4 \end{array}$ | $\begin{aligned} & 22.11 \\ & 22.11 \\ & 21-10 \\ & 16.11 \end{aligned}$ | $\begin{aligned} & 20-10 \\ & 20-10 \\ & 18-11 \\ & 14-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 17-3 \\ & 15-5 \\ & 11-11 \\ & \hline \end{aligned}$ |
| Western white pine | Appearance Construction Standard Utility | $\begin{aligned} & 9.5 \\ & 7-3 \\ & 5-5 \\ & 3-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 8.2 \\ & 6-3 \\ & 4-8 \\ & 3-2 \end{aligned}$ | $\begin{aligned} & 6-8 \\ & 5-2 \\ & 3-10 \\ & 2-7 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-5 \\ & 9-5 \\ & 8-5 \\ & 6-5 \end{aligned}$ | $\begin{aligned} & 8-7 \\ & 8-2 \\ & 7-4 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 7-3 \\ & 6-8 \\ & 6-0 \\ & 4-6 \end{aligned}$ | $\begin{aligned} & 14.9 \\ & 13.11 \\ & 12-6 \\ & 9-7 \end{aligned}$ | $\begin{aligned} & 12-10 \\ & 12-0 \\ & 10-10 \\ & 8-4 \end{aligned}$ | $\begin{aligned} & 10-5 \\ & 9-10 \\ & 8-10 \\ & 6-10 \end{aligned}$ | $\begin{aligned} & 19-6 \\ & 18-4 \\ & 16-5 \\ & 12.8 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 15-10 \\ & 14-3 \\ & 11-0 \end{aligned}$ | $\begin{aligned} & 13-9 \\ & 12-11 \\ & 11-7 \\ & 9-0 \end{aligned}$ | $\begin{aligned} & 24-10 \\ & 23.5 \\ & 21.0 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 20-3 \\ & 18-2 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 17.7 \\ & 16.6 \\ & 14-10 \\ & 11.6 \end{aligned}$ |

$\vec{\sigma}$ Table 16. CEILING JOISTS - Plaster Ceiling - 10 psf live load. No future sleeping rooms and no attic storage,
roof slopes 3 in 12 or less. (Spans shown in light face type are based on a deflection limitation of $l / 360$. Spans
shown in bold face type are limited by allowable extreme fiber stress in bending and include a 5 psf dead load.)


Table 17. CEILING JOISTS - Plaster Ceiling - 20 psf live load. No sleeping rooms but limited storage available. (Spans shown in light face type are based on a deflection limitation of $l / 360$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 10 psf dead load.)

| Species | Grade | $2 \times 4$ |  |  | Grade | $2 \times 4$ |  |  | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (in.) |  |  |  | Joist Spacing ( inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Max. Span (ft - in.) |  |  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Appearance Construction Standard Utility | $\begin{aligned} & 8-9 \\ & 7-9 \\ & 5-10 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8-0 \\ & 6-8 \\ & 5-1 \\ & 3-5 \end{aligned}$ | $\begin{aligned} & 7-0 \\ & 5-5 \\ & 4-2 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-9 \\ & 8-9 \\ & 8-5 \\ & 6-9 \end{aligned}$ | $\begin{aligned} & 8-0 \\ & 8-0 \\ & 7-8 \\ & 5-10 \end{aligned}$ | $\begin{aligned} & 7-0 \\ & 7-0 \\ & 6-5 \\ & 4-10 \end{aligned}$ | $\begin{aligned} & 13-9 \\ & 13-9 \\ & 13-3 \\ & 10-1 \end{aligned}$ | $\begin{array}{r} 12-6 \\ 12.6 \\ 11-6 \\ 8.8 \end{array}$ | $\begin{gathered} 10-11 \\ 10-3 \\ 9-5 \\ 7-1 \end{gathered}$ | $\begin{aligned} & 18-2 \\ & 18-2 \\ & 17-5 \\ & 13-3 \end{aligned}$ | $\begin{aligned} & 16.6 \\ & 16.6 \\ & 15-2 \\ & 11.6 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-6 \\ 12-5 \\ 9-4 \end{array}$ | $\begin{aligned} & 23-2 \\ & 23-2 \\ & 22-3 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 21-1 \\ & 21 \\ & 21-1 \\ & 19-4 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 18-5 \\ & 17.3 \\ & 15.10 \\ & 11-11 \end{aligned}$ |
| Douglas fir-Larch (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8.11 \\ & 8-5 \\ & 6.9 \\ & 4.8 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 7.8 \\ & 5.10 \\ & 4-1 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 6-5 \\ & 4-10 \\ & 3-4 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8.11 \\ & 8.11 \\ & 8.9 \\ & 7-11 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 8-1 \\ & 8-0 \\ & 6-10 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 7-1 \\ & 7-0 \\ & 5.7 \end{aligned}$ | $\begin{aligned} & 14-1 \\ & 14-1 \\ & 13.9 \\ & 11-11 \end{aligned}$ | $\begin{aligned} & 12-9 \\ & 12.9 \\ & 12.6 \\ & 10-4 \end{aligned}$ | $\begin{gathered} 11-2 \\ 11-2 \\ 10-11 \\ 8-5 \end{gathered}$ | $\begin{aligned} & 18-6 \\ & 18.6 \\ & 18-2 \\ & 15.9 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16.10 \\ & 16.6 \\ & 13-8 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 14-5 \\ & 11-2 \end{aligned}$ | $\begin{aligned} & 23.8 \\ & 23.8 \\ & 23.2 \\ & 20.1 \end{aligned}$ | $\begin{array}{ll} 2 & 1-6 \\ 2 & 1-6 \\ 2 & 1.1 \\ 17 & 7 \end{array}$ | $\begin{aligned} & 18.9 \\ & 18.9 \\ & 18.5 \\ & 14-3 \end{aligned}$ |
| Eastern hemlock -Tamarack (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8-0 \\ & 7-4 \\ & 6-3 \\ & 4-4 \end{aligned}$ | $\begin{aligned} & 7.3 \\ & 6-8 \\ & 5.5 \\ & 3-9 \end{aligned}$ | $\begin{aligned} & 6-4 \\ & 5-10 \\ & 4.5 \\ & 3-1 \end{aligned}$ | Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance | $\begin{aligned} & \hline 8-0 \\ & 8-0 \\ & 7-7 \\ & 7-4 \\ & 8-0 \end{aligned}$ | $\begin{aligned} & 7.3 \\ & 7.3 \\ & 6-11 \\ & 6.6 \\ & 7.3 \end{aligned}$ | $\begin{aligned} & \hline 6-4 \\ & 6-4 \\ & 6-0 \\ & 5-3 \\ & 6-4 \end{aligned}$ | $\begin{aligned} & 12.7 \\ & 12.7 \\ & 11.11 \\ & 11.0 \\ & 12.7 \end{aligned}$ | $\begin{aligned} & \hline 11-5 \\ & 11-5 \\ & 10-10 \\ & 9-7 \\ & 11-5 \end{aligned}$ | $\begin{gathered} 10.0 \\ 10-0 \\ 9-6 \\ 7.10 \\ 10.0 \end{gathered}$ | $\begin{aligned} & 16-7 \\ & 16-7 \\ & 15-9 \\ & 14.7 \\ & 16-7 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15.1 \\ & 14-3 \\ & 12.7 \\ & 15.1 \end{aligned}$ | $\begin{aligned} & 13-2 \\ & 13-2 \\ & 12-6 \\ & 10-3 \\ & 13-2 \end{aligned}$ | $\begin{aligned} & 21-2 \\ & 21.2 \\ & 20-1 \\ & 18.7 \\ & 21.2 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-3 \\ & 16.1 \\ & 19-3 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16-10 \\ & 15.11 \\ & 13-2 \\ & 16.10 \end{aligned}$ |
| Hem-Fir (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8-5 \\ & 7-10 \\ & 6-0 \\ & 4-2 \end{aligned}$ | $\begin{aligned} & 7-8 \\ & 7-0 \\ & 5-2 \\ & 3.7 \end{aligned}$ | $\begin{aligned} & 6-8 \\ & 5-8 \\ & 4-3 \\ & 2-11 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-5 \\ & 8-5 \\ & 8-3 \\ & 7-0 \end{aligned}$ | $\begin{aligned} & 7-8 \\ & 7-8 \\ & 7-6 \\ & 6-1 \end{aligned}$ | $\begin{aligned} & 6.8 \\ & 6.8 \\ & 6.6 \\ & 5-0 \end{aligned}$ | $\begin{aligned} & 13-3 \\ & 13-3 \\ & 12-11 \\ & 10-8 \end{aligned}$ | $\begin{array}{r} 12-0 \\ 12-0 \\ 11-9 \\ 9.3 \end{array}$ | $\begin{aligned} & 10-6 \\ & 10-6 \\ & 9-10 \\ & 7-6 \end{aligned}$ | $\begin{aligned} & 17-5 \\ & 17.5 \\ & 17.0 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15.10 \\ & 15.6 \\ & 12.2 \end{aligned}$ | $\begin{aligned} & 13-10 \\ & 13-10 \\ & 12.11 \\ & 9.11 \end{aligned}$ | $\begin{aligned} & 22-3 \\ & 22-3 \\ & 21-9 \\ & 17-11 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 20-2 \\ & 19-9 \\ & 15-6 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 17-8 \\ & 16-6 \\ & 12-8 \end{aligned}$ |
| Ponderosa pine | Appearance Construction Standard Utility | $\begin{aligned} & 7-10 \\ & 7-4 \\ & 5-6 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 6-6 \\ & 4-10 \\ & 3-5 \end{aligned}$ | $\begin{aligned} & 6-2 \\ & 5-4 \\ & 3-11 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 7-10 \\ & 7-10 \\ & 7-7 \\ & 6-6 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 7-1 \\ & 6-11 \\ & 5-8 \end{aligned}$ | $\begin{aligned} & 6-2 \\ & 6-2 \\ & 6-0 \\ & 4-7 \end{aligned}$ | $\begin{gathered} 12-3 \\ 12-3 \\ 11.11 \\ 9.10 \end{gathered}$ | $\begin{gathered} 11-2 \\ 11-2 \\ 10-10 \\ 8-6 \end{gathered}$ | $\begin{aligned} & 9-9 \\ & 9-9 \\ & 9.1 \\ & 6.11 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 16-2 \\ & 15-9 \\ & 12-11 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14.8 \\ & 14.3 \\ & 11.3 \end{aligned}$ | $\begin{gathered} 12-10 \\ 12-10 \\ 11.11 \\ 9.2 \end{gathered}$ | $\begin{aligned} & 20-8 \\ & 20-8 \\ & 20-1 \\ & 16-6 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 18-3 \\ & 14-4 \end{aligned}$ | $\begin{aligned} & 16-5 \\ & 16-5 \\ & 15-3 \\ & 11-8 \end{aligned}$ |
| Red pine | Appearance Construction Standard Utility | $\begin{aligned} & 8-0 \\ & 7-4 \\ & 5-6 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 7-3 \\ & 6-5 \\ & 4-10 \\ & 3-6 \end{aligned}$ | $\begin{aligned} & 6.4 \\ & 5-3 \\ & 3-11 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-0 \\ & 8-0 \\ & 7-10 \\ & 6-8 \end{aligned}$ | $\begin{aligned} & 7.3 \\ & 7-3 \\ & 7.1 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 6-4 \\ & 6-4 \\ & 6-1 \\ & 4-7 \end{aligned}$ | $\begin{array}{r} 12.7 \\ 12.7 \\ 12.3 \\ 9.7 \end{array}$ | $\begin{gathered} 11.5 \\ 11-5 \\ 10-11 \\ 8-4 \end{gathered}$ | $\begin{gathered} 10-0 \\ 9-10 \\ 8.11 \\ 6-10 \end{gathered}$ | $\begin{aligned} & 16-7 \\ & 16.7 \\ & 16-2 \\ & 12.8 \end{aligned}$ | $\begin{aligned} & 15.1 \\ & 15-1 \\ & 14-5 \\ & 11.0 \end{aligned}$ | $\begin{gathered} 13-2 \\ 12.11 \\ 11.9 \\ 9.0 \end{gathered}$ | $\begin{aligned} & 21-2 \\ & 21.2 \\ & 20.8 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-5 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-6 \\ & 15-0 \\ & 11-6 \end{aligned}$ |
| Spruce-Pine-Fir | Appearance Construction Standard Utility | $\begin{aligned} & 8-5 \\ & 7-7 \\ & 5-8 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 7-8 \\ & 6.7 \\ & 4-11 \\ & 3.6 \end{aligned}$ | $\begin{aligned} & 6.8 \\ & 5-5 \\ & 4.0 \\ & 2.9 \end{aligned}$ | Select Structural No. $1 \&$ Appearance No. 2 No. 3 | $\begin{aligned} & 8-5 \\ & 8-5 \\ & 8-0 \\ & 6-8 \end{aligned}$ | $\begin{aligned} & 7.8 \\ & 7.8 \\ & 7.3 \\ & 6.9 \end{aligned}$ | $\begin{aligned} & 6-8 \\ & 6-8 \\ & 6-3 \\ & 4-8 \end{aligned}$ | $\begin{gathered} 13-3 \\ 13.3 \\ 12.7 \\ 9.10 \end{gathered}$ | $\begin{array}{r} 12-0 \\ 12-0 \\ 11-3 \\ 8-6 \end{array}$ | $\begin{gathered} 10.6 \\ 10.1 \\ 9.2 \\ 6.11 \end{gathered}$ | $\begin{aligned} & 17.5 \\ & 17-5 \\ & 16.7 \\ & 12.11 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15.10 \\ & 14-10 \\ & 11-3 \end{aligned}$ | $\begin{gathered} 13-10 \\ 13-3 \\ 12-1 \\ 9-2 \end{gathered}$ | $\begin{aligned} & 22.3 \\ & 22.3 \\ & 21.2 \\ & 16.6 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 20-2 \\ & 18.11 \\ & 14-4 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 16-11 \\ & 15-6 \\ & 11-8 \end{aligned}$ |
| Western cedars (North) | Appearance Construction Standard Utility | $\begin{aligned} & 7.7 \\ & 7-1 \\ & 5-8 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 6-11 \\ & 6-5 \\ & 4-11 \\ & 3-5 \end{aligned}$ | $\begin{aligned} & 6-0 \\ & 5-5 \\ & 4-0 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 7.7 \\ & 7.7 \\ & 7.4 \\ & 6.8 \end{aligned}$ | $\begin{aligned} & 6-11 \\ & 6-11 \\ & 6-8 \\ & 5-9 \end{aligned}$ | $\begin{aligned} & 6.0 \\ & 6.0 \\ & 5.10 \\ & 4.8 \end{aligned}$ | $\begin{aligned} & 11.11 \\ & 11-11 \\ & 11.7 \\ & \mathbf{1 0 . 1} \end{aligned}$ | $\begin{gathered} 10-10 \\ 10-10 \\ 10-6 \\ 6.8 \end{gathered}$ | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 9-2 \\ & 7-1 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 15-9 \\ & 15-3 \\ & 13-3 \end{aligned}$ | $\begin{aligned} & 14-3 \\ & 14-3 \\ & 13-10 \\ & 11-6 \end{aligned}$ | $\begin{array}{r} 12.6 \\ 12.6 \\ 12.1 \\ 9-4 \end{array}$ | $\begin{aligned} & 20-1 \\ & 20-1 \\ & 19-5 \\ & 16.11 \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 18-3 \\ & 17-8 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 15-11 \\ & 15-5 \\ & 11.11 \end{aligned}$ |
| Western white pine | Appearance Construction Standard Utility | $\begin{aligned} & 8-3 \\ & 7-3 \\ & 5-5 \\ & 3-8 \end{aligned}$ | $\begin{aligned} & 7-6 \\ & 6-3 \\ & 4-8 \\ & 3-2 \end{aligned}$ | $\begin{aligned} & 6-6 \\ & 5-2 \\ & 3-10 \\ & 2-7 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-3 \\ & 8-3 \\ & 8-0 \\ & 6-6 \end{aligned}$ | $\begin{aligned} & 7-6 \\ & 7.6 \\ & 7-3 \\ & 6-6 \end{aligned}$ | $\begin{aligned} & 6-6 \\ & 6-6 \\ & 6-0 \\ & 4-8 \end{aligned}$ | $\begin{gathered} 12.11 \\ 12.11 \\ 12.6 \\ 9.7 \end{gathered}$ | $\begin{gathered} 11-9 \\ 11.9 \\ 10.10 \\ 8.4 \end{gathered}$ | $\begin{gathered} 10-3 \\ 9.10 \\ 8-10 \\ 6.10 \end{gathered}$ | $\begin{aligned} & 17-0 \\ & 17.0 \\ & 16.6 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 15.6 \\ & 15.6 \\ & 14-3 \\ & 11-0 \end{aligned}$ | $\begin{gathered} 13-6 \\ 12-11 \\ 11-7 \\ 9-0 \end{gathered}$ | $\begin{aligned} & 21-9 \\ & 21-9 \\ & 21-0 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 19.9 \\ & 19.9 \\ & 18-2 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 16-6 \\ & 14-10 \\ & 11-6 \end{aligned}$ |

$\vec{\infty}$ Table 18. RAFTERS - Any Slope - With Drywall Ceiling - 20 psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 240$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 15-9 \\ & 14-5 \\ & 13-2 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 13-8 \\ 12-6 \\ 11-5 \\ 8.8 \end{array}$ | $\begin{array}{r} 11-2 \\ 10-2 \\ 9-4 \\ 7-1 \end{array}$ | $\begin{aligned} & 20-10 \\ & 19.0 \\ & 17.5 \\ & 13-2 \end{aligned}$ | $\begin{aligned} & 18-0 \\ & 16-5 \\ & 15-1 \\ & 11-5 \end{aligned}$ | $\begin{array}{r} 14-9 \\ 13-5 \\ 12-4 \\ 9-4 \end{array}$ | $\begin{aligned} & 26-6 \\ & 24-3 \\ & 22-2 \\ & 16-9 \end{aligned}$ | $\begin{aligned} & 23-0 \\ & 21-0 \\ & 19-3 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 17-2 \\ & 15-8 \\ & 11-10 \end{aligned}$ | $\begin{aligned} & 32-3 \\ & 29-6 \\ & 27-0 \\ & 20-5 \end{aligned}$ | $\begin{aligned} & 28-0 \\ & 25-6 \\ & 23-5 \\ & 17-8 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 20-10 \\ & 19-1 \\ & 14-5 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 16-1 \\ & 16-1 \\ & 15-6 \\ & 11-11 \end{aligned}$ | $\begin{aligned} & 14-7 \\ & 14-7 \\ & 13-5 \\ & 10-3 \end{aligned}$ | $\begin{array}{r} 12-9 \\ 12-0 \\ 11-0 \\ 8-5 \end{array}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 20-5 \\ & 15-8 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 17-8 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 15-10 \\ & 14-5 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-1 \\ & 26-1 \\ & 20-0 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24-7 \\ & 22-7 \\ & 17-4 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 20-3 \\ & 18-5 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 32-11 \\ & 32-11 \\ & 31-9 \\ & 24-4 \end{aligned}$ | $\begin{aligned} & 29-11 \\ & 29-11 \\ & 27-6 \\ & 21-1 \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 24-7 \\ & 22-5 \\ & 17-2 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 14-5 \\ & 14.5 \\ & 13.8 \\ & 10-11 \end{aligned}$ | $\begin{array}{r} 13-1 \\ 13-1 \\ 12-3 \\ 9-6 \\ \hline \end{array}$ | $\begin{array}{r} 11-5 \\ 11-2 \\ 10-0 \\ 7.9 \end{array}$ | $\begin{aligned} & 19-0 \\ & 19-0 \\ & 18-0 \\ & 14-5 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 17-3 \\ & 16-1 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 14-8 \\ & 13-2 \\ & 10-2 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 24-3 \\ & 22-11 \\ & 18-5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 22-1 \\ & 22-1 \\ & 20-6 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 18-9 \\ & 16-9 \\ & 13-0 \end{aligned}$ | $\begin{aligned} & 29-6 \\ & 29-6 \\ & 27-11 \\ & 22-4 \end{aligned}$ | $\begin{aligned} & 26-10 \\ & 26-10 \\ & 25-0 \\ & 19-4 \end{aligned}$ | $\begin{aligned} & 23-5 \\ & 22-9 \\ & 20-5 \\ & 15-10 \end{aligned}$ |
| Hem-Fir (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 15-2 \\ & 15-2 \\ & 13-9 \\ & 10-7 \end{aligned}$ | $\begin{gathered} 13-9 \\ 13-2 \\ 11-11 \\ 9-2 \\ \hline \end{gathered}$ | $\begin{array}{r} 11-8 \\ 10-9 \\ 9-9 \\ 7-6 \\ \hline \end{array}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 18-2 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 18-2 \\ & 17-5 \\ & 15-9 \\ & 12-1 \end{aligned}$ | $\begin{aligned} & 15-5 \\ & 14-2 \\ & 12-10 \\ & 9-11 \end{aligned}$ | $\begin{aligned} & 25-5 \\ & 25-5 \\ & 23-2 \\ & 17-10 \end{aligned}$ | $\begin{aligned} & 23-2 \\ & 22-2 \\ & 20-1 \\ & 15-5 \end{aligned}$ | $\begin{aligned} & 19-8 \\ & 18-1 \\ & 16-5 \\ & 12-7 \end{aligned}$ | $\begin{aligned} & 30-11 \\ & 30.11 \\ & 28.2 \\ & 21.8 \end{aligned}$ | $\begin{aligned} & 28-2 \\ & 27-0 \\ & 24-5 \\ & 18.9 \end{aligned}$ | $\begin{aligned} & 23-11 \\ & 22-0 \\ & 19-11 \\ & 15-4 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 14-1 \\ 14-1 \\ 12-8 \\ 9-9 \\ \hline \end{array}$ | $\begin{array}{r} 12-9 \\ 12-3 \\ 11-0 \\ 8-5 \\ \hline \end{array}$ | $\begin{gathered} 10-9 \\ 10-0 \\ 9-0 \\ 6.11 \\ \hline \end{gathered}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 16-9 \\ & 12-10 \\ & \hline \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-1 \\ & 14-5 \\ & 11-2 \\ & \hline \end{aligned}$ | $\begin{gathered} 14-2 \\ 13-2 \\ 11-10 \\ 9.1 \\ \hline \end{gathered}$ | $\begin{array}{r} 23-8 \\ 23-8 \\ 21-4 \\ -16-5 \\ \hline \end{array}$ | $\begin{aligned} & 21-6 \\ & 20-6 \\ & 18-6 \\ & 14-2 \\ & \hline \end{aligned}$ | $\begin{aligned} & 18-1 \\ & 16-9 \\ & 15-1 \\ & 11-7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 28.9 \\ & 28-9 \\ & 26-0 \\ & 19-11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 25-0 \\ & 22-6 \\ & 17-3 \\ & \hline \end{aligned}$ | $\begin{aligned} & 22-0 \\ & 20-5 \\ & 18-4 \\ & 14-1 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 14-5 \\ 13-9 \\ 12-6 \\ 9-6 \end{array}$ | $\begin{gathered} 12.11 \\ 11.11 \\ 10-10 \\ 8.3 \end{gathered}$ | $\begin{gathered} 10-7 \\ 9-9 \\ 8-10 \\ 6-9 \end{gathered}$ | $\begin{aligned} & 19-0 \\ & 18-2 \\ & 16-6 \\ & 12-7 \end{aligned}$ | $\begin{aligned} & 17-1 \\ & 15-9 \\ & 14-4 \\ & 10-11 \end{aligned}$ | $\begin{gathered} 13-11 \\ 12-10 \\ 11.8 \\ 8.11 \end{gathered}$ | $\begin{aligned} & 24-3 \\ & 23-2 \\ & 21-1 \\ & 16-0 \end{aligned}$ | $\begin{aligned} & 21-9 \\ & 20-1 \\ & 18-3 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 17.9 \\ & 16.5 \\ & 14-11 \\ & 11-4 \end{aligned}$ | $\begin{aligned} & 29-6 \\ & 28-2 \\ & 25-8 \\ & 19-6 \end{aligned}$ | $\begin{aligned} & 26-6 \\ & 24-5 \\ & 22-2 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 21-7 \\ & 19-11 \\ & 18-1 \\ & 13-9 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 15-2 \\ 14-1 \\ 12.10 \\ 9.9 \\ \hline \end{gathered}$ | $\begin{array}{r} 13-5 \\ 12-3 \\ 11-2 \\ 8-5 \\ \hline \end{array}$ | $\begin{gathered} 11-0 \\ 10-0 \\ 9-1 \\ 6-11 \\ \hline \end{gathered}$ | $\begin{aligned} & 19-11 \\ & 18-7 \\ & 17-0 \\ & 12.10 \\ & \hline \end{aligned}$ | $\begin{aligned} & 17.8 \\ & 16.1 \\ & 14.8 \\ & 11.2 \\ & \hline \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-2 \\ 12-0 \\ 9-1 \\ \hline \end{array}$ | $\begin{aligned} & 25-5 \\ & 23-9 \\ & 21-8 \\ & 15-5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 22-7 \\ & 20-6 \\ & 18-9 \\ & 14-2 \\ & \hline \end{aligned}$ | $\begin{aligned} & 18-5 \\ & 16-9 \\ & 15-4 \\ & 11-7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 30-11 \\ & 28-10 \\ & 26-4 \\ & 19.11 \end{aligned}$ | $\begin{aligned} & 27-6 \\ & 25-0 \\ & 22-10 \\ & 17-3 \end{aligned}$ | $\begin{aligned} & 22-5 \\ & 20-5 \\ & 18-7 \\ & 14-1 \end{aligned}$ |
| Western cedars (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 13-8 \\ & 13-8 \\ & 12-10 \\ & 10.0 \\ & \hline \end{aligned}$ | $\begin{array}{r} 12-5 \\ 12-5 \\ \mathbf{1 1 - 2} \\ \mathbf{8 - 8} \\ \hline \end{array}$ | $\begin{gathered} 10-10 \\ 10-2 \\ 9-1 \\ 7-1 \\ \hline \end{gathered}$ | $\begin{aligned} & 18-0 \\ & 18-0 \\ & 17-0 \\ & 13-2 \\ & \hline \end{aligned}$ | $\begin{aligned} & 16-4 \\ & 16.4 \\ & 14.8 \\ & 11.5 \\ & \hline \end{aligned}$ | $\begin{array}{r} 14-3 \\ 13-5 \\ 12.0 \\ 9-4 \\ \hline \end{array}$ | $\begin{aligned} & 22-11 \\ & 22-11 \\ & 21-8 \\ & 16-9 \\ & \hline \end{aligned}$ | $\begin{aligned} & 20-10 \\ & 20-10 \\ & 18-9 \\ & \mathbf{1 4 - 6} \\ & \hline \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 17-2 \\ & 15-4 \\ & 11-10 \\ & \hline \end{aligned}$ | $\begin{aligned} & 27-11 \\ & 27-11 \\ & \mathbf{2 6 - 4} \\ & \mathbf{2 0 - 6} \\ & \hline \end{aligned}$ | $\begin{aligned} & 25-4 \\ & 25-4 \\ & 22-10 \\ & 17-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 22-2 \\ & 20-10 \\ & 18-7 \\ & 14-5 \\ & \hline \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 14-8 \\ 13-9 \\ 12-4 \\ 9-6 \\ \hline \end{array}$ | $\begin{gathered} 12-9 \\ 11-11 \\ 10-8 \\ 8-3 \\ \hline \end{gathered}$ | $\begin{array}{r} 10-5 \\ 9.9 \\ 8.9 \\ 6.9 \\ \hline \end{array}$ | $\begin{aligned} & 19-5 \\ & 18-2 \\ & 16-3 \\ & 12-7 \end{aligned}$ | $\begin{aligned} & 16-9 \\ & 15-9 \\ & 14-1 \\ & 10-11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 13-8 \\ & 12-10 \\ & 11-6 \\ & 8-11 \end{aligned}$ | $\begin{aligned} & 24-9 \\ & 23-2 \\ & 20-9 \\ & 16-0 \\ & \hline \end{aligned}$ | $\begin{aligned} & 21-5 \\ & 20-1 \\ & 18-0 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 17-6 \\ & 16-5 \\ & 14-8 \\ & 11-4 \end{aligned}$ | $\begin{aligned} & 30-1 \\ & 28-2 \\ & 25-3 \\ & 19-6 \end{aligned}$ | $\begin{aligned} & 26-0 \\ & 24-5 \\ & 21-11 \\ & 16-11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 21-3 \\ & 19-11 \\ & 17-10 \\ & 13-9 \end{aligned}$ |

Table 19. RAFTERS - Any Slope - With Drywall Ceiling - $\mathbf{3 0}$ psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 240$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 13-9 \\ 12-8 \\ 11-8 \\ 8-10 \end{gathered}$ | $\begin{array}{r} 12-1 \\ 11-0 \\ 10-1 \\ 7-7 \end{array}$ | $\begin{aligned} & 9-10 \\ & 9-0 \\ & 8-3 \\ & 6-3 \end{aligned}$ | $\begin{aligned} & 18-2 \\ & 16-9 \\ & 15-4 \\ & 11-7 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 14-6 \\ & 13-4 \\ & 10-0 \end{aligned}$ | $\begin{aligned} & 13-0 \\ & 11-10 \\ & 10-10 \\ & 8-2 \end{aligned}$ | $\begin{aligned} & 23-2 \\ & 21-4 \\ & 19-7 \\ & 14-9 \end{aligned}$ | $\begin{aligned} & 20-3 \\ & 18-6 \\ & 17-0 \\ & 12.10 \end{aligned}$ | $\begin{aligned} & 16-7 \\ & 15.1 \\ & 13-10 \\ & 10-5 \end{aligned}$ | $\begin{aligned} & 28-2 \\ & 26-0 \\ & 23-10 \\ & 18-0 \end{aligned}$ | $\begin{aligned} & 24-8 \\ & 22-6 \\ & 20-8 \\ & 15-7 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 18-4 \\ & 16-10 \\ & 12-9 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 14-1 \\ & 14-1 \\ & 13-8 \\ & 10-6 \end{aligned}$ | $\begin{gathered} 12.9 \\ 12.9 \\ 11.10 \\ 9.1 \end{gathered}$ | $\begin{array}{r} 11.2 \\ 10.7 \\ 9.8 \\ 7.5 \end{array}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 18-0 \\ & 13-10 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 15-7 \\ & 12-0 \end{aligned}$ | $\begin{array}{r} 14-8 \\ 14-0 \\ 12-9 \\ 9-9 \end{array}$ | $\begin{aligned} & 23-8 \\ & 23-8 \\ & 23-0 \\ & 17-7 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 19-11 \\ & 15-3 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 17-10 \\ & 16-3 \\ & 12.6 \end{aligned}$ | $\begin{aligned} & 28-9 \\ & 28-9 \\ & 28-0 \\ & 21-5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 26.1 \\ & 24-3 \\ & 18-7 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 21.8 \\ & 19-9 \\ & 15-2 \\ & \hline \end{aligned}$ |
| Eastern hemlock <br> -Tamarack <br> (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12.7 \\ 12.7 \\ 11.11 \\ 9.8 \end{gathered}$ | $\begin{array}{r} 11-5 \\ 11.5 \\ 10-9 \\ 8.4 \end{array}$ | $\begin{gathered} 10-0 \\ 9.10 \\ 8-10 \\ 8-10 \end{gathered}$ | $\begin{aligned} & 16-7 \\ & 16-7 \\ & 15-9 \\ & 12-9 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15-1 \\ & 14-2 \\ & 11-0 \end{aligned}$ | $\begin{gathered} 13-2 \\ 12.11 \\ 11-7 \\ 9.0 \end{gathered}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 20-1 \\ & 16-3 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-1 \\ & 14-1 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16.6 \\ & 14.9 \\ & 11.6 \\ & \hline \end{aligned}$ | $\begin{array}{r} 25-9 \\ 25-9 \\ 24-5 \\ 19-9 \\ \hline \end{array}$ | $\begin{aligned} & 23-5 \\ & 23-5 \\ & 22-0 \\ & 17-1 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-1 \\ & 18-0 \\ & 13-11 \\ & \hline \end{aligned}$ |
| Hem-Fir (North) | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 13-3 \\ 13-3 \\ 12-2 \\ 9-4 \end{array}$ | $\begin{array}{r} 12-0 \\ 11-8 \\ 10-6 \\ 8-1 \end{array}$ | $\begin{array}{r} 10-4 \\ 9.6 \\ 8.7 \\ 6.7 \end{array}$ | $\begin{aligned} & 17-5 \\ & 17.5 \\ & 16-0 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-4 \\ & 13-11 \\ & 10-8 \end{aligned}$ | $\begin{array}{r} 13.7 \\ 12-6 \\ 11-4 \\ 8-9 \end{array}$ | $\begin{aligned} & 22-3 \\ & 22-3 \\ & 20-5 \\ & 15-9 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 19-7 \\ & 17-9 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 17-4 \\ & 16-0 \\ & 14-6 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-1 \\ & 24-10 \\ & 19-1 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 23-9 \\ & 21-7 \\ & 16.7 \end{aligned}$ | $\begin{aligned} & 21-1 \\ & 19-5 \\ & 17.7 \\ & 13-6 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-3 \\ 12-3 \\ 11-2 \\ 8-7 \end{array}$ | $\begin{array}{r} 11.2 \\ 10-9 \\ 9-8 \\ 7.5 \end{array}$ | $\begin{aligned} & 9-6 \\ & 8-10 \\ & 7-11 \\ & 6-1 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 16-2 \\ & 14-9 \\ & 11-4 \end{aligned}$ | $\begin{gathered} 14-8 \\ 14-2 \\ 12-9 \\ 9-10 \end{gathered}$ | $\begin{array}{r} 12-6 \\ 11-7 \\ 10-5 \\ 8-0 \end{array}$ | $\begin{aligned} & 20-8 \\ & 20-8 \\ & 18-10 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-1 \\ & 16-4 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 16.0 \\ & 14.9 \\ & 13-4 \\ & 10.3 \end{aligned}$ | $\begin{aligned} & 25.1 \\ & 25.1 \\ & 22.11 \\ & 17.7 \end{aligned}$ | $\begin{aligned} & 22.10 \\ & 22.0 \\ & 19-10 \\ & 15-3 \end{aligned}$ | $\begin{aligned} & 19-5 \\ & 18-0 \\ & 18-2 \\ & 12.5 \\ & \hline \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-7 \\ 12-2 \\ 11-1 \\ 8-5 \end{array}$ | $\begin{array}{r} 11-5 \\ 10.6 \\ 9-7 \\ 7.3 \end{array}$ | $\begin{aligned} & 9-4 \\ & 8-7 \\ & 7-10 \\ & 5-11 \end{aligned}$ | $\begin{aligned} & 16-7 \\ & 16-0 \\ & 14-7 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 13.11 \\ & 12.7 \\ & 9.7 \end{aligned}$ | $\begin{gathered} 12-3 \\ 11-4 \\ 10-4 \\ 7-10 \end{gathered}$ | $\begin{aligned} & 21-2 \\ & 20-6 \\ & 18-7 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 19-2 \\ & 17-9 \\ & 16-1 \\ & 12-3 \end{aligned}$ | $\begin{aligned} & 15-8 \\ & 14-6 \\ & 13-2 \\ & 10-0 \end{aligned}$ | $\begin{aligned} & 25.9 \\ & 24-10 \\ & 22-7 \\ & 17.2 \end{aligned}$ | $\begin{aligned} & 23-4 \\ & 21-7 \\ & 19-7 \\ & 14-11 \end{aligned}$ | $\begin{aligned} & 19-1 \\ & 17-7 \\ & 16-0 \\ & 12-2 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 13.3 \\ 12-5 \\ 11-4 \\ 8.7 \end{array}$ | $\begin{gathered} 11-10 \\ 10.9 \\ 9-10 \\ 7-5 \end{gathered}$ | $\begin{aligned} & 9-8 \\ & 8-10 \\ & 8-0 \\ & 8-1 \end{aligned}$ | $\begin{aligned} & 17.5 \\ & 16-5 \\ & 15-0 \\ & 11-4 \end{aligned}$ | $\begin{aligned} & 15-7 \\ & 14-2 \\ & 12-11 \\ & 9-10 \end{aligned}$ | $\begin{array}{r} 12.9 \\ 11.7 \\ 10.7 \\ 8-0 \end{array}$ | $\begin{aligned} & 22-3 \\ & 20-11 \\ & 19-1 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 18-1 \\ & 16-6 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 16.3 \\ & 14.9 \\ & 13.6 \\ & 10.3 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 25-5 \\ & 23-3 \\ & 17-7 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 22-0 \\ & 20-1 \\ & 15-3 \end{aligned}$ | $\begin{aligned} & 19-9 \\ & 18-0 \\ & 16-5 \\ & 12-6 \end{aligned}$ |
| Western cedars (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 11-11 \\ 11-11 \\ 11-4 \\ 8-10 \end{gathered}$ | $\begin{array}{r} 10.10 \\ 10.10 \\ 9.10 \\ 7.7 \end{array}$ | $\begin{aligned} & 9.6 \\ & 9.0 \\ & 8-0 \\ & 6.3 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 15-9 \\ & 15-0 \\ & 11-7 \end{aligned}$ | $\begin{aligned} & 14-3 \\ & 14-3 \\ & 12-11 \\ & 10-0 \end{aligned}$ | $\begin{gathered} 12-6 \\ 11-10 \\ 10.7 \\ 8-2 \end{gathered}$ | $\begin{aligned} & 20-1 \\ & 20-1 \\ & 19-1 \\ & 14-9 \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 18-3 \\ & 18-8 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 15-1 \\ & 13-6 \\ & 10-5 \end{aligned}$ | $\begin{aligned} & 24.5 \\ & 24-5 \\ & 23-3 \\ & 18-0 \end{aligned}$ | $\begin{aligned} & 22-2 \\ & 22-2 \\ & 20-1 \\ & 16-7 \end{aligned}$ | $\begin{aligned} & 19-4 \\ & 18-4 \\ & 16-5 \\ & 12-9 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12-11 \\ & 12-2 \\ & 10-11 \\ & 8-5 \end{aligned}$ | $\begin{array}{r} 11-3 \\ 10.6 \\ 9.6 \\ 7-3 \end{array}$ | $\begin{aligned} & 9-2 \\ & 8-7 \\ & 7-8 \\ & 5-11 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 16-0 \\ & 14-4 \\ & 11-1 \end{aligned}$ | $\begin{gathered} 14-10 \\ 13-11 \\ 12-5 \\ 9.7 \end{gathered}$ | $\begin{gathered} 12-1 \\ 11-4 \\ 10-2 \\ 7-10 \end{gathered}$ | $\begin{aligned} & 21-9 \\ & 20.5 \\ & 18-4 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 18-11 \\ & 17.9 \\ & 15-10 \\ & 12.3 \end{aligned}$ | $\begin{aligned} & 15.5 \\ & 14.6 \\ & 13.0 \\ & 10.0 \end{aligned}$ | $\begin{aligned} & 26-5 \\ & 24-10 \\ & 22-3 \\ & 17-2 \end{aligned}$ | $\begin{aligned} & 23-0 \\ & 21-7 \\ & 19-4 \\ & 14-11 \end{aligned}$ | $\begin{aligned} & 18.9 \\ & 17.7 \\ & 15.9 \\ & 12.2 \end{aligned}$ |

O Table 20. RAFTERS - Any Slope - With Drywall Ceiling - 40 psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 240$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span ( ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12.6 \\ 11-6 \\ 10.6 \\ 7.11 \end{gathered}$ | $\begin{gathered} 10-11 \\ 9-11 \\ 9-1 \\ 6.11 \end{gathered}$ | $\begin{aligned} & 8-11 \\ & 8-1 \\ & 7-5 \\ & 5.7 \end{aligned}$ | $\begin{aligned} & 16-6 \\ & 15-2 \\ & 13-11 \\ & 10-6 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-1 \\ 12.0 \\ 9-1 \end{array}$ | $\begin{gathered} 11.9 \\ 10-9 \\ 9.10 \\ 7.5 \end{gathered}$ | $\begin{aligned} & 21-1 \\ & 19-4 \\ & 17-9 \\ & 13-5 \end{aligned}$ | $\begin{aligned} & 18-4 \\ & 16-9 \\ & 15-4 \\ & 11-7 \end{aligned}$ | $\begin{array}{r} 15-0 \\ 13-8 \\ 12-6 \\ 9-5 \end{array}$ | $\begin{aligned} & 25-7 \\ & 23-6 \\ & 21-7 \\ & 16-3 \end{aligned}$ | $\begin{aligned} & 22-4 \\ & 20-4 \\ & 18-8 \\ & 14-1 \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 16-7 \\ & 15-3 \\ & 11-6 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-9 \\ 12-9 \\ 12-4 \\ 9-6 \end{array}$ | $\begin{array}{r} 11.7 \\ 11.7 \\ 10.9 \\ 8.3 \end{array}$ | $\begin{array}{r} 10-2 \\ 9.7 \\ 8.9 \\ 6-8 \end{array}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 16.4 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14-1 \\ & 10-10 \end{aligned}$ | $\begin{gathered} 13-4 \\ 12-8 \\ 11-6 \\ 8-10 \end{gathered}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 20-10 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 19-6 \\ & 19-6 \\ & 18-0 \\ & 13.10 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 16-2 \\ & 14-9 \\ & 11-3 \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 26-1 \\ & 25-4 \\ & 19-5 \end{aligned}$ | $\begin{aligned} & 23-9 \\ & 23-9 \\ & 21-11 \\ & 16-9 \end{aligned}$ | $\begin{aligned} & 20-9 \\ & 19.8 \\ & 17-11 \\ & 13.9 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 11.5 \\ 11.5 \\ 10-10 \\ 8.9 \end{gathered}$ | $\begin{array}{r} 10-5 \\ 10-5 \\ 9.9 \\ 7.7 \end{array}$ | $\begin{aligned} & 9-1 \\ & 8-11 \\ & 7-11 \\ & 6-2 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15.1 \\ & 14-3 \\ & 11-6 \end{aligned}$ | $\begin{gathered} 13.9 \\ 13-9 \\ 12-10 \\ 9.11 \end{gathered}$ | $\begin{array}{r} 12-0 \\ 11-8 \\ 10-6 \\ 8-2 \end{array}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-3 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 17-6 \\ & 17-6 \\ & 16-5 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 14-11 \\ & 13-5 \\ & 10-4 \end{aligned}$ | $\begin{aligned} & 23.5 \\ & 23-5 \\ & 22-2 \\ & 17-10 \end{aligned}$ | $\begin{aligned} & 21-3 \\ & 21-3 \\ & 19-11 \\ & 15-5 \end{aligned}$ | $\begin{aligned} & 18-7 \\ & 18-2 \\ & 16-3 \\ & 12-7 \end{aligned}$ |
| Hem-Fir (North) | Select Structurai <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-0 \\ 12.0 \\ 11.0 \\ 8.5 \end{array}$ | $\begin{gathered} 10.11 \\ 10.6 \\ 9.6 \\ 7.4 \end{gathered}$ | $\begin{aligned} & 9-4 \\ & 8.7 \\ & 7.9 \\ & 6-0 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-10 \\ & 14-8 \\ & 11-2 \end{aligned}$ | $\begin{aligned} & 14.5 \\ & 13-10 \\ & 12.7 \\ & 9.8 \end{aligned}$ | $\begin{gathered} 12.4 \\ 11.4 \\ 10.3 \\ 7-11 \end{gathered}$ | $\begin{aligned} & 20-2 \\ & 20-2 \\ & 18-6 \\ & 14-3 \end{aligned}$ | $\begin{aligned} & 18-4 \\ & 17-8 \\ & 16.0 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 15-8 \\ & 14-5 \\ & 13-1 \\ & 10-1 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24-7 \\ & 22-6 \\ & 17-4 \end{aligned}$ | $\begin{aligned} & 22.4 \\ & 21-6 \\ & 19.6 \\ & 15-0 \end{aligned}$ | $\begin{aligned} & 19-1 \\ & 17-7 \\ & 15.11 \\ & 12.3 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-2 \\ 11.2 \\ 10-2 \\ 7.9 \end{array}$ | $\begin{array}{r} 10-2 \\ 9-9 \\ 8.9 \\ 6-9 \end{array}$ | $\begin{aligned} & 8.7 \\ & 7-11 \\ & 7.2 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 13.4 \\ & 10.3 \end{aligned}$ | $\begin{gathered} 13.4 \\ 12-10 \\ 11.7 \\ 8.11 \end{gathered}$ | $\begin{array}{r} 11.4 \\ 10.8 \\ 9.5 \\ 7-3 \end{array}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 17-0 \\ & 13-1 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 16-5 \\ & 14-9 \\ & 11-4 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-5 \\ 12.1 \\ 9-3 \end{array}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 20-9 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 20-9 \\ & 19-11 \\ & 17-11 \\ & 13-9 \end{aligned}$ | $\begin{aligned} & 17-7 \\ & 16-3 \\ & 14-8 \\ & 11-3 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11.5 \\ 11.0 \\ 10.0 \\ 7.7 \end{array}$ | $\begin{array}{r} 10.4 \\ 9.6 \\ 8.8 \\ 6.7 \end{array}$ | $\begin{aligned} & 8-5 \\ & 7.9 \\ & 7-1 \\ & 5-4 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 14-6 \\ & 13-2 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 13-7 \\ 12-7 \\ 11-5 \\ 8-8 \end{array}$ | $\begin{array}{r} 11-1 \\ 10-3 \\ 9-4 \\ 7-1 \end{array}$ | $\begin{aligned} & 19.3 \\ & 18-6 \\ & 16.10 \\ & 12.9 \end{aligned}$ | $\begin{aligned} & 17.4 \\ & 16.0 \\ & 14-7 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 14.2 \\ & 13-1 \\ & 11-11 \\ & 9-0 \end{aligned}$ | $\begin{aligned} & 23-5 \\ & 22.6 \\ & 20.5 \\ & 15.7 \end{aligned}$ | $\begin{aligned} & 21-1 \\ & 19-6 \\ & 17-8 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 17.3 \\ & 15.11 \\ & 14-5 \\ & 11-0 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12.0 \\ 11.3 \\ 10.3 \\ 7.9 \end{array}$ | $\begin{gathered} 10.9 \\ 9.9 \\ 8-11 \\ 6-9 \end{gathered}$ | $\begin{aligned} & 8-9 \\ & 7-11 \\ & 7-3 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 14-10 \\ & 13-8 \\ & 10-3 \end{aligned}$ | $\begin{aligned} & 14-1 \\ & 12-10 \\ & 11-9 \\ & 8-11 \end{aligned}$ | $\begin{array}{r} 11-6 \\ 10.6 \\ 9.7 \\ 7.3 \end{array}$ | $\begin{aligned} & 20-2 \\ & 18-11 \\ & 17-3 \\ & 13-1 \end{aligned}$ | $\begin{aligned} & 18-0 \\ & 16-5 \\ & 14-11 \\ & 11.4 \end{aligned}$ | $\begin{array}{r} 14-9 \\ 13-5 \\ 12-3 \\ 9.3 \end{array}$ | $\begin{aligned} & 24-7 \\ & 23.0 \\ & 21-0 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 21-11 \\ & 19-11 \\ & 18-2 \\ & 13.9 \end{aligned}$ | $\begin{aligned} & 17-11 \\ & 16-3 \\ & 14-10 \\ & 11-3 \end{aligned}$ |
| Western cedars <br> (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10.10 \\ 10-10 \\ \mathbf{1 0 - 3} \\ \mathbf{7 - 1 1} \end{gathered}$ | $\begin{aligned} & 9-10 \\ & 9-10 \\ & 8-11 \\ & 6-11 \end{aligned}$ | $\begin{aligned} & 8.7 \\ & 8.1 \\ & 7.3 \\ & 5-7 \end{aligned}$ | $\begin{aligned} & 14-3 \\ & 14-3 \\ & 13-6 \\ & 10-6 \end{aligned}$ | $\begin{array}{r} 13-0 \\ 13-0 \\ 11-9 \\ 9-1 \end{array}$ | $\begin{array}{r} 11.4 \\ 10.9 \\ 9.7 \\ 7.5 \end{array}$ | $\begin{aligned} & 18-3 \\ & 18-3 \\ & 17-3 \\ & 13-5 \end{aligned}$ | $\begin{aligned} & 16.7 \\ & 16.7 \\ & 14.11 \\ & 11.7 \end{aligned}$ | $\begin{array}{r} 14-6 \\ 13-8 \\ 12.3 \\ 9.5 \end{array}$ | $\begin{aligned} & 22-2 \\ & 22-2 \\ & 21-0 \\ & 16-3 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 20-2 \\ & 18-2 \\ & 14-1 \end{aligned}$ | $\begin{aligned} & 17-7 \\ & 16-7 \\ & 14-10 \\ & 11-6 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 11-9 \\ 11-0 \\ 9-10 \\ 7-7 \end{gathered}$ | $\begin{array}{r} 10-2 \\ 9.6 \\ 8.6 \\ 6.7 \end{array}$ | $\begin{aligned} & 8.4 \\ & 7.9 \\ & 7.0 \\ & 5.4 \end{aligned}$ | $\begin{aligned} & 15-5 \\ & 14-6 \\ & 13-0 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 13-5 \\ 12-7 \\ 11.3 \\ 8-8 \end{array}$ | $\begin{gathered} 10-11 \\ 10-3 \\ 9-2 \\ 7-1 \end{gathered}$ | 19-9 $18 \cdot 6$ 16.7 12 -9 | $17-1$ <br> 16-0 <br> 14.4 <br> 11-1 | 13-11 <br> 13-1 <br> 11-9 <br> 9-0 | $\begin{aligned} & 24-0 \\ & 22-6 \\ & 20-2 \\ & 15-7 \end{aligned}$ | $\begin{aligned} & 20-9 \\ & 19-6 \\ & 17-6 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 15-11 \\ & 14-3 \\ & 11-0 \end{aligned}$ |

Table 21. RAFTERS - Any Slope - With Plaster Ceiling - $\mathbf{2 0}$ psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 360$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 13-9 \\ & 13-9 \\ & 13-2 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 12.6 \\ 12-6 \\ 11.5 \\ 8.8 \end{array}$ | $\begin{gathered} 10-11 \\ 10-2 \\ 9-4 \\ 7-1 \end{gathered}$ | $\begin{aligned} & 18-2 \\ & 18-2 \\ & 17-5 \\ & 13-2 \end{aligned}$ | $\begin{aligned} & 16-6 \\ & 16-5 \\ & 15-1 \\ & 11-2 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-5 \\ 12-4 \\ 9-4 \end{array}$ | $\begin{aligned} & 23-2 \\ & 23-2 \\ & 22-2 \\ & 16-9 \end{aligned}$ | $\begin{aligned} & 21-1 \\ & 21-0 \\ & 19-3 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 18.5 \\ & 17.2 \\ & 16-8 \\ & 11-10 \end{aligned}$ | $\begin{aligned} & 28-2 \\ & 28-2 \\ & 27-0 \\ & 20-6 \end{aligned}$ | $\begin{aligned} & 25.7 \\ & 25-6 \\ & 23.5 \\ & 17-8 \end{aligned}$ | $\begin{aligned} & 22.5 \\ & 20-10 \\ & 19-1 \\ & 14-5 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 14-1 \\ & 14-1 \\ & 13-9 \\ & 19-11 \end{aligned}$ | $\begin{aligned} & 12.9 \\ & 12-9 \\ & 12-6 \\ & 10-3 \end{aligned}$ | $\begin{gathered} 11-2 \\ 11-2 \\ 10-11 \\ 8-5 \end{gathered}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 18-2 \\ & 16-8 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 16-6 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 14-5 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 23-8 \\ & 23-8 \\ & 23-2 \\ & 20-0 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 21-1 \\ & 17-4 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 18-5 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 28-9 \\ & 28-9 \\ & 28-2 \\ & 24-4 \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 26-1 \\ & 25.7 \\ & 21-1 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 22-5 \\ & 17-2 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12.7 \\ & 12.7 \\ & 11.11 \\ & 10.11 \end{aligned}$ | $\begin{gathered} 11-5 \\ 11-5 \\ 10-10 \\ 9-6 \end{gathered}$ | $\begin{array}{r} 10-0 \\ 10-0 \\ 9-6 \\ 7-9 \end{array}$ | $\begin{aligned} & 16-7 \\ & 16-7 \\ & 15-9 \\ & 14-5 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15-1 \\ & 14-3 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 13-2 \\ & 13-2 \\ & 12-6 \\ & 10-2 \end{aligned}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 20-1 \\ & 18-5 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-3 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 15-11 \\ & 13-0 \end{aligned}$ | $\begin{aligned} & 25-9 \\ & 25-9 \\ & 24-5 \\ & 22-4 \end{aligned}$ | $\begin{aligned} & 23-5 \\ & 23-5 \\ & 22-2 \\ & 19-4 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-4 \\ & 15-10 \\ & \hline \end{aligned}$ |
| Hem-Fir (North) | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 13-3 \\ & 13-3 \\ & 12-11 \\ & 10-7 \end{aligned}$ | $\begin{array}{r} 12-0 \\ 12-0 \\ 11-9 \\ 9-2 \end{array}$ | $\begin{array}{r} 10-6 \\ 10.6 \\ 9.9 \\ 7.6 \end{array}$ | $\begin{aligned} & 17-5 \\ & 17-5 \\ & 17-0 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-10 \\ & 15-6 \\ & 12-1 \end{aligned}$ | $\begin{array}{r} 13-10 \\ 13-10 \\ 12-10 \\ 9-11 \end{array}$ | $\begin{aligned} & 22-3 \\ & 22-3 \\ & 21-9 \\ & 17-10 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 20-2 \\ & 19-9 \\ & 15-5 \end{aligned}$ | $\begin{aligned} & 17-5 \\ & 17-8 \\ & 18-5 \\ & 12-7 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-1 \\ & 26-5 \\ & 21-8 \end{aligned}$ | $\begin{aligned} & 24.7 \\ & 24.7 \\ & 24-0 \\ & 18-9 \end{aligned}$ | $\begin{aligned} & 21.6 \\ & 21.6 \\ & 19.11 \\ & 16-4 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12-3 \\ 12-3 \\ 11-11 \\ 9.9 \end{gathered}$ | $\begin{gathered} 11-2 \\ 11.2 \\ 10-10 \\ 8.5 \end{gathered}$ | $\begin{aligned} & 9-9 \\ & 9-9 \\ & 9-0 \\ & 6-11 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 16-2 \\ & 15-9 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 14-3 \\ & 11-2 \end{aligned}$ | $\begin{gathered} 12-10 \\ 12-10 \\ 11-10 \\ 9-1 \end{gathered}$ | $\begin{aligned} & 20-8 \\ & 20-8 \\ & 20-1 \\ & 16-5 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 18-3 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 16-5 \\ & 16-5 \\ & 15-1 \\ & 11-7 \end{aligned}$ | $\begin{aligned} & 25.1 \\ & 25-1 \\ & 24.5 \\ & 19.11 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 22-2 \\ & 17-3 \\ & \hline \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 18-4 \\ & 14-1 \end{aligned}$ |
| Red pine | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-7 \\ 12.7 \\ 12-3 \\ 9-6 \end{array}$ | $\begin{aligned} & 11-5 \\ & 11.5 \\ & 10-10 \\ & 8.3 \end{aligned}$ | $\begin{gathered} 10-0 \\ 9-9 \\ 8-10 \\ 6-9 \end{gathered}$ | $\begin{aligned} & 16-7 \\ & 16-7 \\ & 16-2 \\ & \mathbf{1 2 - 7} \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15-1 \\ & 14-4 \\ & 10-11 \end{aligned}$ | $\begin{gathered} 13-2 \\ 12-10 \\ 11-8 \\ 8-11 \end{gathered}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 20-8 \\ & 16-0 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-3 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16.6 \\ & 14.11 \\ & 11.4 \end{aligned}$ | $\begin{aligned} & 25-9 \\ & 25-9 \\ & 25-1 \\ & 19-6 \end{aligned}$ | $\begin{aligned} & 23-5 \\ & 23-5 \\ & 22-2 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 19-11 \\ & 18-1 \\ & 13-9 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 13-3 \\ 13-3 \\ 12.7 \\ 9.9 \end{array}$ | $\begin{array}{r} 12.0 \\ 12.0 \\ 11-2 \\ 8.5 \end{array}$ | $\begin{gathered} \hline 10-6 \\ 10-0 \\ 9-1 \\ 6-11 \end{gathered}$ | $\begin{aligned} & 17.5 \\ & 17-5 \\ & 16-7 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-10 \\ & 14-8 \\ & 11-2 \end{aligned}$ | $\begin{gathered} 13-10 \\ 13-2 \\ 12-0 \\ 9-1 \end{gathered}$ | $\begin{aligned} & 22-3 \\ & 22-3 \\ & 21-2 \\ & 16-5 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 20-2 \\ & 18-9 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 16-9 \\ & 15-4 \\ & 11-7 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27.1 \\ & 25-9 \\ & 19.11 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24-7 \\ & 22-10 \\ & 17-3 \\ & \hline \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 20-5 \\ & 18-7 \\ & 14-1 \\ & \hline \end{aligned}$ |
| Western cedars (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 |  | $\begin{gathered} 10-10 \\ 10-10 \\ 10-6 \\ 8-8 \end{gathered}$ | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 9-1 \\ & 7-1 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 15-9 \\ & 15-3 \\ & 13-2 \end{aligned}$ | $\begin{aligned} & 14-3 \\ & 14-3 \\ & 13-10 \\ & 11-5 \end{aligned}$ | $\begin{array}{r} 12.6 \\ 12.6 \\ 12.0 \\ 9.4 \end{array}$ | $\begin{aligned} & 20.1 \\ & 20-1 \\ & 19.5 \\ & 18.9 \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 18-3 \\ & 17-8 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 15-11 \\ & 15-4 \\ & 11-10 \end{aligned}$ | $\begin{aligned} & 24-5 \\ & 24-5 \\ & 23-7 \\ & 20-5 \end{aligned}$ | $\begin{aligned} & 22-2 \\ & 22-2 \\ & 21-6 \\ & 17-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 19-4 \\ & 19-4 \\ & 18-7 \\ & 14-5 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12-11 \\ 12-11 \\ 12-4 \\ 9-6 \end{gathered}$ | $\begin{array}{r} 11.9 \\ 11.9 \\ 10.8 \end{array}$ | $\begin{array}{r} 10.3 \\ 9.9 \\ 8-9 \\ 6-9 \end{array}$ | $\begin{aligned} & 17-0 \\ & 17-0 \\ & 18-3 \\ & 12-7 \end{aligned}$ | $\begin{aligned} & 15.6 \\ & 15.6 \\ & 14.1 \\ & 10-11 \end{aligned}$ | $\begin{aligned} & 13-6 \\ & 12.10 \\ & 11-8 \\ & 8.11 \end{aligned}$ | $\begin{aligned} & 21 \\ & 21-9 \\ & 21 \\ & 20-9 \\ & 10-9 \\ & \hline \end{aligned}$ | $\begin{aligned} & 19-9 \\ & 19-9 \\ & 18-0 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 18-5 \\ & 14-8 \\ & 11-4 \end{aligned}$ | $\begin{aligned} & 26-5 \\ & 26-5 \\ & 25-3 \\ & 19-6 \end{aligned}$ | $\begin{aligned} & 24-0 \\ & 24-0 \\ & 21-11 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 21-0 \\ & 19-11 \\ & 17-10 \\ & 13-9 \end{aligned}$ |

N Table 22. RAFTERS - Any Slope - With Plaster Ceiling - 30 psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 360$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span ( ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12.0 \\ 12-0 \\ 11.7 \\ 8.10 \end{gathered}$ | $\begin{gathered} 10-11 \\ 10.11 \\ \mathbf{1 0 - 1} \\ \mathbf{7 . 7} \end{gathered}$ | $\begin{aligned} & 9-7 \\ & 9-0 \\ & 8-3 \\ & 6-3 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-10 \\ & 15-3 \\ & 11-7 \end{aligned}$ | $\begin{aligned} & 14-5 \\ & 14-5 \\ & 13-4 \\ & 10-0 \end{aligned}$ | $\begin{aligned} & 12.7 \\ & 11-10 \\ & 10-10 \\ & 8-2 \end{aligned}$ | $\begin{aligned} & 20-3 \\ & 20-3 \\ & 19-5 \\ & 14-9 \end{aligned}$ | $\begin{aligned} & 18-5 \\ & 18-5 \\ & 17-0 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 16-1 \\ & 16-1 \\ & 13-10 \\ & 10-5 \end{aligned}$ | $\begin{aligned} & 24-8 \\ & 24-8 \\ & 23-7 \\ & 18-0 \end{aligned}$ | $\begin{aligned} & 22-5 \\ & 22-5 \\ & 20-8 \\ & 15-7 \end{aligned}$ | $\begin{aligned} & 19-7 \\ & 18-4 \\ & 16-10 \\ & 12-9 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12-3 \\ & 12-3 \\ & 12-0 \\ & 10-8 \end{aligned}$ | $\begin{gathered} 11-2 \\ 11-2 \\ 10.11 \\ 9.1 \end{gathered}$ | $\begin{aligned} & 9-9 \\ & 9-9 \\ & 9-7 \\ & 7-5 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 16-2 \\ & 15-10 \\ & 13-10 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 14.5 \\ & \mathbf{1 2 - 0} \end{aligned}$ | $\begin{gathered} 12-10 \\ 12-10 \\ 12.7 \\ 9-9 \\ \hline \end{gathered}$ | $\begin{aligned} & 20-8 \\ & 20.8 \\ & 20-3 \\ & 17.7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 18.9 \\ & 18.9 \\ & 18-5 \\ & 16-3 \\ & \hline \end{aligned}$ | $\begin{aligned} & 16.5 \\ & 16.5 \\ & 16.1 \\ & 12.6 \end{aligned}$ | $\begin{aligned} & 25 \cdot 1 \\ & 25-1 \\ & 24-8 \\ & 27-5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 22.10 \\ & 22.10 \\ & 22.5 \\ & 18.7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 19.11 \\ & 19.11 \\ & 19.7 \\ & 15-2 \\ & \hline \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-0 \\ 11-0 \\ 10-5 \\ 9-8 \end{array}$ | $\begin{array}{r} 10-0 \\ 10-0 \\ 9-6 \\ 8-4 \end{array}$ | $\begin{aligned} & 8-9 \\ & 8-9 \\ & 8-3 \\ & 6-10 \end{aligned}$ | $\begin{aligned} & 14-6 \\ & 14-6 \\ & 13-9 \\ & \mathbf{1 2 - 9} \end{aligned}$ | $\begin{aligned} & 13-2 \\ & 13-2 \\ & 12-6 \\ & 11-0 \end{aligned}$ | $\begin{aligned} & 11.6 \\ & 11.6 \\ & 10.11 \\ & 9.0 \end{aligned}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 17-6 \\ & 16-3 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16-10 \\ & 15-11 \\ & 14.1 \end{aligned}$ | $\begin{aligned} & 14.8 \\ & 14.8 \\ & 13.11 \\ & 11.6 \end{aligned}$ | $\begin{aligned} & 22-6 \\ & 22-6 \\ & 21-4 \\ & 19-9 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-4 \\ & 17-1 \end{aligned}$ | $\begin{aligned} & 17-11 \\ & 17-11 \\ & 16.11 \\ & 13-11 \end{aligned}$ |
| Hem-Fir (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11.7 \\ 11-7 \\ 11-3 \\ 9-4 \end{array}$ | $\begin{array}{r} 10-6 \\ 10-6 \\ 10-3 \\ 8-1 \end{array}$ | $\begin{aligned} & 9-2 \\ & 9-2 \\ & 8-7 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14-11 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 13.10 \\ & 13.10 \\ & 13-6 \\ & 10.8 \end{aligned}$ | $\begin{array}{r} 12-1 \\ 12-1 \\ 11-4 \\ 8-9 \end{array}$ | $\begin{aligned} & 19-5 \\ & 19-5 \\ & 19-0 \\ & 15-9 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 17-8 \\ & 17-3 \\ & \mathbf{1 3 - 7} \end{aligned}$ | $\begin{aligned} & 15-5 \\ & 15-5 \\ & 14-6 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 23-7 \\ & 23-7 \\ & 23-1 \\ & 19-1 \end{aligned}$ | $\begin{aligned} & 21 \\ & 21-6 \\ & 2 \\ & 2 \\ & 2 \end{aligned} 1-0$ | $\begin{aligned} & 18-9 \\ & 18.9 \\ & 17.7 \\ & 13-6 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-9 \\ 10.9 \\ 10-5 \\ 8.7 \end{array}$ | $\begin{aligned} & 9-9 \\ & 9-9 \\ & 9-6 \\ & 7-5 \end{aligned}$ | $\begin{aligned} & 8-6 \\ & 8-6 \\ & 7-11 \\ & 6-1 \end{aligned}$ | $\begin{aligned} & 14-2 \\ & 14-2 \\ & 13-9 \\ & 11-4 \end{aligned}$ | $\begin{gathered} 12-10 \\ 12-10 \\ 12-6 \\ 9-10 \end{gathered}$ | $\begin{array}{r} 11.3 \\ 11.3 \\ 10-5 \\ 8-0 \end{array}$ | $\begin{aligned} & 18-0 \\ & 18-0 \\ & 17-6 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 16-5 \\ & 16-5 \\ & 15-11 \\ & \mathbf{1 2 - 6} \end{aligned}$ | $\begin{aligned} & 14.4 \\ & 14.4 \\ & 13-4 \\ & 10-3 \end{aligned}$ | $\begin{array}{llll} 2 & 1 & -1 & 1 \\ 2 & 1 & -1 & 1 \\ 2 & 1 & -4 \\ 17 & -7 \end{array}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 19-4 \\ & 15-3 \end{aligned}$ | $\begin{aligned} & 17-5 \\ & 17-5 \\ & 16-2 \\ & 12-6 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11.0 \\ 11-0 \\ 10-9 \\ \mathbf{8 . 5} \end{array}$ | $\begin{array}{r} 10-0 \\ 10-0 \\ 9.7 \\ 7.3 \end{array}$ | $\begin{aligned} & 8-9 \\ & 8-7 \\ & 7-10 \\ & 5-11 \end{aligned}$ | $\begin{aligned} & 14-6 \\ & 14-6 \\ & 14-2 \\ & 11-1 \end{aligned}$ | $\begin{array}{r} 13-2 \\ 13-2 \\ 12.7 \\ 9.7 \end{array}$ | $\begin{gathered} 11-6 \\ 11-4 \\ 10-4 \\ 7.10 \end{gathered}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 18-0 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16.10 \\ & 16.1 \\ & 12-3 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-6 \\ & 13-2 \\ & 10-0 \end{aligned}$ | $\begin{aligned} & 22-6 \\ & 22-6 \\ & 21-11 \\ & 17-2 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19.7 \\ & 14.11 \end{aligned}$ | $\begin{aligned} & 17.11 \\ & 17.7 \\ & 16.0 \\ & 12.2 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11.7 \\ 11.7 \\ 11-0 \\ 8.7 \end{array}$ | $\begin{aligned} & 10-6 \\ & 10-6 \\ & 9-10 \\ & 7-5 \end{aligned}$ | $\begin{aligned} & 9-2 \\ & 8-10 \\ & 8-0 \\ & 6-1 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14-6 \\ & 11-4 \end{aligned}$ | $\begin{array}{r} 13.10 \\ 13-10 \\ 12-11 \\ 9.10 \end{array}$ | $\begin{array}{r} 12-1 \\ 11-7 \\ 10.7 \\ 8-0 \end{array}$ | $\begin{aligned} & 19-5 \\ & 19-5 \\ & 18-6 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 17.8 \\ & 16-6 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 15-5 \\ & 14.9 \\ & 13-6 \\ & 10-3 \end{aligned}$ | $\begin{aligned} & 23.7 \\ & 23-7 \\ & 22.6 \\ & 17.7 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 20-1 \\ & 15-3 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-0 \\ & 16-5 \\ & 12-5 \end{aligned}$ |
| Western cedars <br> (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10-5 \\ 10-5 \\ 10-1 \\ 8-10 \end{gathered}$ | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 9-2 \\ & 7-7 \end{aligned}$ | $\begin{aligned} & 8-3 \\ & 8-3 \\ & 8-0 \\ & 6-3 \end{aligned}$ | $\begin{aligned} & 13.9 \\ & 13-9 \\ & 13-4 \\ & 11-7 \end{aligned}$ | $\begin{aligned} & 12-6 \\ & 12-6 \\ & 12-1 \\ & 10-0 \end{aligned}$ | $\begin{gathered} 10-11 \\ 10-11 \\ 10-7 \\ \mathbf{8 - 2} \end{gathered}$ | $\begin{aligned} & 17-6 \\ & 17-6 \\ & 17-0 \\ & 14-9 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 15-11 \\ & 15-5 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 13-11 \\ & 13-11 \\ & 13.6 \\ & 10-5 \end{aligned}$ | $\begin{aligned} & 21-4 \\ & 21.4 \\ & 20-8 \\ & 18-0 \end{aligned}$ | $\begin{aligned} & 19-4 \\ & 19-4 \\ & 18-9 \\ & \mathbf{1 5 - 7} \end{aligned}$ | $\begin{aligned} & 16-11 \\ & 16.11 \\ & 16-5 \\ & 12.9 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 11-3 \\ & 11.3 \\ & \mathbf{1 0 - 1 1} \\ & 8-5 \end{aligned}$ | $\begin{array}{r} 10.3 \\ 10.3 \\ 9.5 \\ 7.3 \end{array}$ | $\begin{aligned} & 8-11 \\ & 8-7 \\ & 7-8 \\ & 5-11 \end{aligned}$ | $\begin{aligned} & 14-11 \\ & 14.11 \\ & 14-4 \\ & 11-1 \end{aligned}$ | $\begin{array}{r} 13-6 \\ 13-6 \\ 12-5 \\ 9.7 \end{array}$ | $\begin{gathered} 11-10 \\ 11-4 \\ 10-2 \\ 7-10 \end{gathered}$ | $\begin{aligned} & 19-0 \\ & 19-0 \\ & 18-4 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 17-3 \\ & 15-10 \\ & 12-3 \end{aligned}$ | $\begin{aligned} & 15.1 \\ & 14-6 \\ & 13-0 \\ & 10-0 \end{aligned}$ | $\begin{aligned} & 23-1 \\ & 23-1 \\ & 22-3 \\ & 17-2 \end{aligned}$ | $\begin{aligned} & 21-0 \\ & 21-0 \\ & 19-4 \\ & 14-11 \end{aligned}$ | $\begin{aligned} & 18-4 \\ & 17-7 \\ & 15-9 \\ & 12-2 \end{aligned}$ |

Table 23. RAFTERS - Any Slope - With Plaster Ceiling - 40 psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 360$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span ( ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10-11 \\ 10.11 \\ 10-6 \\ 7.11 \end{gathered}$ | $\begin{aligned} & 9-11 \\ & 9-11 \\ & 9-1 \\ & 6-11 \end{aligned}$ | $\begin{aligned} & 8-8 \\ & 8-1 \\ & 7.5 \\ & 5.7 \end{aligned}$ | $\begin{aligned} & 14-5 \\ & 14-5 \\ & 13-10 \\ & 10.6 \end{aligned}$ | $\begin{array}{r} 13-1 \\ 13-1 \\ 12-0 \\ 9.1 \end{array}$ | $\begin{gathered} 11-5 \\ 10-9 \\ 9.10 \\ 7.5 \end{gathered}$ | $\begin{aligned} & 18-5 \\ & 18-5 \\ & 17-8 \\ & 13-5 \end{aligned}$ | $\begin{aligned} & 16-9 \\ & 16-9 \\ & 15-4 \\ & 11.7 \end{aligned}$ | $\begin{array}{r} 14-7 \\ 13-8 \\ 12-6 \\ 9-5 \end{array}$ | $\begin{aligned} & 22-5 \\ & 22-5 \\ & 21-6 \\ & 16-3 \end{aligned}$ | $\begin{aligned} & 20-4 \\ & 20-4 \\ & 18-8 \\ & 14-1 \end{aligned}$ | $\begin{aligned} & 17-9 \\ & 16-7 \\ & 15-3 \\ & 11-6 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 11-2 \\ 11-2 \\ 10-11 \\ 9-8 \end{gathered}$ | $\begin{gathered} 10-2 \\ 10-2 \\ 9-11 \\ 8-3 \end{gathered}$ | $\begin{aligned} & 8-10 \\ & 8-10 \\ & 8-8 \\ & 6-8 \end{aligned}$ | $\begin{aligned} & 14.8 \\ & 14.8 \\ & 14.5 \\ & 12.6 \end{aligned}$ | $\begin{aligned} & 13-4 \\ & 13-4 \\ & 13-1 \\ & \mathbf{1 0 - 1 0} \end{aligned}$ | $\begin{gathered} 11-8 \\ 11-8 \\ 11-5 \\ 8-10 \end{gathered}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 18-5 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 17.0 \\ & 17-0 \\ & 16-9 \\ & \mathbf{1 3 - 1 0} \end{aligned}$ | $\begin{aligned} & 14-11 \\ & 14.11 \\ & 14-7 \\ & 11-3 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 22.5 \\ & 19.5 \end{aligned}$ | $\begin{aligned} & 20-9 \\ & 20-9 \\ & 20-4 \\ & 16-9 \end{aligned}$ | $\begin{aligned} & 18-1 \\ & 18-1 \\ & 17-9 \\ & 13-9 \end{aligned}$ |
| Eastern hemlock <br> Tamarack (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10.0 \\ 10.0 \\ 9.6 \\ \mathbf{8 - 9} \end{array}$ | $\begin{aligned} & 9-1 \\ & 9-1 \\ & 8-7 \\ & 7-7 \end{aligned}$ | $\begin{aligned} & 7-11 \\ & 7-11 \\ & 7-6 \\ & 6-2 \end{aligned}$ | $\begin{aligned} & 13-2 \\ & 13-2 \\ & 12-6 \\ & 11-6 \\ & \hline \end{aligned}$ | $\begin{gathered} 12-0 \\ 12-0 \\ 11-4 \\ 9-11 \end{gathered}$ | $\begin{gathered} 10-6 \\ 10-6 \\ 9-11 \\ 8-2 \end{gathered}$ | $\begin{aligned} & 16.10 \\ & 16.10 \\ & 15.11 \\ & 14.8 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14-6 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 13-4 \\ & 13-4 \\ & 12.8 \\ & 10-4 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-4 \\ & 17-10 \end{aligned}$ | $\begin{aligned} & 18-7 \\ & 18-7 \\ & 17-7 \\ & 15-6 \end{aligned}$ | $\begin{aligned} & 16-3 \\ & 16-3 \\ & 15-4 \\ & 12-7 \end{aligned}$ |
| Hem-Fir (North) | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-6 \\ 10-6 \\ 10-3 \\ 8-5 \end{array}$ | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 9-4 \\ & 7-4 \end{aligned}$ | $\begin{aligned} & 8.4 \\ & 8.4 \\ & 7.9 \\ & 8.0 \end{aligned}$ | $\begin{aligned} & 13-10 \\ & 13-10 \\ & 13-6 \\ & 11-2 \end{aligned}$ | $\begin{array}{r} 12.7 \\ 12.7 \\ 12.3 \\ 9-8 \end{array}$ | $\begin{gathered} 11.0 \\ 11.0 \\ 10-3 \\ 7.11 \end{gathered}$ | $\begin{aligned} & 17-8 \\ & 17.8 \\ & 17-3 \\ & 14-3 \end{aligned}$ | $\begin{aligned} & 16-0 \\ & 16-0 \\ & 15-8 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 14-0 \\ & 14-0 \\ & 13-1 \\ & 10-1 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 21-0 \\ & 17-4 \end{aligned}$ | $\begin{aligned} & 19-6 \\ & 19-6 \\ & 19-1 \\ & 16-0 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 17.0 \\ & 15.11 \\ & 12.3 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-9 \\ & 9-9 \\ & 9-6 \\ & 7-9 \end{aligned}$ | $\begin{aligned} & 8-10 \\ & 8-10 \\ & 8.7 \\ & 6.9 \end{aligned}$ | $\begin{aligned} & 7-9 \\ & 7-9 \\ & 7.2 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 12-10 \\ & 12-10 \\ & 12-6 \\ & 10-3 \end{aligned}$ | $\begin{gathered} 11.8 \\ 11.8 \\ 11.4 \\ 8.11 \end{gathered}$ | $\begin{array}{r} 10-2 \\ 10-2 \\ 9-5 \\ 7-3 \end{array}$ | $\begin{aligned} & 16-5 \\ & 16-5 \\ & 15-11 \\ & 13-1 \end{aligned}$ | $\begin{aligned} & 14.11 \\ & 14-11 \\ & 14-6 \\ & 11-4 \end{aligned}$ | $\begin{array}{r} 13-0 \\ 13-0 \\ 12-1 \\ \mathbf{9 - 3} \end{array}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 19-4 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 18.1 \\ & 18-1 \\ & 17.7 \\ & 13-9 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-10^{*} \\ & 14-8 \\ & 11-3 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-0 \\ 10.0 \\ 9-9 \\ 7-7 \end{array}$ | $\begin{aligned} & 9.1 \\ & 9.1 \\ & 8.8 \\ & 6.7 \end{aligned}$ | $\begin{aligned} & 7-11 \\ & 7-9 \\ & 7-1 \\ & 5-4 \end{aligned}$ | $\begin{aligned} & 13-2 \\ & 13-2 \\ & 12-10 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 12-0 \\ 12-0 \\ 11-5 \\ 8-8 \end{array}$ | $\begin{array}{r} 10-6 \\ 10-3 \\ 9-4 \\ 7-1 \end{array}$ | $\begin{aligned} & 16-10 \\ & 16.10 \\ & 16.5 \\ & 12-9 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15.3 \\ & 14-7 \\ & 11-1 \end{aligned}$ | $\begin{gathered} 13-4 \\ 13-1 \\ 11-11 \\ 9-0 \end{gathered}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-11 \\ & 15.7 \end{aligned}$ | $\begin{aligned} & 18.7 \\ & 18.7 \\ & 17-8 \\ & 13.6 \end{aligned}$ | $\begin{aligned} & 16-3 \\ & 15.11 \\ & 14-5 \\ & 11-0 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-6 \\ 10-6 \\ 10.0 \\ 7.9 \end{array}$ | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 8-11 \\ & 6-9 \end{aligned}$ | $\begin{aligned} & 8.4 \\ & 7.11 \\ & 7.3 \\ & 5.6 \end{aligned}$ | $\begin{aligned} & 13-10 \\ & 13-10 \\ & 13-2 \\ & 10-3 \end{aligned}$ | $\begin{gathered} 12-7 \\ 12-7 \\ 11-9 \\ 8-11 \end{gathered}$ | $\begin{array}{r} 11-0 \\ 10-6 \\ 9.7 \\ 7-3 \end{array}$ | $\begin{aligned} & 17-8 \\ & 17-8 \\ & 16.10 \\ & 13-1 \end{aligned}$ | $\begin{aligned} & 16-0 \\ & 16.0 \\ & 14-11 \\ & 11-4 \end{aligned}$ | $\begin{array}{r} 14.0 \\ 13.5 \\ 12.3 \\ 9.3 \end{array}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 20-6 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 19.6 \\ & 19.6 \\ & 18.2 \\ & 13-9 \end{aligned}$ | $\begin{aligned} & 17.0 \\ & 16.3 \\ & 14-10 \\ & 11-3 \end{aligned}$ |
| Western cedars (North) | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 9-2 \\ & 7-11 \end{aligned}$ | $\begin{aligned} & 8.7 \\ & 8-7 \\ & 8-4 \\ & 8-11 \end{aligned}$ | $\begin{aligned} & 7-6 \\ & 7-6 \\ & 7-3 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 12-6 \\ & 12-6 \\ & 12-1 \\ & 10-6 \end{aligned}$ | $\begin{array}{r} 11.4 \\ 11.4 \\ 11.0 \\ 9.1 \end{array}$ | $\begin{aligned} & 9-11 \\ & 9-11 \\ & 9-7 \\ & 7-5 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 15-11 \\ & 15-5 \\ & 13.5 \end{aligned}$ | $\begin{aligned} & 14-6 \\ & 14-6 \\ & 14-0 \\ & 11-7 \end{aligned}$ | $\begin{array}{r} 12-8 \\ 12.8 \\ 12-3 \\ 9-5 \end{array}$ | $\begin{aligned} & 19.4 \\ & 19-4 \\ & 18-9 \\ & \mathbf{1 6 - 3} \end{aligned}$ | $\begin{aligned} & 17-7 \\ & 17-7 \\ & 17-0 \\ & 14-1 \end{aligned}$ | $\begin{aligned} & 15-4 \\ & 15-4 \\ & 14-10 \\ & 11-6 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 10-3 \\ & 10-3 \\ & 9.10 \\ & 7.7 \end{aligned}$ | $\begin{aligned} & 9-4 \\ & 9-4 \\ & 8-6 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 8-2 \\ & 7.9 \\ & 7-0 \\ & 5-4 \end{aligned}$ | $\begin{aligned} & 13-6 \\ & 13-6 \\ & 13-0 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 12-3 \\ 12-3 \\ 11-3 \\ \mathbf{8 - 8} \end{array}$ | $\begin{array}{r} 10.9 \\ 10-3 \\ 9-2 \\ 7-1 \end{array}$ | $\begin{aligned} & 17.3 \\ & 17.3 \\ & 16.7 \\ & 12-9 \end{aligned}$ | $\begin{aligned} & 15-8 \\ & 15-8 \\ & 14-4 \\ & 11-1 \end{aligned}$ | $\begin{array}{r} 13-8 \\ 13-1 \\ 11.9 \\ 9.0 \end{array}$ | $\begin{aligned} & 21.0 \\ & 21-0 \\ & \mathbf{2 0 - 2} \\ & \mathbf{1 5 - 7} \end{aligned}$ | $\begin{aligned} & 19-1 \\ & 19-1 \\ & 17-6 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 16.8 \\ & 15.11 \\ & 14.3 \\ & 11-0 \end{aligned}$ |

N Table 24. RAFTERS - Low Slope (3 in 12 or less) - With No Finished Ceiling - 20 psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 240$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 10 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 15.9 \\ & 15.7 \\ & 14.3 \\ & 10-9 \end{aligned}$ | $\begin{array}{r} 14-4 \\ 13-6 \\ 12.4 \\ 9.4 \end{array}$ | $\begin{array}{r} 12-1 \\ 11-0 \\ 10-1 \\ 7-7 \end{array}$ | $\begin{aligned} & 20-10 \\ & 20-6 \\ & 18-10 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 18-11 \\ & 17-9 \\ & 16-3 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 14.6 \\ & 134 \\ & 10-0 \end{aligned}$ | $\begin{aligned} & 26.6 \\ & 26.2 \\ & 24.0 \\ & 18-1 \end{aligned}$ | $\begin{aligned} & 24-1 \\ & 22-8 \\ & 20-9 \\ & 15-8 \end{aligned}$ | $\begin{aligned} & 20-3 \\ & 18.6 \\ & 17.0 \\ & 12.10 \end{aligned}$ | $\begin{aligned} & 32-3 \\ & 31-10 \\ & 29-2 \\ & 22-0 \end{aligned}$ | $\begin{aligned} & 29-4 \\ & 27-7 \\ & 25-3 \\ & 19-1 \end{aligned}$ | $\begin{aligned} & 24-8 \\ & 22-6 \\ & 20-8 \\ & 15-7 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 16-1 \\ & 16-1 \\ & 15-9 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 14.7 \\ & 14.7 \\ & 14.4 \\ & 11.1 \end{aligned}$ | $\begin{aligned} & 12.9 \\ & 12-9 \\ & 11-10 \\ & 9.1 \end{aligned}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 20-10 \\ & 16-11 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-11 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16.10 \\ & 15.7 \\ & 12.0 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-1 \\ & 26-6 \\ & 21-7 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24-7 \\ & 24-1 \\ & 18-8 \end{aligned}$ | $\begin{aligned} & 29-6 \\ & 21.6 \\ & \mathbf{1 9 - 1 1} \\ & \mathbf{1 5 - 3} \end{aligned}$ | $\begin{aligned} & 32-11 \\ & 32-11 \\ & 32-3 \\ & \mathbf{2 6 - 3} \end{aligned}$ | $\begin{aligned} & 29-11 \\ & 29-11 \\ & 29-4 \\ & 22-9 \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 26.1 \\ & 24-3 \\ & 18.7 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 14-5 \\ & 14.5 \\ & 13-8 \\ & 11-10 \end{aligned}$ | $\begin{aligned} & 13-1 \\ & 13-1 \\ & 12.5 \\ & 10-3 \end{aligned}$ | $\begin{array}{r} 11.5 \\ 11-5 \\ 10.9 \\ \mathbf{8 - 4} \end{array}$ | $\begin{aligned} & 19-0 \\ & 19-0 \\ & 18-0 \\ & 15-7 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 17-3 \\ & 16-4 \\ & 13.6 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15-1 \\ & 14-2 \\ & 11-0 \end{aligned}$ | $\begin{aligned} & 24.3 \\ & 24-3 \\ & 22.11 \\ & 19-10 \end{aligned}$ | $\begin{aligned} & 22-1 \\ & 22-1 \\ & 20-10 \\ & 17-2 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-1 \\ & 14-1 \end{aligned}$ | $\begin{aligned} & 29-6 \\ & 29-6 \\ & 27.11 \\ & 24-2 \end{aligned}$ | $\begin{aligned} & 26-10 \\ & 26-10 \\ & 25-4 \\ & 20-11 \end{aligned}$ | $\begin{aligned} & 23-5 \\ & 23-5 \\ & 22-0 \\ & 17-1 \end{aligned}$ |
| Hem-Fir (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 15-2 \\ & 15-2 \\ & 14-9 \\ & 11-5 \end{aligned}$ | $\begin{aligned} & 13-9 \\ & 13-9 \\ & 12-11 \\ & 9-11 \end{aligned}$ | $\begin{array}{r} 12-0 \\ 11.8 \\ 10-6 \\ 8-1 \end{array}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 19-6 \\ & 15-1 \end{aligned}$ | $\begin{aligned} & 18-2 \\ & 18-2 \\ & 17-0 \\ & 13-1 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15-4 \\ & 13-11 \\ & 10-8 \end{aligned}$ | $\begin{aligned} & 25-5 \\ & 25-5 \\ & 24-10 \\ & 19-3 \end{aligned}$ | $\begin{aligned} & 23-2 \\ & 23-2 \\ & 21-8 \\ & 16.8 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 19-7 \\ & 17-9 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 30-11 \\ & 30-11 \\ & 30-3 \\ & 23-5 \end{aligned}$ | $\begin{aligned} & 28-2 \\ & 28-2 \\ & 26-5 \\ & 20-3 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 23-9 \\ & 21-7 \\ & 16-7 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 14-1 \\ & 14.1 \\ & 13-8 \\ & \mathbf{1 0 - 6} \end{aligned}$ | $\begin{aligned} & 12-9 \\ & 12-9 \\ & 11.11 \\ & 9-1 \end{aligned}$ | $\begin{array}{r} 11.2 \\ 10.9 \\ 9.8 \\ 7.5 \end{array}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 18-0 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16.10 \\ & 15.8 \\ & 12.0 \end{aligned}$ | $\begin{gathered} 14.8 \\ 14-2 \\ 12.9 \\ 9-10 \end{gathered}$ | $\begin{aligned} & 23-8 \\ & 23-8 \\ & 22-11 \\ & 17-9 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-6 \\ & 20-0 \\ & 15-4 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-1 \\ & 16-4 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 28-9 \\ & 28-9 \\ & 27-11 \\ & 21-7 \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 26-1 \\ & 24-4 \\ & 18-8 \end{aligned}$ | $\begin{aligned} & 22.10 \\ & 22.0 \\ & 19-10 \\ & 15-3 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 14-5 \\ & 14.5 \\ & 13.6 \\ & 10.3 \end{aligned}$ | $\begin{gathered} 13-1 \\ 12-11 \\ 11-9 \\ 8-11 \end{gathered}$ | $\begin{array}{r} 11.5 \\ 10-6 \\ 9.7 \\ 7.3 \end{array}$ | $\begin{aligned} & 19-0 \\ & 19-0 \\ & 17.10 \\ & 13.7 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 17-0 \\ & 15-5 \\ & 11-9 \end{aligned}$ | $\begin{aligned} & 15.1 \\ & 13.11 \\ & 12.7 \\ & 9.7 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 24-3 \\ & 22.9 \\ & 17-4 \end{aligned}$ | $\begin{aligned} & 22-1 \\ & 21-8 \\ & 19-9 \\ & 15-0 \end{aligned}$ | $\begin{aligned} & 19-2 \\ & 17-9 \\ & 16-1 \\ & 12-3 \end{aligned}$ | $\begin{aligned} & 29-6 \\ & 29-6 \\ & 27-8 \\ & 21-1 \end{aligned}$ | $\begin{aligned} & 26-10 \\ & 26-5 \\ & 24-0 \\ & 18-3 \end{aligned}$ | $\begin{aligned} & 23-4 \\ & 21-7 \\ & 19-7 \\ & 14-11 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 15-2 \\ & 15.2 \\ & 13.11 \\ & 10.6 \end{aligned}$ | $\begin{array}{r} 13-9 \\ 13-2 \\ 12-0 \\ 9-1 \end{array}$ | $\begin{aligned} & 11.10 \\ & 10.9 \\ & 9.10 \\ & 7.5 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 19-11 \\ & 18-4 \\ & 13.11 \end{aligned}$ | $\begin{aligned} & 18.2 \\ & 17.5 \\ & 15-10 \\ & 12.0 \end{aligned}$ | $\begin{aligned} & 15.7 \\ & 14.2 \\ & 12.11 \\ & 9.10 \end{aligned}$ | $\begin{aligned} & 25-5 \\ & 25-5 \\ & 23-5 \\ & 17-9 \end{aligned}$ | $\begin{aligned} & 23-2 \\ & 22-2 \\ & 20-3 \\ & 15-4 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 18-1 \\ & 16-6 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 30-11 \\ & 30-11 \\ & 28-5 \\ & \mathbf{2 1 - 7} \end{aligned}$ | $\begin{aligned} & 28-2 \\ & 27-0 \\ & 24-8 \\ & 18-8 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 22 \cdot 0 \\ & 20-1 \\ & 15-3 \end{aligned}$ |
| Western cedars <br> (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 13.8 \\ & 13.8 \\ & 13-3 \\ & 10-9 \end{aligned}$ | $\begin{array}{r} 12-5 \\ 12-5 \\ 12-0 \\ \mathbf{9 - 4} \end{array}$ | $\begin{gathered} 10.10 \\ 10.10 \\ 9.10 \\ 7.7 \end{gathered}$ | $\begin{aligned} & 18-0 \\ & 18-0 \\ & 17-5 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 16-4 \\ & 16-4 \\ & 15-10 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 14.3 \\ & 14-3 \\ & 12.11 \\ & 10.0 \end{aligned}$ | $\begin{aligned} & 22-11 \\ & 22-11 \\ & 22-3 \\ & \mathbf{1 8 - 1} \end{aligned}$ | $\begin{aligned} & 20.10 \\ & 20-10 \\ & 20-2 \\ & 15-8 \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 18.3 \\ & 16-6 \\ & 12.10 \end{aligned}$ | $\begin{aligned} & 27-11 \\ & 27-11 \\ & 27-1 \\ & 22-0 \end{aligned}$ | $\begin{aligned} & 25-4 \\ & 25-4 \\ & 24-7 \\ & 19-1 \end{aligned}$ | $\begin{aligned} & 22-2 \\ & 22.2 \\ & 20-1 \\ & 15.7 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 14-9 \\ & 14.9 \\ & 13.4 \\ & 10-3 \end{aligned}$ | $\begin{gathered} 13-5 \\ 12.11 \\ 11-7 \\ 8-11 \end{gathered}$ | $\begin{array}{r} 11.3 \\ 10.6 \\ 9.5 \\ 7.3 \end{array}$ | $\begin{aligned} & 19-6 \\ & 19.6 \\ & 17.7 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 17-9 \\ & 17-0 \\ & 15-3 \\ & 11.9 \end{aligned}$ | $\begin{gathered} 14.10 \\ 13.11 \\ 12.5 \\ 9.7 \end{gathered}$ | $\begin{aligned} & 24.10 \\ & 24.10 \\ & 22.5 \\ & 17.4 \end{aligned}$ | $\begin{aligned} & 22.7 \\ & 21.8 \\ & 19.5 \\ & 15.0 \end{aligned}$ | $\begin{aligned} & 18-11 \\ & 17.9 \\ & 15-10 \\ & 12.3 \end{aligned}$ | $\begin{aligned} & 30-3 \\ & 30-3 \\ & 27-4 \\ & 21-1 \end{aligned}$ | $\begin{aligned} & 27-6 \\ & 26.5 \\ & 23.8 \\ & 18-3 \end{aligned}$ | $\begin{aligned} & 23.0 \\ & 21-7 \\ & 19.4 \\ & 14.11 \end{aligned}$ |

Table 25. RAFTERS - Low Slope (3 in 12 or less) - With No Finished Ceiling - $\mathbf{3 0}$ psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 240$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 10 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 13-9 \\ 13-6 \\ 12-4 \\ 9.4 \end{array}$ | $\begin{array}{r} 12-6 \\ 11-8 \\ 10-8 \\ 8-1 \end{array}$ | $\begin{array}{r} 10-5 \\ 9-6 \\ 8-9 \\ 6.7 \end{array}$ | $\begin{aligned} & 18-2 \\ & 17-9 \\ & 16-3 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 16-6 \\ & 16-5 \\ & 14-1 \\ & 10-8 \end{aligned}$ | $\begin{array}{r} 13-9 \\ 12-7 \\ 11-6 \\ 8-8 \end{array}$ | $\begin{aligned} & 23-2 \\ & 22-8 \\ & 20-9 \\ & 15-8 \end{aligned}$ | $\begin{aligned} & 21-1 \\ & 19-7 \\ & 18-0 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 17-7 \\ & 16-0 \\ & 14-8 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 28-2 \\ & 27-7 \\ & 25-3 \\ & 19-1 \end{aligned}$ | $\begin{aligned} & 25-7 \\ & 23.10 \\ & 21.11 \\ & 16-6 \end{aligned}$ | $\begin{aligned} & 21-4 \\ & 19.6 \\ & 17.10 \\ & 13-6 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 14-1 \\ & 14-1 \\ & 13-9 \\ & 11-1 \end{aligned}$ | $\begin{array}{r} 12.9 \\ 12-9 \\ 12-6 \\ 9-8 \end{array}$ | $\begin{aligned} & 11.2 \\ & 11-2 \\ & 10-3 \\ & 7-10 \end{aligned}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 18-2 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 16-6 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 13-6 \\ & 10-4 \end{aligned}$ | $\begin{aligned} & 23-8 \\ & 23-8 \\ & 23-2 \\ & 18-8 \end{aligned}$ | $\begin{aligned} & 21 \\ & 21-6 \\ & 21 \\ & 21-6 \\ & 1 \\ & 16-1 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 17-3 \\ & 13-3 \end{aligned}$ | $\begin{aligned} & 28-9 \\ & 28-9 \\ & 28-2 \\ & 22-9 \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 26-1 \\ & 25-7 \\ & 19-8 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 21-0 \\ & 16-1 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12.7 \\ & 12.7 \\ & 11.11 \\ & 10-3 \end{aligned}$ | $\begin{aligned} & 11-5 \\ & 11-5 \\ & 10-10 \\ & 8-10 \end{aligned}$ | $\begin{array}{r} 10-0 \\ 10-0 \\ 9-4 \\ 7.3 \end{array}$ | $\begin{aligned} & 16-7 \\ & 16-7 \\ & 15-9 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15-1 \\ & 14-3 \\ & 11-8 \end{aligned}$ | $\begin{array}{r} 13-2 \\ 13-2 \\ 12-4 \\ 9-6 \end{array}$ | $\begin{array}{ll} 2 & 1-2 \\ 2 & 1-2 \\ 20-1 \\ 17-2 \end{array}$ | $\begin{aligned} & 19.3 \\ & 19-3 \\ & 18-3 \\ & 14-11 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 15-8 \\ & 12-2 \end{aligned}$ | $\begin{aligned} & 25-9 \\ & 25-9 \\ & 24.5 \\ & 20-11 \end{aligned}$ | $\begin{aligned} & 23-5 \\ & 23-5 \\ & 22-2 \\ & 18-1 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 20-6 \\ & 19-1 \\ & 14-10 \end{aligned}$ |
| Hem-Fir (North) | Select Structura <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 13-3 \\ & 13-3 \\ & 12-11 \\ & 9-11 \end{aligned}$ | $\begin{array}{r} 12.0 \\ 12.0 \\ 11-2 \\ 8.7 \end{array}$ | $\begin{array}{r} 10-6 \\ 10-1 \\ 9-1 \\ 7-0 \end{array}$ | $\begin{aligned} & 17-5 \\ & 17-5 \\ & 17-0 \\ & 13-1 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15.10 \\ & 14-9 \\ & 11.4 \end{aligned}$ | $\begin{gathered} 13-10 \\ 13-3 \\ 12.0 \\ 9-3 \end{gathered}$ | $\begin{aligned} & 22-3 \\ & 22-3 \\ & 21-8 \\ & 16-8 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 20-2 \\ & 18-9 \\ & 14-5 \end{aligned}$ | $\begin{aligned} & 17.8 \\ & 16.11 \\ & 15.4 \\ & 11.9 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-1 \\ & 28-5 \\ & 20-3 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24-7 \\ & 22.10 \\ & 17-7 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 20-7 \\ & 18-8 \\ & 14-4 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12-3 \\ & 12-3 \\ & 11-11 \\ & 9-1 \end{aligned}$ | $\begin{gathered} 11-2 \\ 11-2 \\ 10-3 \\ 7-11 \end{gathered}$ | $\begin{aligned} & 9-9 \\ & 9-4 \\ & 8-5 \\ & 6-5 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 16-2 \\ & 15-8 \\ & 12-0 \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 13-7 \\ & 10-5 \end{aligned}$ | $\begin{gathered} 12-10 \\ 12-4 \\ 11-1 \\ 8-6 \end{gathered}$ | $\begin{aligned} & 20-8 \\ & 20-8 \\ & 20-0 \\ & 15-4 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 17-4 \\ & 13-3 \end{aligned}$ | $\begin{aligned} & 16-5 \\ & 15-8 \\ & 14-2 \\ & 10-10 \end{aligned}$ | $\begin{aligned} & 25-1 \\ & 25-1 \\ & 24-4 \\ & 18-8 \end{aligned}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 21-1 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 19-1 \\ & 17-2 \\ & 13-2 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12.7 \\ 12.7 \\ \mathbf{1 1 - 9} \\ \mathbf{8 . 1 1} \end{gathered}$ | $\begin{array}{r} 11-5 \\ 11-2 \\ 10-2 \\ 7.9 \end{array}$ | $\begin{aligned} & 9.11 \\ & 9.1 \\ & 8-3 \\ & 8.4 \end{aligned}$ | $\begin{aligned} & 16-7 \\ & 16-7 \\ & 16-6 \\ & 11-9 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 14-9 \\ & 13-5 \\ & 10-2 \end{aligned}$ | $\begin{gathered} 13-0 \\ 12-0 \\ 10-11 \\ 8-4 \end{gathered}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 19-9 \\ & 15-0 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 18.9 \\ & 17-1 \\ & 13-0 \end{aligned}$ | $\begin{aligned} & 16.7 \\ & 15-4 \\ & 13.11 \\ & 10.7 \end{aligned}$ | $\begin{aligned} & 25-9 \\ & 25-9 \\ & 24-0 \\ & 18-3 \end{aligned}$ | $\begin{aligned} & 23-5 \\ & 22-10 \\ & 20-9 \\ & 16-9 \end{aligned}$ | $\begin{aligned} & 20-3 \\ & 18-8 \\ & 16-11 \\ & 12-11 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 13-3 \\ 13-2 \\ 12-0 \\ 9-1 \end{array}$ | $\begin{gathered} 12.0 \\ 11.5 \\ 10.5 \\ 7.11 \end{gathered}$ | $\begin{array}{r} 10-3 \\ 9-4 \\ 8-6 \\ 8-5 \end{array}$ | $\begin{aligned} & 17-5 \\ & 17-5 \\ & 15-10 \\ & 12-0 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 15.1 \\ & 13.9 \\ & 10.5 \end{aligned}$ | $\begin{array}{r} 13-6 \\ 12-4 \\ 11-3 \\ 8-6 \end{array}$ | $\begin{aligned} & 22-3 \\ & 22-2 \\ & 20.3 \\ & 15-4 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 19.3 \\ & 17.6 \\ & 13-3 \end{aligned}$ | $\begin{aligned} & 17-3 \\ & 15-8 \\ & 14-4 \\ & 10-10 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-0 \\ & 24-8 \\ & 18-8 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 23-4 \\ & 21-4 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 21-0 \\ & 19-1 \\ & 17-5 \\ & 13-2 \end{aligned}$ |
| Western cedars (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 11-11 \\ & 11.11 \\ & 11-7 \end{aligned}$ | $\begin{gathered} 10-10 \\ 10-10 \\ 10-5 \\ 8-1 \end{gathered}$ | $\begin{aligned} & 9-6 \\ & 9-6 \\ & 8-6 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 15-9 \\ & 15-3 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 14-3 \\ & 14-3 \\ & 13-9 \\ & 10-8 \end{aligned}$ | $\begin{array}{r} 12-6 \\ 12.6 \\ 11.3 \\ 8.8 \end{array}$ | $\begin{aligned} & 20-1 \\ & 20-1 \\ & 19-5 \\ & 15-8 \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 18-3 \\ & 17-6 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 15-17 \\ & 15-11 \\ & 14-4 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 24-5 \\ & 24-5 \\ & 23-7 \\ & 19-1 \end{aligned}$ | $\begin{aligned} & 22-2 \\ & 22-2 \\ & 21-4 \\ & 16-6 \end{aligned}$ | $\begin{aligned} & 19-4 \\ & 19-4 \\ & 17-5 \\ & 13-6 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12-11 \\ 12-11 \\ 11-7 \\ 8.11 \end{gathered}$ | $\begin{array}{r} 11-9 \\ 11-2 \\ 10-0 \\ 7-9 \end{array}$ | $\begin{aligned} & 9-9 \\ & 9-1 \\ & 8-2 \\ & 8-4 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 17-0 \\ & 15-3 \\ & 11-9 \end{aligned}$ | $\begin{aligned} & 15-6 \\ & 14-9 \\ & 13-2 \\ & 10-2 \end{aligned}$ | $\begin{gathered} 12.10 \\ 12.0 \\ 10.9 \\ 8.4 \end{gathered}$ | $\begin{aligned} & 21-9 \\ & 21-8 \\ & 19-5 \\ & 15-0 \end{aligned}$ | $\begin{aligned} & 19.9 \\ & 18.9 \\ & 16-10 \\ & 13-0 \end{aligned}$ | $\begin{aligned} & 164 \\ & 154 \\ & 13-9 \\ & 10-7 \end{aligned}$ | $\begin{aligned} & 26-5 \\ & 26-5 \\ & 23-8 \\ & 18-3 \end{aligned}$ | $\begin{aligned} & 24-0 \\ & 22-10 \\ & 20-6 \\ & 15-9 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 18-8 \\ & 16-9 \\ & 12-11 \end{aligned}$ |

Rafters (low slope, no ceiling) - LL 30

N Table 26. RAFTERS - Low Slope (3 in 12 or less) - With No Finished Ceiling - $\mathbf{4 0}$ psf live load. (Spans shown in light face type are based on a deflection limitation of $l / 240$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 10 psf dead load.)

| Species | Grade | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  | $2 \times 12$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 4 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 12-6 \\ 12-1 \\ 11-1 \\ 8-4 \end{array}$ | $\begin{array}{r} 11-5 \\ 10.5 \\ 9.7 \\ 7.3 \end{array}$ | $\begin{aligned} & 9.4 \\ & 8.8 \\ & 7.10 \\ & 5.11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 16.6 \\ & 15-11 \\ & 14-7 \\ & 11-0 \end{aligned}$ | $\begin{array}{r} 15.0 \\ 13-9 \\ 12.7 \\ 9-6 \end{array}$ | $\begin{array}{r} 12-4 \\ 11-3 \\ 10-4 \\ 7.9 \end{array}$ | $\begin{aligned} & 21.1 \\ & 20.3 \\ & 18.7 \\ & 14.0 \end{aligned}$ | $\begin{aligned} & 19-2 \\ & 17.7 \\ & 16-1 \\ & 12-2 \end{aligned}$ | $\begin{gathered} 15-8 \\ 14-4 \\ 13-2 \\ 9.11 \end{gathered}$ | $\begin{aligned} & 25.7 \\ & 24-8 \\ & 22.7 \\ & 17.1 \end{aligned}$ | $\begin{aligned} & 23-3 \\ & 21-4 \\ & 19-7 \\ & 14-9 \end{aligned}$ | $\begin{aligned} & 19-1 \\ & 17-5 \\ & 16-0 \\ & 12-1 \end{aligned}$ |
| Douglas fir-Larch (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12-9 \\ 12.9 \\ 12.6 \\ 9.11 \end{gathered}$ | $\begin{array}{r} 11.7 \\ 11.7 \\ \mathbf{1 1 . 3} \\ \mathbf{8 . 7} \\ \hline \end{array}$ | $\begin{array}{r} 10.2 \\ 10.1 \\ 9.2 \\ 7.0 \\ \hline \end{array}$ | $\begin{aligned} & 16-10 \\ & 16-10 \\ & 16.6 \\ & 13-1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15.3 \\ & 14-10 \\ & 11.4 \\ & \hline \end{aligned}$ | $\begin{array}{r} 13.4 \\ 13-3 \\ 12-1 \\ 9.3 \\ \hline \end{array}$ | $\begin{aligned} & 21 \\ & 21-6 \\ & 21 \\ & 21-6 \\ & 21-1 \\ & 1 \end{aligned}$ | $\begin{aligned} & 19-6 \\ & 19-6 \\ & 18-11 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 17.0 \\ & 16-11 \\ & 15-5 \\ & 11-10 \end{aligned}$ | $\begin{aligned} & 26-1 \\ & 26-1 \\ & 25-7 \\ & 20-4 \end{aligned}$ | $\begin{aligned} & 23.9 \\ & 23.9 \\ & 23.0 \\ & 17-7 \end{aligned}$ | $\begin{aligned} & 20.9 \\ & 20.7 \\ & 18.9 \\ & 14-5 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack <br> (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 11.5 \\ & 11.5 \\ & 10-10 \\ & \mathbf{9 . 2} \\ & \hline \end{aligned}$ | $\begin{array}{r} 10.5 \\ 10.5 \\ 9-10 \\ 7.11 \\ \hline \end{array}$ | $\begin{aligned} & 9-1 \\ & 9-1 \\ & 8-4 \\ & 6-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15-1 \\ & 14-3 \\ & 12-1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 13-9 \\ & 13.9 \\ & 13-0 \\ & 10-5 \\ & \hline \end{aligned}$ | $\begin{array}{r} 12-0 \\ 12-0 \\ \mathbf{1 1 - 0} \\ \mathbf{8 - 6} \end{array}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 18-3 \\ & \mathbf{1 5 - 5} \end{aligned}$ | $\begin{aligned} & 17-6 \\ & 17-6 \\ & 16.7 \\ & 13.4 \end{aligned}$ | $\begin{aligned} & 15-3 \\ & 15-3 \\ & 14.0 \\ & 10-11 \end{aligned}$ | $\begin{aligned} & 23-5 \\ & 23-5 \\ & 22-2 \\ & 18-9 \end{aligned}$ | $\begin{aligned} & 21-3 \\ & 21-3 \\ & 20-2 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 18-7 \\ & 18-7 \\ & 17-1 \\ & 13.3 \end{aligned}$ |
| Hem-Fir (North) | Select Struçtural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12.0 \\ 12.0 \\ 11.6 \\ 8.10 \end{gathered}$ | $\begin{gathered} 10.11 \\ 10.11 \\ 10.0 \\ 7.8 \end{gathered}$ | $\begin{aligned} & 9-6 \\ & 9-0 \\ & 8-2 \\ & 8-3 \end{aligned}$ | $\begin{aligned} & 15.10 \\ & 15.10 \\ & 15.2 \\ & 11.8 \end{aligned}$ | $\begin{aligned} & 14-5 \\ & 14-5 \\ & 13-2 \\ & 10-1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 12-7 \\ & 11-11 \\ & 10-9 \\ & 8.3 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 20-2 \\ & 19-5 \\ & 14-11 \end{aligned}$ | $\begin{aligned} & 18.4 \\ & 18-4 \\ & 16-10 \\ & 12-11 \end{aligned}$ | $\begin{aligned} & 16-0 \\ & 15-2 \\ & 13-9 \\ & 10-7 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24-7 \\ & 23-7 \\ & 18-2 \end{aligned}$ | $\begin{aligned} & 22.4 \\ & 22-4 \\ & 20-5 \\ & 15-9 \end{aligned}$ | $\begin{aligned} & 19.6 \\ & 18.5 \\ & 16.8 \\ & 12.10 \end{aligned}$ |
| Ponderosa pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-2 \\ 11.2 \\ 10.8 \\ \mathbf{8 . 2} \\ \hline \end{array}$ | $\begin{array}{r} 10.2 \\ 10.2 \\ 9.2 \\ 7.1 \\ \hline \end{array}$ | $\begin{aligned} & 8.10 \\ & 8.4 \\ & 7.6 \\ & 5.9 \\ & \hline \end{aligned}$ | $\begin{aligned} & 14-8 \\ & 14-8 \\ & 14.0 \\ & 10-9 \\ & \hline \end{aligned}$ | $\begin{array}{r} 13.4 \\ 13-4 \\ 12.2 \\ 9.4 \end{array}$ | $\begin{gathered} 11.8 \\ 11.0 \\ 9.11 \\ 7.7 \end{gathered}$ | $\begin{aligned} & 18-9 \\ & 18-9 \\ & 17-10 \\ & 13-9 \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 17-0 \\ & 15-6 \\ & 11-11 \end{aligned}$ | $\begin{gathered} 14-11 \\ 14-0 \\ 12-8 \\ 9.8 \end{gathered}$ | $\begin{aligned} & 22-10 \\ & 22-10 \\ & 21-9 \\ & 16-8 \end{aligned}$ | $\begin{aligned} & 20-9 \\ & 20.9 \\ & 18-10 \\ & \mathbf{1 4 . 5} \end{aligned}$ | $\begin{aligned} & 18-1 \\ & 17-1 \\ & 15-4 \\ & 11-10 \end{aligned}$ |
| Red pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11.5 \\ 11.5 \\ \mathbf{1 0 . 6} \\ \mathbf{8 . 0} \end{array}$ | $\begin{gathered} 10.5 \\ 10.0 \\ 9.1 \\ 6.11 \end{gathered}$ | $\begin{aligned} & 8-10 \\ & 8-2 \\ & 7.5 \\ & 5-8 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15-1 \\ & \mathbf{1 3 - 1 0} \\ & \mathbf{1 0 - 6} \end{aligned}$ | $\begin{array}{r} 13-9 \\ 13-2 \\ 12-0 \\ 9-1 \\ \hline \end{array}$ | $\begin{array}{r} 11.8 \\ 10.9 \\ 9.9 \\ 7.5 \end{array}$ | $\begin{aligned} & 19-3 \\ & 19-3 \\ & 17-8 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 17.6 \\ & 16.10 \\ & 15.3 \\ & 11.7 \end{aligned}$ | $\begin{gathered} 14.10 \\ 13.9 \\ 12.6 \\ 9.6 \end{gathered}$ | $\begin{aligned} & 23-5 \\ & 23-5 \\ & 21.5 \\ & 16.4 \end{aligned}$ | $\begin{aligned} & 21-3 \\ & 20.6 \\ & 18.7 \\ & 14.1 \end{aligned}$ | $\begin{aligned} & 18-1 \\ & 16.8 \\ & 15-2 \\ & 11.6 \end{aligned}$ |
| Spruce-Pine-Fir | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 12-0 \\ & 11.10 \\ & 10-9 \\ & 8.2 \end{aligned}$ | $\begin{gathered} 10-11 \\ 10.3 \\ 9-4 \\ 7-1 \end{gathered}$ | $\begin{aligned} & 9.2 \\ & 8.4 \\ & 7.7 \\ & 5.9 \\ & \hline \end{aligned}$ | $\begin{aligned} & 15.10 \\ & 15.7 \\ & 14.2 \\ & 10.9 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-6 \\ 12.4 \\ 9-4 \end{array}$ | $\begin{array}{r} 12.1 \\ 11.0 \\ 10-0 \\ 7.7 \end{array}$ | $\begin{aligned} & 20.2 \\ & 19.10 \\ & 18.1 \\ & 13.9 \end{aligned}$ | $\begin{aligned} & 18.4 \\ & 17.2 \\ & 15.8 \\ & 11.11 \end{aligned}$ | $\begin{aligned} & 15.5 \\ & 14.0 \\ & 12.10 \\ & 9.8 \end{aligned}$ | $\begin{aligned} & 24-7 \\ & 24-2 \\ & 22.0 \\ & 16-8 \end{aligned}$ | $\begin{aligned} & 22-4 \\ & 20-11 \\ & 19-1 \\ & 14-5 \end{aligned}$ | $\begin{aligned} & 18.9 \\ & 17.1 \\ & 16-7 \\ & 11.10 \end{aligned}$ |
| Western cedars (North) | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10-10 \\ 10.10 \\ 10.6 \\ \mathbf{8 . 4} \end{gathered}$ | $\begin{aligned} & 9-10 \\ & 9-10 \\ & 9-4 \\ & 7.3 \end{aligned}$ | $\begin{aligned} & 8.7 \\ & 8.6 \\ & 7.7 \\ & 5.11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 14-3 \\ & 14-3 \\ & 13-10 \\ & 11-0 \end{aligned}$ | $\begin{array}{r} 13-0 \\ 13-0 \\ 12-4 \\ \mathbf{9 . 6} \end{array}$ | $\begin{array}{r} 11.4 \\ 11-3 \\ 10.0 \\ 7.9 \end{array}$ | $\begin{aligned} & 18-3 \\ & 18.3 \\ & 17-8 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 16-7 \\ & 16.7 \\ & 15.8 \\ & \mathbf{1 2 - 2} \\ & \hline \end{aligned}$ | $\begin{aligned} & 14.6 \\ & 14.4 \\ & 12.10 \\ & 9.11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 22-2 \\ & 22-2 \\ & 21.6 \\ & 17-1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 20.2 \\ & 20.2 \\ & 19.1 \\ & 14.9 \end{aligned}$ | $\begin{aligned} & 17.7 \\ & 17.5 \\ & 15.7 \\ & 12.1 \end{aligned}$ |
| Western white pine | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11.9 \\ 11.6 \\ 10-4 \\ 8.0 \end{array}$ | $\begin{gathered} 10.8 \\ 10-0 \\ 8.11 \\ 6-11 \\ \hline \end{gathered}$ | $\begin{aligned} & 8-8 \\ & 8.2 \\ & 7.4 \\ & 5-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 15-6 \\ & 15-2 \\ & 13-8 \\ & 10-6 \end{aligned}$ | $\begin{gathered} 14.0 \\ 13-2 \\ 11-10 \\ 9.1 \end{gathered}$ | $\begin{array}{r} 11-6 \\ 10.9 \\ 9.8 \\ 7-6 \\ \hline \end{array}$ | $\begin{aligned} & 19-9 \\ & 19-5 \\ & 17-6 \\ & 13-5 \end{aligned}$ | $\begin{aligned} & 17-11 \\ & 16-10 \\ & 16-1 \\ & 11-7 \end{aligned}$ | $\begin{array}{r} 14-8 \\ 13.9 \\ 12-4 \\ 9.6 \end{array}$ | $\begin{aligned} & 24-0 \\ & 23-7 \\ & 21-2 \\ & 16-4 \end{aligned}$ | $\begin{aligned} & 21-9 \\ & 20-5 \\ & 18.4 \\ & 14-1 \end{aligned}$ | $\begin{aligned} & 17.9 \\ & 16.8 \\ & 14.11 \\ & 11.6 \end{aligned}$ |

Table 27. RAFTERS - High Slope (over 3 in 12) - With No Finished Ceiling. 20 psf live load +15 psf dead load heavy roofing. (Spans shown in light face type are based on a deflection limitation of $l / 180$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)

| Species | Grade | $2 \times 4$ |  |  | Grade | $2 \times 4$ |  |  | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (in.) |  |  |  | Joist Spacing ( inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 |  | 12 | 16 | 4 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Max. Span ( ft - in.) |  |  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Appearance Construction Standard Utility | $\begin{aligned} & 9-10 \\ & 7-8 \\ & 5.10 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8-7 \\ & 6-8 \\ & 5-0 \\ & 3-4 \end{aligned}$ | $\begin{aligned} & 7-0 \\ & 5-5 \\ & 4-1 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10-8 \\ 9-10 \\ 9-0 \\ 6-9 \end{gathered}$ | $\begin{aligned} & 9-3 \\ & 8-7 \\ & 7-9 \\ & 5-10 \end{aligned}$ | $\begin{aligned} & 7-7 \\ & 7.0 \\ & 6-4 \\ & 4.9 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 14-5 \\ & 13.2 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 13-8 \\ 12-6 \\ 11-5 \\ 8-8 \end{array}$ | $\begin{array}{r} 11-2 \\ 10-2 \\ 9-4 \\ 7-1 \end{array}$ | $\begin{aligned} & 20.10 \\ & 19-0 \\ & 17.6 \\ & 13.2 \end{aligned}$ | $\begin{aligned} & 18-0 \\ & 18-5 \\ & 15-1 \\ & 11-5 \end{aligned}$ | $\begin{array}{r} 14-9 \\ 13-5 \\ 12-4 \\ 9-4 \end{array}$ | $\begin{aligned} & 26.7 \\ & 24-3 \\ & 22-2 \\ & 16-9 \end{aligned}$ | $\begin{aligned} & 23-0 \\ & 21-0 \\ & 19-3 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 17-2 \\ & 15-8 \\ & 11-10 \end{aligned}$ |
| Douglas fir-Larch (North) | Appearance Construction Standard Utility | $\begin{array}{r} 11-9 \\ 9-0 \\ 6-9 \\ 4-8 \end{array}$ | $\begin{gathered} 10.2 \\ 7.9 \\ 5-1 \mathrm{C} \\ 4.0 \end{gathered}$ | $\begin{aligned} & 8-4 \\ & 6-4 \\ & 4-9 \\ & 3-3 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 12.8 \\ 11.9 \\ 10-8 \\ 7.10 \end{gathered}$ | $\begin{gathered} 11-0 \\ 10-2 \\ 9-1 \\ 6-10 \end{gathered}$ | $\begin{aligned} & 9-0 \\ & 8-4 \\ & 7-5 \\ & 5-7 \end{aligned}$ | $\begin{aligned} & 18-5 \\ & 17-0 \\ & 15-6 \\ & 11-11 \end{aligned}$ | $\begin{aligned} & 16-0 \\ & 14-9 \\ & 13-5 \\ & 10-3 \end{aligned}$ | $\begin{array}{r} 13-0 \\ 12-0 \\ 11-0 \\ 8.5 \end{array}$ | $\begin{aligned} & 24.4 \\ & 22-5 \\ & 20-5 \\ & 15-8 \end{aligned}$ | $\begin{aligned} & 21-1 \\ & 19-5 \\ & 17-8 \\ & 13-7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 17-2 \\ & 15-10 \\ & 14-5 \\ & 11-1 \end{aligned}$ | $\begin{aligned} & 31-0 \\ & 28-7 \\ & 26-1 \\ & 20-0 \\ & \hline \end{aligned}$ | $\begin{aligned} & 26-11 \\ & 24-9 \\ & 22-7 \\ & 17-4 \\ & \hline \end{aligned}$ | $\begin{aligned} & 21-19 \\ & 20-3 \\ & 18.5 \\ & 14-2 \\ & \hline \end{aligned}$ |
| Eastern hemlock -Tamarack (North) | Appearance Construction Standard Utility | $\begin{array}{r} 10-0 \\ 8-6 \\ 6-2 \\ 4-4 \end{array}$ | $\begin{aligned} & 8-8 \\ & 7-3 \\ & 5-4 \\ & 3-9 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 5-11 \\ & 4-5 \\ & 3-1 \end{aligned}$ | Select Structura <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance | $\begin{gathered} 11-9 \\ 10-10 \\ 9-10 \\ 7-4 \\ 10-0 \\ \hline \end{gathered}$ | $\begin{array}{r} 10-2 \\ 9-5 \\ 8-7 \\ 6-4 \\ 8.8 \\ \hline \end{array}$ | $\begin{aligned} & 8-4 \\ & 7-8 \\ & 7-0 \\ & 5-2 \\ & 7-1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 17-0 \\ & 15-9 \\ & 14-1 \\ & 10-11 \\ & 15-9 \\ & \hline \end{aligned}$ | $\begin{array}{r} 14-9 \\ 13-8 \\ 12-3 \\ 9-6 \\ 13-8 \\ \hline \end{array}$ | $\begin{array}{r} 12-0 \\ 11-2 \\ 10-0 \\ 7.9 \\ 11-2 \end{array}$ | $\begin{aligned} & 22-5 \\ & 20-9 \\ & 18-7 \\ & 14-5 \\ & 20-9 \\ & \hline \end{aligned}$ | $\begin{aligned} & 19-5 \\ & 18-0 \\ & 16-1 \\ & 12-6 \\ & 18-0 \\ & \hline \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 14-8 \\ & 13-2 \\ & 10-2 \\ & 14-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 28-7 \\ & 26-6 \\ & 23-9 \\ & 18-5 \\ & 26-6 \\ & \hline \end{aligned}$ | $\begin{aligned} & 24-9 \\ & 22-11 \\ & 20-6 \\ & 15-11 \\ & 22-11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 20-3 \\ & 18-9 \\ & 16-9 \\ & 13-0 \\ & 18-9 \\ & \hline \end{aligned}$ |
| Hem-Fir (North) | Appearance Construction Standard Utility | $\begin{gathered} 10-4 \\ 8-0 \\ 5-11 \\ 4-1 \end{gathered}$ | $\begin{aligned} & 9.0 \\ & 6.11 \\ & 5.1 \\ & 3.7 \end{aligned}$ | $\begin{aligned} & 7-4 \\ & 5-8 \\ & 4-2 \\ & 2-11 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-3 \\ 10-4 \\ 9-4 \\ 7-0 \end{array}$ | $\begin{aligned} & 9-9 \\ & 9-0 \\ & 8-1 \\ & 6-0 \end{aligned}$ | $\begin{aligned} & 8.0 \\ & 7-4 \\ & 6.7 \\ & 4-11 \end{aligned}$ | $\begin{aligned} & 16-7 \\ & 15-3 \\ & 13-9 \\ & 10-7 \end{aligned}$ | $\begin{gathered} 14-4 \\ 13-2 \\ 11-11 \\ 9-2 \end{gathered}$ | $\begin{array}{r} 11-8 \\ 10-9 \\ 9-9 \\ 7-6 \end{array}$ | $\begin{aligned} & 21-10 \\ & 20-1 \\ & 18-2 \\ & 14-0 \end{aligned}$ | $\begin{aligned} & 18-11 \\ & 17-5 \\ & 15-9 \\ & 12-1 \end{aligned}$ | $\begin{aligned} & 15-5 \\ & 14-2 \\ & 12-10 \\ & 9-11 \end{aligned}$ | $\begin{aligned} & 27-10 \\ & 25-7 \\ & 23-2 \\ & 17-10 \end{aligned}$ | $\begin{aligned} & 24-1 \\ & 22-2 \\ & 20-1 \\ & 15-5 \\ & \hline \end{aligned}$ | $\begin{aligned} & 19-8 \\ & 18-1 \\ & 18-5 \\ & 12-7 \end{aligned}$ |
| Ponderosa pine | Appearance Construction Standard Utility | $\begin{aligned} & 9-8 \\ & 7.8 \\ & 5-6 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8.5 \\ & 6-5 \\ & 4-9 \\ & 3-4 \end{aligned}$ | $\begin{aligned} & 6-10 \\ & 5-3 \\ & 3-11 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-6 \\ 9-6 \\ 8-9 \\ 6-6 \end{array}$ | $\begin{aligned} & 9-1 \\ & 8-5 \\ & 7.7 \\ & 6.7 \end{aligned}$ | $\begin{aligned} & 7-5 \\ & 6-10 \\ & 8-2 \\ & 4-7 \end{aligned}$ | $\begin{array}{r} 15-3 \\ 14-1 \\ 12-8 \\ 9-9 \end{array}$ | $\begin{array}{r} 13-2 \\ 12-3 \\ 11-0 \\ 8-5 \end{array}$ | $\begin{gathered} 10.9 \\ 10-0 \\ 9.0 \\ 6.11 \end{gathered}$ | $\begin{aligned} & 20-1 \\ & 18-7 \\ & 16.9 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 17-5 \\ & 16-1 \\ & 14-6 \\ & 11-2 \end{aligned}$ | $\begin{gathered} 14-2 \\ 13-2 \\ 11-10 \\ 9-1 \end{gathered}$ | $\begin{aligned} & 25-7 \\ & 23-9 \\ & 21-4 \\ & 16-5 \end{aligned}$ | $\begin{aligned} & 22-2 \\ & 20-6 \\ & 18-6 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 18-1 \\ & 16-9 \\ & 15-1 \\ & 11-7 \end{aligned}$ |
| Red pine | Appearance Construction Standard Utility | $\begin{aligned} & 9-6 \\ & 7-4 \\ & 5-6 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8.3 \\ & 6.4 \\ & 4.9 \\ & 3.4 \end{aligned}$ | $\begin{aligned} & 6-9 \\ & 5-2 \\ & 3-11 \\ & 2.9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-4 \\ 9-8 \\ 8.7 \\ 6-6 \end{array}$ | $\begin{aligned} & 9-0 \\ & 8-3 \\ & 7-5 \\ & 5-7 \end{aligned}$ | $\begin{aligned} & 7.4 \\ & 6.9 \\ & 6.1 \\ & 4.7 \end{aligned}$ | $\begin{aligned} & 14-11 \\ & 13-9 \\ & 12-6 \\ & 9-8 \end{aligned}$ | $\begin{gathered} 12-11 \\ 11-11 \\ 10-10 \\ 8.3 \end{gathered}$ | $\begin{array}{c\|} \hline 10-7 \\ 9-9 \\ 8-10 \\ 6-9 \end{array}$ | $\begin{aligned} & 19-8 \\ & 18-2 \\ & 16-6 \\ & 12-7 \end{aligned}$ | $\begin{aligned} & 17-1 \\ & 15-9 \\ & 14-4 \\ & 10-11 \end{aligned}$ | $\begin{gathered} 13-11 \\ 12.10 \\ 11-8 \\ 8-11 \end{gathered}$ | $\begin{aligned} & 25-2 \\ & 23-2 \\ & 21-1 \\ & 16-0 \end{aligned}$ | $\begin{aligned} & 21-9 \\ & 20-1 \\ & 18-3 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 17-9 \\ & 16-5 \\ & 14-11 \\ & 11-4 \end{aligned}$ |
| Spruce-Pine-Fir | Appearance Construction Standard Utility | $\begin{aligned} & 9-8 \\ & 7-7 \\ & 5-8 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8-5 \\ & 6-7 \\ & 4-11 \\ & 3-4 \end{aligned}$ | $\begin{aligned} & 6-10 \\ & 5-4 \\ & 4-0 \\ & 2-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-6 \\ 9-6 \\ 8.9 \\ 8.7 \end{array}$ | $\begin{aligned} & 9-1 \\ & 8-6 \\ & 7-7 \\ & 5-9 \end{aligned}$ | $\begin{aligned} & 7.5 \\ & 6.10 \\ & 6.2 \\ & 4.8 \end{aligned}$ | $\begin{gathered} 15.6 \\ 14.1 \\ 12-10 \\ 9-9 \end{gathered}$ | $\begin{array}{r} 13-5 \\ 12.3 \\ 11-2 \\ 8-5 \end{array}$ | $\begin{gathered} 11-0 \\ 10-0 \\ 9.1 \\ 6.11 \end{gathered}$ | $\begin{aligned} & 20-5 \\ & 18-7 \\ & 17-0 \\ & 12-10 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 16-1 \\ & 14-8 \\ & 11-2 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-2 \\ 12-0 \\ 9-1 \end{array}$ | $\begin{aligned} & 26-1 \\ & 23-9 \\ & 21-8 \\ & 16-6 \end{aligned}$ | $\begin{aligned} & 22-7 \\ & 20-6 \\ & 18.9 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 18-5 \\ & 16-9 \\ & 15-4 \\ & 11-7 \end{aligned}$ |
| Western cedars <br> (North) | Appearance Construction Standard Utility | $\begin{aligned} & 9-10 \\ & 7-7 \\ & 5-8 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 8-7 \\ & 6-7 \\ & 4-11 \\ & 3-4 \end{aligned}$ | $\begin{aligned} & 7.0 \\ & 5.4 \\ & 4-0 \\ & 2.9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 10-8 \\ & 9-10 \\ & 9-0 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 9-3 \\ & 8-7 \\ & 7-9 \\ & 5-9 \end{aligned}$ | $\begin{aligned} & 7.7 \\ & 7.0 \\ & 8.4 \\ & 4.8 \end{aligned}$ | $\begin{aligned} & 15-6 \\ & 14-5 \\ & 12-10 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 13-5 \\ 12-6 \\ 11-2 \\ 8-8 \end{array}$ | $\begin{array}{r} 11-0 \\ 10-2 \\ 9.1 \\ 7-1 \end{array}$ | $\begin{aligned} & 20-5 \\ & 19-0 \\ & 17-0 \\ & 13-2 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 16-5 \\ & 14-8 \\ & 11-6 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-5 \\ 12-0 \\ 9-4 \end{array}$ | $\begin{aligned} & 26-1 \\ & 24-3 \\ & 21-8 \\ & 16-9 \end{aligned}$ | $\begin{aligned} & 22.7 \\ & 21.0 \\ & 18.9 \\ & 14-6 \end{aligned}$ | $\begin{aligned} & 18-5 \\ & 17-2 \\ & 15-4 \\ & 11-10 \end{aligned}$ |
| Western white pine | Appearance Construction Standard Utility | $\begin{aligned} & 9-4 \\ & 7-2 \\ & 5-4 \\ & 3-8 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 6-3 \\ & 4-8 \\ & 3-2 \end{aligned}$ | $\begin{aligned} & 6-7 \\ & 5-1 \\ & 3-9 \\ & 2-7 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-2 \\ 9-4 \\ 8-5 \\ 6-4 \end{array}$ | $\begin{aligned} & 8-10 \\ & 8.1 \\ & 7-3 \\ & 5.6 \end{aligned}$ | $\begin{aligned} & 7-2 \\ & 6-7 \\ & 5-11 \\ & 4-6 \end{aligned}$ | $\begin{array}{r} 14-8 \\ 13-9 \\ 12-4 \\ 9-6 \end{array}$ | $\begin{gathered} 12-9 \\ 11-11 \\ 10-8 \\ 8-3 \end{gathered}$ | $\begin{array}{r} 10-5 \\ 9-9 \\ 8-9 \\ 8.9 \end{array}$ | $\begin{aligned} & 19-5 \\ & 18-2 \\ & 16-3 \\ & 12.7 \end{aligned}$ | $\begin{aligned} & 16-9 \\ & 15-9 \\ & 14-1 \\ & 10-11 \end{aligned}$ | $\begin{aligned} & 13-8 \\ & 12-10 \\ & 11-6 \\ & 8.11 \end{aligned}$ | $\begin{aligned} & 24-9 \\ & 23-2 \\ & 20-9 \\ & 16-0 \end{aligned}$ | $\begin{aligned} & 21-5 \\ & 20-1 \\ & 18-0 \\ & 13-11 \end{aligned}$ | $\begin{aligned} & 17-6 \\ & 16-5 \\ & 14-8 \\ & 11-4 \end{aligned}$ |

N Table 28. RAFTERS - High Slope (over 3 in 12) - With No Finished Ceiling. 30 psf live load + 15 psf dead load heavy roofing. (Spans shown in light face type are based on a deflection limitation of $l / 180$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)


Table 29. RAFTERS - High Slope (over 3 in 12) - With No Finished Ceiling - 40 psf live load +15 psf dead load - heavy roofing. (Spans shown in light face type are based on a deflection limitation of $l / 180$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 15 psf dead load.)

| Species | Grade | $2 \times 4$ |  |  | Grade | $2 \times 4$ |  |  | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (in.) |  |  |  | Joist Spacing ( inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Max. Span (ft - in.) |  |  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Appearance Construction Standard Utility | $\begin{aligned} & 7.10 \\ & 6.1 \\ & 4.8 \\ & 3.1 \end{aligned}$ | $\begin{aligned} & 6-10 \\ & 5.4 \\ & 4-0 \\ & 2.8 \end{aligned}$ | $\begin{aligned} & 5.7 \\ & 4.4 \\ & 3.3 \\ & 2.2 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-6 \\ & 7-10 \\ & 7.2 \\ & 5-5 \end{aligned}$ | $\begin{aligned} & 7.5 \\ & 6.10 \\ & 6.2 \\ & 4.8 \end{aligned}$ | $\begin{aligned} & 6-0 \\ & 5-7 \\ & 5-1 \\ & 3-10 \end{aligned}$ | $\begin{gathered} 12.7 \\ 11-6 \\ 10.6 \\ 7.11 \end{gathered}$ | $\begin{gathered} 10-11 \\ 9-11 \\ 9.1 \\ 6-11 \end{gathered}$ | $\begin{aligned} & 8-11 \\ & 8-1 \\ & 7-5 \\ & 5-7 \end{aligned}$ | $\begin{aligned} & 16-7 \\ & 15-2 \\ & 13-11 \\ & 10-6 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-1 \\ 120 \\ 9-1 \end{array}$ | $\begin{aligned} & 11-9 \\ & 10-9 \\ & 9.10 \\ & 7.5 \end{aligned}$ | $\begin{aligned} & 21-2 \\ & 19-4 \\ & 17-9 \\ & 13-5 \end{aligned}$ | $\begin{aligned} & 18-4 \\ & 16-9 \\ & 15-4 \\ & 11-7 \end{aligned}$ | $\begin{array}{r} 15-0 \\ 13-8 \\ 12.6 \\ 9.5 \end{array}$ |
| Douglas fir-Larch (North) | Appearance <br> Construction <br> Standard <br> Utility | $\begin{aligned} & 8.11 \\ & 7-2 \\ & 5.5 \\ & 3.8 \end{aligned}$ | $\begin{aligned} & 8.1 \\ & 6-2 \\ & 4.8 \\ & 3.3 \end{aligned}$ | $\begin{aligned} & 6-7 \\ & 5-1 \\ & 3-10 \\ & 2-7 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-11 \\ & 8-11 \\ & 8-5 \\ & 6-3 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 8-1 \\ & 7-3 \\ & 5-5 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 6.7 \\ & 5.11 \\ & 4-5 \end{aligned}$ | $\begin{array}{r} 14-1 \\ 13.7 \\ 12-4 \\ 9-6 \end{array}$ | $\begin{array}{r} 12.9 \\ 11.9 \\ 10.9 \\ 8.3 \end{array}$ | $\begin{array}{r} 10-5 \\ 9-7 \\ 8-9 \\ 6-8 \end{array}$ | $\begin{aligned} & 18.6 \\ & 17.11 \\ & 16-4 \\ & 12.6 \end{aligned}$ | $\begin{aligned} & 16.9 \\ & 15.8 \\ & 14-1 \\ & 10-10 \end{aligned}$ | $\begin{gathered} 13.9 \\ 12.8 \\ 11-6 \\ 8.10 \end{gathered}$ | $\begin{aligned} & 23.8 \\ & 22-10 \\ & 20.10 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 21.5 \\ & 19.9 \\ & 18.0 \\ & 13.10 \\ & \hline \end{aligned}$ | $\begin{aligned} & 17-6 \\ & 16-2 \\ & 14-9 \\ & 11-3 \end{aligned}$ |
| Eastern hemlock -Tamarack (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8.0 \\ & 6-8 \\ & 4.11 \\ & 3.5 \end{aligned}$ | $\begin{aligned} & 6-11 \\ & 5-10 \\ & 4-3 \\ & 3-0 \end{aligned}$ | $\begin{aligned} & 5.8 \\ & 4.9 \\ & 3-6 \\ & 2.5 \end{aligned}$ | Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Adpearance | $\begin{aligned} & 8-0 \\ & 8-0 \\ & 7-7 \\ & 5-10 \\ & 8-0 \\ & \hline \end{aligned}$ | $\begin{aligned} & 7-3 \\ & 7-3 \\ & 6-10 \\ & 5-1 \\ & 6-11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 6-4 \\ & 6-1 \\ & 5-7 \\ & 4-2 \\ & 5-8 \\ & \hline \end{aligned}$ | $\begin{array}{r} 12-7 \\ 12.7 \\ 11.3 \\ 8.9 \\ 12.7 \\ \hline \end{array}$ | $\begin{gathered} 11.5 \\ 10.10 \\ 9.9 \\ 7.7 \\ 10.10 \\ \hline \end{gathered}$ | $\begin{aligned} & 9-7 \\ & 8-11 \\ & 7-11 \\ & 6-2 \\ & 8-11 \\ & \hline \end{aligned}$ | $\begin{aligned} & 16.7 \\ & 16-7 \\ & 14.10 \\ & 11.6 \\ & 16.7 \\ & \hline \end{aligned}$ | $\begin{array}{r} 15-1 \\ 14-4 \\ 12.10 \\ 9.11 \\ 14-4 \\ \hline \end{array}$ | $\begin{array}{r} 12.8 \\ 11.8 \\ 10.6 \\ 8.2 \\ 11.8 \\ \hline \end{array}$ | $\begin{aligned} & 21-2 \\ & 21-1 \\ & 18.11 \\ & 14-8 \\ & 21.1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 18-3 \\ & 16-5 \\ & 12-8 \\ & 18-3 \\ & \hline \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 14-11 \\ & 13-5 \\ & 10-4 \\ & 14-11 \\ & \hline \end{aligned}$ |
| Hem-Fir (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8.3 \\ & 6-4 \\ & 4.9 \\ & 3.3 \end{aligned}$ | $\begin{aligned} & 7-2 \\ & 5-6 \\ & 4-1 \\ & 2-10 \end{aligned}$ | $\begin{aligned} & 5-10 \\ & 4-6 \\ & 3-4 \\ & 2-4 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-5 \\ & 8-3 \\ & 7-6 \\ & 5-7 \end{aligned}$ | $\begin{aligned} & 7-8 \\ & 7-2 \\ & 6-6 \\ & 4-10 \end{aligned}$ | $\begin{aligned} & 6.4 \\ & 5 \cdot 10 \\ & 5-3 \\ & 3.11 \end{aligned}$ | $\begin{array}{r} 13-2 \\ 12-2 \\ 110 \\ 8.5 \end{array}$ | $\begin{array}{r} 11-5 \\ 10-6 \\ 9-6 \\ 7-4 \end{array}$ | $\begin{aligned} & 9-4 \\ & 8-7 \\ & 7.9 \\ & 6-0 \end{aligned}$ | $\begin{aligned} & 17.5 \\ & 16-0 \\ & 14.6 \\ & 11.2 \end{aligned}$ | $\begin{aligned} & 15.1 \\ & 13.10 \\ & 12-7 \\ & 9.8 \end{aligned}$ | $\begin{gathered} 12-4 \\ 11-4 \\ 10-3 \\ 7-11 \end{gathered}$ | $\begin{aligned} & 22-2 \\ & 20-5 \\ & 18-6 \\ & 14-3 \end{aligned}$ | $\begin{aligned} & 19-3 \\ & 17-8 \\ & 16-0 \\ & 12-4 \end{aligned}$ | $\begin{aligned} & 15-8 \\ & 14-5 \\ & 13-1 \\ & 10-1 \end{aligned}$ |
| Ponderosa pine | Appearance Construction Standard Utility | $\begin{aligned} & 7-9 \\ & 5-11 \\ & 4.5 \\ & 3-1 \end{aligned}$ | $\begin{aligned} & 6 \cdot 8 \\ & 5 \cdot 2 \\ & 3-10 \\ & 2-8 \end{aligned}$ | $\begin{aligned} & 5-6 \\ & 4-2 \\ & 3-1 \\ & 2-2 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 7-10 \\ & 7-9 \\ & 7-0 \\ & 5-2 \end{aligned}$ | $\begin{aligned} & 7.1 \\ & 6.8 \\ & 6.1 \\ & 4.6 \end{aligned}$ | $\begin{aligned} & 5-11 \\ & 5-6 \\ & 4-11 \\ & 3 \cdot 8 \end{aligned}$ | $\begin{array}{r} 12.2 \\ 11.3 \\ 10.2 \\ 7.9 \end{array}$ | $\begin{array}{r} 10.6 \\ 9.9 \\ 8.9 \\ 6.9 \end{array}$ | $\begin{aligned} & 8-7 \\ & 7-11 \\ & 7-2 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 16.0 \\ & 14-10 \\ & 13.4 \\ & 10-3 \end{aligned}$ | $\begin{gathered} 13-10 \\ 12-10 \\ 11-7 \\ 8-11 \end{gathered}$ | $\begin{array}{r} 11.4 \\ 10-6 \\ 9.5 \\ 7-3 \end{array}$ | $\begin{aligned} & 20-5 \\ & 18-11 \\ & 17-0 \\ & 13.1 \end{aligned}$ | $\begin{aligned} & 17-8 \\ & 16-5 \\ & 14.9 \\ & 11-4 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-5 \\ 12-1 \\ 9.3 \end{array}$ |
| Red pine | Appearance Construction Standard Utility | $\begin{aligned} & 7-7 \\ & 5-10 \\ & 4-5 \\ & 3-1 \end{aligned}$ | $\begin{aligned} & 6-7 \\ & 5-1 \\ & 3-10 \\ & 2-8 \end{aligned}$ | $\begin{aligned} & 5-4 \\ & 4-2 \\ & 3-1 \\ & 2-2 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8.0 \\ & 7.7 \\ & 6.10 \\ & 5.2 \end{aligned}$ | $\begin{aligned} & 7-2 \\ & 6-7 \\ & 5-11 \\ & 4-6 \end{aligned}$ | $\begin{aligned} & 5.10 \\ & 5.4 \\ & 4.10 \\ & 3.8 \end{aligned}$ | $\begin{gathered} 11-11 \\ 11.0 \\ 10-0 \\ 7.7 \end{gathered}$ | $\begin{array}{r} 10-4 \\ 9-6 \\ 8-8 \\ 6-7 \end{array}$ | $\begin{aligned} & 8-5 \\ & 7-9 \\ & 7-1 \\ & 5-4 \end{aligned}$ | $\begin{aligned} & 15.9 \\ & 14.6 \\ & 13.2 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 13.7 \\ 12.7 \\ 11.5 \\ 8.8 \end{array}$ | $\begin{array}{r} 11-1 \\ 10-3 \\ 9-4 \\ 7-1 \end{array}$ | $\begin{aligned} & 20-1 \\ & 18-6 \\ & 16-10 \\ & 12-9 \end{aligned}$ | $\begin{aligned} & 17-4 \\ & 16-0 \\ & 14-7 \\ & 11-1 \end{aligned}$ | $\begin{gathered} 14.2 \\ 13.1 \\ 11.11 \\ 9.0 \end{gathered}$ |
| Spruce-Pine-Fir | Appearance Construction Standard Utility | $\begin{aligned} & 7.9 \\ & 6.0 \\ & 4-6 \\ & 3.1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 6-8 \\ & 5 \cdot 3 \\ & 3-11 \\ & 2-8 \end{aligned}$ | $\begin{aligned} & 5.6 \\ & 4.3 \\ & 3.2 \\ & 2.2 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8.5 \\ & 7.9 \\ & 7-0 \\ & 5.3 \end{aligned}$ | $\begin{aligned} & 7.3 \\ & 6.8 \\ & 6-1 \\ & 4.7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 5 \cdot 11 \\ & 5 \cdot 6 \\ & 4-11 \\ & 3.9 \end{aligned}$ | $\begin{array}{r} 12-4 \\ 11-3 \\ 10-3 \\ 7-9 \end{array}$ | $\begin{gathered} 10.9 \\ 9.9 \\ 8.11 \\ 6.9 \\ \hline \end{gathered}$ | $\begin{aligned} & 8-9 \\ & 7-11 \\ & 7-3 \\ & 5-6 \end{aligned}$ | $\begin{aligned} & 16-4 \\ & 14-10 \\ & 13.6 \\ & 10-3 \end{aligned}$ | $\begin{gathered} 14-1 \\ 12-10 \\ 11-9 \\ 8.11 \end{gathered}$ | $\begin{array}{r} 11-6 \\ 10-6 \\ 9.7 \\ 7.3 \end{array}$ | $\begin{aligned} & 20-10 \\ & 18.11 \\ & 17-3 \\ & 13.1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 18-0 \\ & 16-5 \\ & 14-11 \\ & 11.4 \end{aligned}$ | $\begin{array}{r} 14-9 \\ 13-5 \\ 12.3 \\ 9-3 \end{array}$ |
| Western cedars (North) | Appearance Construction Standard Utility | $\begin{aligned} & 7.7 \\ & 6.0 \\ & 4.6 \\ & 3.1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 6-10 \\ & 5-3 \\ & 3-11 \\ & 2-8 \\ & \hline \end{aligned}$ | $\begin{aligned} & 5.7 \\ & 4.3 \\ & 3.2 \\ & 2.2 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 7.7 \\ & 7.7 \\ & 7.2 \\ & 5.3 \end{aligned}$ | $\begin{aligned} & 6-11 \\ & 6-10 \\ & 6-2 \\ & 4-7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 6-0 \\ & 5.7 \\ & 5-1 \\ & 3-9 \\ & \hline \end{aligned}$ | $\begin{gathered} 11.11 \\ 11.6 \\ 10.3 \\ 7.11 \\ \hline \end{gathered}$ | $\begin{gathered} 10.9 \\ 9-11 \\ 8.11 \\ 6-11 \\ \hline \end{gathered}$ | $\begin{aligned} & 8.9 \\ & 8.1 \\ & 7.3 \\ & 5.7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 15.9 \\ & 15-2 \\ & 13.6 \\ & 10.6 \end{aligned}$ | $\begin{array}{r} 14-1 \\ 13-1 \\ 11-9 \\ 9-1 \\ \hline \end{array}$ | $\begin{array}{r} 11.6 \\ 10.9 \\ 9.7 \\ 7.5 \\ \hline \end{array}$ | $\begin{aligned} & 20-1 \\ & 19-4 \\ & 17-3 \\ & 13-5 \end{aligned}$ | $\begin{aligned} & 18.0 \\ & 16-9 \\ & 14-11 \\ & 11.7 \end{aligned}$ | $\begin{array}{r} 14.9 \\ 13.6 \\ 12.3 \\ 9.5 \\ \hline \end{array}$ |
| Western white pine | Appearance Construction Standard Utility | $\begin{aligned} & 7-6 \\ & 5.9 \\ & 4-3 \\ & 2-11 \end{aligned}$ | $\begin{aligned} & 6.6 \\ & 5-0 \\ & 3.8 \\ & 2.6 \end{aligned}$ | $\begin{aligned} & 5-3 \\ & 4-1 \\ & 3-0 \\ & 2-1 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8.2 \\ & 7.6 \\ & 6.8 \\ & 5.1 \\ & \hline \end{aligned}$ | $\begin{aligned} & 7.0 \\ & 6.6 \\ & 5-10 \\ & 4.5 \end{aligned}$ | $\begin{aligned} & 5-9 \\ & 5.3 \\ & 4-9 \\ & 3-7 \\ & \hline \end{aligned}$ | $\begin{aligned} & 11-9 \\ & 11-0 \\ & 9.10 \\ & 7.7 \end{aligned}$ | $\begin{array}{r} 10.2 \\ 9.6 \\ 8.6 \\ 6.7 \end{array}$ | $\begin{aligned} & 8-4 \\ & 7.9 \\ & 7-0 \\ & 5.4 \end{aligned}$ | $\begin{aligned} & 15-5 \\ & 14-6 \\ & 13-0 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 13-5 \\ 12-7 \\ 11-3 \\ 8-8 \end{array}$ | $\begin{gathered} 10-11 \\ 10-3 \\ 9-2 \\ 7-1 \end{gathered}$ | $\begin{aligned} & 19-9 \\ & 18-6 \\ & 16.7 \\ & 12.9 \end{aligned}$ | $\begin{aligned} & 17-1 \\ & 16-0 \\ & 14-4 \\ & 11-1 \end{aligned}$ | $\begin{array}{r} 13.11 \\ 13.1 \\ 11.9 \\ 9.0 \end{array}$ |


$\omega$ Table 30. RAFTERS - High Slope (over 3 in 12) - With No Finished Ceiling - 20 psf live load - 7 psf dead load - light roofing. (Spans shown in light face type are based on a deflection limitation of $l / 180$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 7 psf dead load.)

| Species | Grade | $2 \times 4$ |  |  | Grade | $2 \times 4$ |  |  | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (in.) |  |  |  | Joist Spacing ( inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 16 | 24 |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Max. Span ( ft - in.) |  |  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | ADpearance Construction Standard Utility | $\begin{array}{r} 11-1 \\ 8-9 \\ 6-7 \\ 4-5 \end{array}$ | $\begin{aligned} & 9.9 \\ & 7.7 \\ & 5.9 \\ & 3.10 \end{aligned}$ | $\begin{aligned} & 7-11 \\ & 6-2 \\ & 4-8 \\ & 3-2 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 11-1 \\ 11-1 \\ 10-3 \\ 7-8 \end{array}$ | $\begin{aligned} & 10-0 \\ & 9-9 \\ & 8-10 \\ & 6-8 \end{aligned}$ | $\begin{aligned} & 8-7 \\ & 7-11 \\ & 7-3 \\ & 5-5 \end{aligned}$ | $\begin{aligned} & 17-4 \\ & 16-5 \\ & 15-0 \\ & 11-4 \end{aligned}$ | $\begin{gathered} 15-7 \\ 14-2 \\ 13-0 \\ 9-10 \end{gathered}$ | $\begin{array}{r} 12.9 \\ 11.7 \\ 10.8 \\ 8.0 \end{array}$ | $\begin{aligned} & 22-11 \\ & 21-7 \\ & 19-10 \\ & 15-0 \end{aligned}$ | $\begin{aligned} & 20-6 \\ & 18-9 \\ & 17-2 \\ & 12-11 \end{aligned}$ | $\begin{aligned} & 16-9 \\ & 15-3 \\ & 14-0 \\ & 10-7 \end{aligned}$ | $\begin{aligned} & 29-2 \\ & 27-7 \\ & 25-3 \\ & 19-1 \end{aligned}$ | $\begin{aligned} & \text { 26-2 } \\ & 23-11 \\ & 21-11 \\ & 16-6 \end{aligned}$ | 21-4 <br> 19-6 <br> 17-11 <br> $13-6$ |
| Douglas fir-Larch (North) | Appearance Construction Standard Utility | $\begin{array}{r} 11-3 \\ 10.3 \\ 7.8 \\ 5.3 \end{array}$ | $\begin{aligned} & 10-3 \\ & 8-10 \\ & 6-8 \\ & 4-7 \end{aligned}$ | $\begin{aligned} & 8-11 \\ & 7-3 \\ & 5-5 \\ & 3-9 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 11-3 \\ 11-3 \\ 11-1 \\ 8-11 \end{gathered}$ | $\begin{array}{r} 10-3 \\ 10-3 \\ 10-0 \\ 7.9 \end{array}$ | $\begin{aligned} & 8-11 \\ & 8-11 \\ & 8-6 \\ & 6-4 \end{aligned}$ | $\begin{aligned} & 17.8 \\ & 17.8 \\ & 17-4 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 16-1 \\ & 16-1 \\ & 15-4 \\ & 11-9 \end{aligned}$ | $\begin{array}{r} 14-1 \\ 13-8 \\ 12-6 \\ 9.7 \end{array}$ | $\begin{aligned} & 23-4 \\ & 23-4 \\ & 22-11 \\ & 17-10 \end{aligned}$ | $\begin{aligned} & \hline 21-2 \\ & 21-2 \\ & 20-2 \\ & 15-5 \end{aligned}$ | $\begin{aligned} & 18-6 \\ & 18-1 \\ & 16-6 \\ & 12-7 \end{aligned}$ | $\begin{aligned} & 29-9 \\ & 29-9 \\ & 29-2 \\ & 22-9 \end{aligned}$ | $\begin{aligned} & 27-1 \\ & 27-1 \\ & 25-9 \\ & 19-8 \end{aligned}$ | $\begin{aligned} & 23-8 \\ & 23-0 \\ & 21-0 \\ & 16-1 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Appearance Construction Standard Utility | $\begin{gathered} 10-1 \\ 9-3 \\ 7-1 \\ 4-11 \end{gathered}$ | $\begin{aligned} & 9-2 \\ & 8-3 \\ & 6-1 \\ & 4-3 \end{aligned}$ | $\begin{aligned} & 8-0 \\ & 6-9 \\ & 5-0 \\ & 3-6 \end{aligned}$ | Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance | $\begin{array}{r} \hline 10-1 \\ 10-1 \\ 9-7 \\ 8-4 \\ 10-1 \end{array}$ | $\begin{aligned} & 9-2 \\ & 9-2 \\ & 8-8 \\ & 7-3 \\ & 9-2 \end{aligned}$ | $\begin{aligned} & \hline 8-0 \\ & 8-0 \\ & 7.7 \\ & 5-11 \\ & 8-0 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 15-11 \\ & 15-0 \\ & 12-5 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 14-5 \\ & 14-5 \\ & 13-8 \\ & 10-9 \\ & 14-5 \end{aligned}$ | $\begin{gathered} \hline 12-7 \\ 12-7 \\ 11-4 \\ 8-10 \\ 12-7 \end{gathered}$ | $\begin{aligned} & 20-11 \\ & 20-11 \\ & 19-10 \\ & 16-5 \\ & 20-11 \end{aligned}$ | $\begin{aligned} & 19-0 \\ & 19-0 \\ & 18-0 \\ & \mathbf{1 4 - 3} \\ & 19-0 \end{aligned}$ | $\begin{aligned} & 16-7 \\ & 16-7 \\ & 15-0 \\ & 11-7 \\ & 16-7 \end{aligned}$ | $\begin{aligned} & 26-9 \\ & 26-9 \\ & 25-3 \\ & 20-11 \\ & 26-9 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 24-3 \\ & 22-11 \\ & 18-2 \\ & 24-3 \end{aligned}$ | $\begin{aligned} & 21-2 \\ & 21-2 \\ & 19-1 \\ & 14-10 \\ & 21-2 \end{aligned}$ |
| Hem-Fir (North) | Appearance Construction Standard Utility | $\begin{array}{r} 10-7 \\ 9-1 \\ 6-9 \\ 4-8 \end{array}$ | $\begin{aligned} & 9-8 \\ & 7-10 \\ & 5-10 \\ & 4-1 \end{aligned}$ | $\begin{aligned} & 8-4 \\ & 6-5 \\ & 4-9 \\ & 3-4 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{gathered} 10.7 \\ 10-7 \\ 10-4 \\ 7.11 \end{gathered}$ | $\begin{aligned} & 9-8 \\ & 9-8 \\ & 9-3 \\ & 6-10 \end{aligned}$ | $\begin{aligned} & 8-5 \\ & 8-4 \\ & 7-6 \\ & 5-7 \end{aligned}$ | $\begin{aligned} & 16-8 \\ & 16-8 \\ & 15-8 \\ & 12-1 \end{aligned}$ | $\begin{aligned} & 15.2 \\ & 15-0 \\ & 13.7 \\ & 10-5 \end{aligned}$ | $\begin{array}{r} 13.3 \\ 12-3 \\ 11-1 \\ 8.6 \end{array}$ | $\begin{aligned} & 22-0 \\ & 22-0 \\ & 20-8 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 19-10 \\ & 17-11 \\ & 13-9 \end{aligned}$ | $\begin{aligned} & 17-5 \\ & 16-2 \\ & 14-8 \\ & 11.3 \end{aligned}$ | $\begin{aligned} & 28-0 \\ & 28-0 \\ & 26.5 \\ & 20-4 \end{aligned}$ | $\begin{aligned} & 25-5 \\ & 25-3 \\ & 22-10 \\ & 17-7 \end{aligned}$ | $\begin{aligned} & 22-3 \\ & 20-7 \\ & 18-8 \\ & 14-4 \end{aligned}$ |
| Ponderosa pine | Appearance Construction Standard Utility | $\begin{aligned} & 9-10 \\ & 8-6 \\ & 6-3 \\ & 4-5 \end{aligned}$ | $\begin{aligned} & 8-11 \\ & 7-4 \\ & 5-5 \\ & 3-10 \end{aligned}$ | $\begin{aligned} & 7-10 \\ & 6 \cdot 0 \\ & 4-5 \\ & 3-2 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-10 \\ & 9-10 \\ & 9-7 \\ & 7-5 \end{aligned}$ | $\begin{aligned} & 8.11 \\ & 8-11 \\ & 8-8 \\ & 6.5 \end{aligned}$ | $\begin{aligned} & 7-10 \\ & 7-10 \\ & 7-1 \\ & 5-3 \end{aligned}$ | $\begin{aligned} & 15-6 \\ & 15-6 \\ & 14-6 \\ & 11-1 \end{aligned}$ | $\begin{gathered} 14-1 \\ 13-11 \\ 12-6 \\ 9.7 \end{gathered}$ | $\begin{aligned} & 12.3 \\ & 11-4 \\ & 10-3 \\ & 7.10 \end{aligned}$ | $\begin{aligned} & 20-5 \\ & 20-5 \\ & 19-1 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 18-6 \\ & 18-4 \\ & 16-6 \\ & 12-8 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 15-0 \\ & 13-6 \\ & 10-4 \end{aligned}$ | $\begin{aligned} & 26-0 \\ & 26-0 \\ & 24-4 \\ & 18-8 \end{aligned}$ | $\begin{aligned} & 23-8 \\ & 23-5 \\ & 21-1 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 20-7 \\ & 19-1 \\ & 17-2 \\ & 13-2 \end{aligned}$ |
| Red pine | Appearance Construction Standard Utility | $\begin{array}{r} 10.1 \\ 8-4 \\ 6-3 \\ 4-5 \end{array}$ | $\begin{aligned} & 9-2 \\ & 7-3 \\ & 5-5 \\ & 3-10 \end{aligned}$ | $\begin{aligned} & 7.8 \\ & 5.11 \\ & 4.5 \\ & 3.2 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 10-1 \\ & 10-1 \\ & 9-10 \\ & 7-5 \end{aligned}$ | $\begin{aligned} & 9-2 \\ & 9-2 \\ & 8.6 \\ & 6.5 \end{aligned}$ | $\begin{aligned} & 8-0 \\ & 7-8 \\ & 6-11 \\ & 5-3 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 15-8 \\ & 14-3 \\ & 10-10 \end{aligned}$ | $\begin{array}{r} 14-5 \\ 13-7 \\ 12-4 \\ 9-5 \end{array}$ | $\begin{array}{r} 12.0 \\ 11-1 \\ 10-1 \\ 7.8 \end{array}$ | $\begin{aligned} & 20-11 \\ & 20-8 \\ & 18-10 \\ & 14-4 \end{aligned}$ | $\begin{aligned} & 19-0 \\ & 17-11 \\ & 16-3 \\ & 12.5 \end{aligned}$ | $\begin{aligned} & 15-10 \\ & 14-8 \\ & 13-4 \\ & 10-1 \end{aligned}$ | $\begin{aligned} & 26-9 \\ & 26-5 \\ & 24-0 \\ & 18-3 \end{aligned}$ | $\begin{aligned} & 24-3 \\ & 22-10 \\ & 20-9 \\ & 15-10 \end{aligned}$ | $\begin{aligned} & 20-3 \\ & 18-8 \\ & 17-0 \\ & 12-11 \end{aligned}$ |
| Spruce-Pine-Fir | Appearance Construction Standard Utility | $\begin{array}{r} 10.7 \\ 8.7 \\ 6.5 \\ 4.5 \end{array}$ | $\begin{aligned} & 9-7 \\ & 7-5 \\ & 5-7 \\ & 3-10 \end{aligned}$ | $\begin{aligned} & 7-10 \\ & 6-1 \\ & 4-7 \\ & 3-2 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10.7 \\ 10.7 \\ 10.0 \\ \mathbf{7 . 6} \end{array}$ | $\begin{aligned} & 9-8 \\ & 9-7 \\ & 8-8 \\ & 6-6 \end{aligned}$ | $\begin{aligned} & 8-5 \\ & 7-10 \\ & 7.1 \\ & 5-4 \end{aligned}$ | $\begin{aligned} & 16-8 \\ & 16-1 \\ & 14-8 \\ & 11-1 \end{aligned}$ | $\begin{gathered} 15-2 \\ 13-11 \\ 12-8 \\ 9.7 \end{gathered}$ | $\begin{gathered} \hline 12-6 \\ 11-4 \\ 10-4 \\ 7.10 \end{gathered}$ | $\begin{aligned} & 22.0 \\ & 21-2 \\ & 19.4 \\ & 14-8 \end{aligned}$ | $\begin{aligned} & 19.11 \\ & 18-4 \\ & 16.9 \\ & 12.8 \end{aligned}$ | $\begin{aligned} & 16.6 \\ & 15.0 \\ & 13-8 \\ & 10-4 \end{aligned}$ | $\begin{aligned} & 28-0 \\ & 27-0 \\ & 24-8 \\ & 18-8 \end{aligned}$ | $\begin{aligned} & 25-5 \\ & 23-5 \\ & 21-4 \\ & 16-2 \end{aligned}$ | $\begin{aligned} & 21-0 \\ & 19-1 \\ & 17-5 \\ & 13-2 \end{aligned}$ |
| Western cedars (North) | Appearance Construction Standard Utility | $\begin{aligned} & 9-7 \\ & 8-7 \\ & 6.5 \\ & 4.5 \end{aligned}$ | $\begin{aligned} & 8-8 \\ & 7-5 \\ & 5-7 \\ & 3-10 \end{aligned}$ | $\begin{aligned} & 7-7 \\ & 6-1 \\ & 4-7 \\ & 3-2 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-7 \\ & 9-7 \\ & 9-3 \\ & 7.6 \end{aligned}$ | $\begin{aligned} & 8-8 \\ & 8-8 \\ & 8-5 \\ & 6-6 \end{aligned}$ | $\begin{aligned} & 7-7 \\ & 7.7 \\ & 7-3 \\ & 5-4 \end{aligned}$ | $\begin{aligned} & 15-0 \\ & 15-0 \\ & 14.7 \\ & 11-4 \end{aligned}$ | $\begin{gathered} 13-8 \\ 13-8 \\ 12-8 \\ 9-10 \end{gathered}$ | $\begin{gathered} 11-11 \\ 11-7 \\ 10-4 \\ \mathbf{8 - 0} \end{gathered}$ | $\begin{aligned} & 19.10 \\ & 19.10 \\ & 19-2 \\ & \mathbf{1 5 - 0} \end{aligned}$ | $\begin{aligned} & 18-0 \\ & 18.0 \\ & 16-9 \\ & 12-11 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 15-3 \\ & 13-8 \\ & 10-7 \end{aligned}$ | $\begin{aligned} & 25-3 \\ & 25-3 \\ & 24-6 \\ & 19-1 \end{aligned}$ | $\begin{aligned} & 22-11 \\ & 22-11 \\ & 21-4 \\ & 16-6 \end{aligned}$ | $\begin{aligned} & 20-1 \\ & 19-6 \\ & 17.5 \\ & 13-6 \end{aligned}$ |
| Western white pine | Appearance Construction Standard Utility | $\begin{array}{r} 10-4 \\ 8.2 \\ 6.1 \\ 4-2 \end{array}$ | $\begin{aligned} & 9.3 \\ & 7.1 \\ & 5-3 \\ & 3.7 \end{aligned}$ | $\begin{aligned} & 7-6 \\ & 5-10 \\ & 4-4 \\ & 2-11 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{array}{r} 10-4 \\ 10-4 \\ 9.7 \\ 7-3 \end{array}$ | $\begin{aligned} & 9-5 \\ & 9-3 \\ & 8-3 \\ & 6-3 \end{aligned}$ | $\begin{aligned} & 8-2 \\ & 7-6 \\ & 6.9 \\ & 5-1 \end{aligned}$ | $\begin{aligned} & 16-3 \\ & 15-8 \\ & 14-1 \\ & 10-10 \end{aligned}$ | $\begin{array}{r} 14-6 \\ 13-7 \\ 12-2 \\ 9-5 \end{array}$ | $\begin{gathered} 11-10 \\ 11-1 \\ 9-11 \\ 7.8 \end{gathered}$ | $\begin{aligned} & 21-6 \\ & 20-8 \\ & 18-7 \\ & 14-4 \end{aligned}$ | $\begin{aligned} & 19-1 \\ & 17-11 \\ & 16-1 \\ & 12-5 \end{aligned}$ | $\begin{aligned} & 15-7 \\ & 14-8 \\ & 13-1 \\ & 10-1 \end{aligned}$ | $\begin{aligned} & 27-5 \\ & 26-5 \\ & 23-8 \\ & 18-3 \end{aligned}$ | $\begin{aligned} & 24-5 \\ & 22 \cdot 10 \\ & 20.6 \\ & 15-10 \end{aligned}$ | $\begin{aligned} & 19-11 \\ & 18-8 \\ & 16-9 \\ & 12-11 \end{aligned}$ |

Table 31. RAFTERS - High Slope (over 3 in 12) - With No Finished Ceiling - 30 psf live load + 7 psf dead
load - light roofing. (Spans shown in light face type are based on a deflection limitation of $l / 180$. Spans shown
in bold face type are limited by allowable extreme fiber stress in bending and include a 7 psf dead load.)

| Species | Grade | $2 \times 4$ |  |  | Grade | $2 \times 4$ |  |  | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (in.) |  |  |  | Joist Spacing ( inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Max. Span (ft - in.) |  |  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Appearance Construction Standard Utility | $\begin{aligned} & 9.7 \\ & 7.6 \\ & 5-8 \\ & 3.9 \end{aligned}$ | $\begin{aligned} & 8-4 \\ & 6-6 \\ & 4-11 \\ & 3-3 \end{aligned}$ | $\begin{aligned} & 6.9 \\ & 5.3 \\ & 4.0 \\ & 2.8 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9.8 \\ & 9.7 \\ & 8.9 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 8-9 \\ & 8-4 \\ & 7-7 \\ & 5-8 \end{aligned}$ | $\begin{aligned} & 7-4 \\ & 6-9 \\ & 6-2 \\ & 4-8 \end{aligned}$ | $\begin{aligned} & 15-2 \\ & 14-0 \\ & 12-10 \\ & 9-8 \end{aligned}$ | $\begin{array}{r} 13-4 \\ 12-2 \\ 11-1 \\ 8-5 \end{array}$ | $\begin{gathered} 10-10 \\ 9-11 \\ 9.1 \\ 6-10 \end{gathered}$ | $\begin{aligned} & 20-0 \\ & 18-6 \\ & 16.11 \\ & 12.9 \end{aligned}$ | $\begin{aligned} & 17.6 \\ & 16.0 \\ & 14.8 \\ & 11.1 \end{aligned}$ | $\begin{array}{r} 14-4 \\ 13-1 \\ 12-0 \\ 9-0 \end{array}$ | $\begin{aligned} & 25-6 \\ & 23-7 \\ & 21-7 \\ & 16-4 \end{aligned}$ | $\begin{aligned} & 22.4 \\ & 20.5 \\ & 18.8 \\ & 14.1 \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 16-8 \\ & 15-3 \\ & 11-6 \end{aligned}$ |
| Douglas fir-Larch (North) | Appearance Construction Standard Utility | $\begin{aligned} & 9-10 \\ & 8-9 \\ & 6.7 \\ & 4-6 \end{aligned}$ | $\begin{aligned} & 8 \cdot 11 \\ & 7-7 \\ & 5-8 \\ & 3-11 \end{aligned}$ | $\begin{aligned} & 7-10 \\ & 6-2 \\ & 4-8 \\ & 3.2 \end{aligned}$ | Select Structural No. $1 \&$ Appearance No. 2 No. 3 | $\begin{aligned} & 9-10 \\ & 9-10 \\ & 9.8 \\ & 7.8 \end{aligned}$ | $\begin{aligned} & 8-11 \\ & 8-11 \\ & 8-9 \\ & 6-7 \end{aligned}$ | $\begin{aligned} & 7-10 \\ & 7-10 \\ & 7.3 \\ & 5-5 \end{aligned}$ | $\begin{aligned} & 15-6 \\ & 15-6 \\ & 15-1 \\ & 11-7 \end{aligned}$ | $\begin{aligned} & 14-1 \\ & 14-1 \\ & 13-1 \\ & 10-0 \end{aligned}$ | $\begin{array}{r} 12.3 \\ 11.8 \\ 10.8 \\ 8-2 \end{array}$ | $\begin{aligned} & 20-5 \\ & 20-5 \\ & 19-11 \\ & 15-3 \end{aligned}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 17-3 \\ & 13-2 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 15-5 \\ & 14-1 \\ & 10.9 \end{aligned}$ | $\begin{aligned} & 26.0 \\ & 26-0 \\ & 254 \\ & 19.5 \end{aligned}$ | $\begin{aligned} & 23-8 \\ & 23-8 \\ & 22.0 \\ & 16.10 \end{aligned}$ | $\begin{aligned} & 20.8 \\ & 19.8 \\ & 17.11 \\ & 13.9 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8.10 \\ & 8.1 \\ & 6.0 \\ & 4.2 \end{aligned}$ | $\begin{aligned} & 8-0 \\ & 7-1 \\ & 5-3 \\ & 3-8 \end{aligned}$ | $\begin{aligned} & \text { 6-11 } \\ & 5-9 \\ & 4-3 \\ & 3-0 \end{aligned}$ | Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance | $\begin{aligned} & 8-10 \\ & 8-10 \\ & 8-4 \\ & 7-2 \\ & 8-10 \end{aligned}$ | $\begin{aligned} & 8-0 \\ & 8-0 \\ & 7-7 \\ & 6.2 \\ & 8-0 \end{aligned}$ | $\begin{aligned} & 7-0 \\ & 7.0 \\ & 6-8 \\ & 5-0 \\ & 6-11 \end{aligned}$ | $\begin{aligned} & 13-10 \\ & 13-10 \\ & 13-1 \\ & 10-8 \\ & 13-10 \end{aligned}$ | $\begin{gathered} 12.7 \\ 12.7 \\ 11.11 \\ 9.3 \\ 12.7 \end{gathered}$ | $\begin{gathered} 11-0 \\ 10-10 \\ 9-8 \\ 7-6 \\ 10-10 \end{gathered}$ | $\begin{aligned} & 18-3 \\ & 18-3 \\ & 17-4 \\ & \mathbf{1 4 - 0} \\ & 18-3 \end{aligned}$ | $\begin{aligned} & 16.7 \\ & 16.7 \\ & 15.8 \\ & 12.2 \\ & 16.7 \end{aligned}$ | $\begin{aligned} & 14-6 \\ & 14-3 \\ & 12-9 \\ & 9-11 \\ & 14-3 \end{aligned}$ | $\begin{aligned} & 23-4 \\ & 23-4 \\ & 22-1 \\ & 17-11 \\ & 23.4 \end{aligned}$ | $\begin{aligned} & 21.2 \\ & 21.2 \\ & 20-0 \\ & 15-6 \\ & 21-2 \end{aligned}$ | $\begin{aligned} & 18-6 \\ & 18-2 \\ & 16-4 \\ & 12-8 \\ & 18-2 \end{aligned}$ |
| Hem-Fir (North) | Appearance Construction Standard Utility | $\begin{aligned} & 9.3 \\ & 7.9 \\ & 5-9 \\ & 4-0 \end{aligned}$ | $\begin{aligned} & 8-5 \\ & 6-9 \\ & 5-0 \\ & 3-6 \end{aligned}$ | $\begin{aligned} & 7.2 \\ & 5-6 \\ & 4.1 \\ & 2.10 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-3 \\ & 9-3 \\ & 9-1 \\ & 6-9 \end{aligned}$ | $\begin{aligned} & 8-5 \\ & 8-5 \\ & 7-11 \\ & 5-10 \end{aligned}$ | $\begin{aligned} & 7.4 \\ & 7.2 \\ & 6.5 \\ & 4-9 \end{aligned}$ | $\begin{aligned} & 14-7 \\ & 14-7 \\ & 13-5 \\ & 10-4 \end{aligned}$ | $\begin{aligned} & 13.3 \\ & 12.10 \\ & 11.7 \\ & 8.11 \end{aligned}$ | $\begin{array}{r} 11.5 \\ 10.6 \\ 9.8 \\ 7.3 \end{array}$ | $\begin{aligned} & 19-2 \\ & 19-2 \\ & 17.8 \\ & 13-7 \end{aligned}$ | $\begin{aligned} & 17.5 \\ & 16.11 \\ & 15.4 \\ & 11.9 \end{aligned}$ | $\begin{gathered} 15-0 \\ 13-10 \\ 12-6 \\ 9.7 \end{gathered}$ | $\begin{aligned} & 24.6 \\ & 24.6 \\ & 22.7 \\ & 17.4 \end{aligned}$ | $\begin{aligned} & 22-3 \\ & 21.7 \\ & 19.6 \\ & 15.0 \end{aligned}$ | $\begin{aligned} & 19.2 \\ & 17.7 \\ & 15.11 \\ & 12.3 \end{aligned}$ |
| Ponderosa pine | Appearance Construction Standard Utility | $\begin{aligned} & 8-7 \\ & 7.3 \\ & 5-4 \\ & 3.9 \end{aligned}$ | $\begin{aligned} & 7.10 \\ & 6-3 \\ & 4.8 \\ & 3.3 \end{aligned}$ | $\begin{aligned} & 6.8 \\ & 5.1 \\ & 3.9 \\ & 2.8 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-7 \\ & 8.7 \\ & 8.4 \\ & 6.4 \end{aligned}$ | $\begin{aligned} & 7.10 \\ & 7.10 \\ & 7.5 \\ & 5.6 \end{aligned}$ | $\begin{aligned} & 6.10 \\ & 6.8 \\ & 6.0 \\ & 4.5 \end{aligned}$ | $\begin{array}{r} 13-6 \\ 13-6 \\ 12.4 \\ 9.6 \end{array}$ | $\begin{aligned} & 12-3 \\ & 11-11 \\ & 10-8 \\ & 8.3 \end{aligned}$ | $\begin{array}{r} 10.6 \\ 9.8 \\ 8.9 \\ 6.8 \end{array}$ | $\begin{aligned} & 17-10 \\ & 17-10 \\ & 16-3 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 16.2 \\ & 15.8 \\ & 14.1 \\ & 10.10 \end{aligned}$ | $\begin{gathered} 13.10 \\ 12.9 \\ 11.6 \\ 8.10 \end{gathered}$ | $\begin{aligned} & 22-9 \\ & 22-9 \\ & 20-9 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 20-8 \\ & 20.0 \\ & 18-0 \\ & 13-10 \end{aligned}$ | $\begin{aligned} & 17-7 \\ & 16.4 \\ & 14.8 \\ & 11-3 \end{aligned}$ |
| Red pine | Appearance Construction Standard Utility | $\begin{aligned} & 8-10 \\ & 7-2 \\ & 5.4 \\ & 3-9 \end{aligned}$ | $\begin{aligned} & 8-0 \\ & 6.2 \\ & 4-8 \\ & 3-3 \end{aligned}$ | $\begin{aligned} & 6.6 \\ & 5.0 \\ & 3.9 \\ & 2.8 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-10 \\ & 8-10 \\ & 8.4 \\ & 6.4 \end{aligned}$ | $\begin{aligned} & 8.0 \\ & 8.0 \\ & 7.3 \\ & 5.6 \end{aligned}$ | $\begin{aligned} & 7-0 \\ & 6.6 \\ & 5.11 \\ & 4-5 \end{aligned}$ | $\begin{gathered} 13.10 \\ 13.5 \\ 12.2 \\ 9.3 \end{gathered}$ | $\begin{array}{r} 12.7 \\ 11.7 \\ 10.7 \\ 8.0 \end{array}$ | $\begin{array}{r} 10.3 \\ 9.6 \\ 8.7 \\ 6.7 \end{array}$ | $\begin{aligned} & 18-3 \\ & 17.8 \\ & 16.1 \\ & 12.3 \end{aligned}$ | $\begin{aligned} & 16.7 \\ & 15-4 \\ & 13.11 \\ & 10.7 \end{aligned}$ | $\begin{array}{r} 13-7 \\ 12.6 \\ 11-4 \\ 8-8 \end{array}$ | $\begin{aligned} & 23-4 \\ & 22-7 \\ & 20-6 \\ & 15-7 \end{aligned}$ | $\begin{aligned} & 21.2 \\ & 19.6 \\ & 17.9 \\ & 13.6 \end{aligned}$ | $\begin{aligned} & 17.3 \\ & 16.11 \\ & 14.6 \\ & 11.0 \end{aligned}$ |
| Spruce-Pine-Fir | Appearance Construction Standard Utility | $\begin{aligned} & 9-3 \\ & 7.4 \\ & 5-6 \\ & 3.9 \end{aligned}$ | $\begin{aligned} & 8.2 \\ & 6-4 \\ & 4.9 \\ & 3.3 \end{aligned}$ | $\begin{aligned} & 6-8 \\ & 5-2 \\ & 3-11 \\ & 2-8 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-3 \\ & 9-3 \\ & 8-6 \\ & 6-5 \end{aligned}$ | $\begin{aligned} & 8-5 \\ & 8-2 \\ & 7.5 \\ & 5.7 \end{aligned}$ | $\begin{aligned} & 7.3 \\ & 6.8 \\ & 6.0 \\ & 4.7 \end{aligned}$ | $\begin{array}{r} 14.7 \\ 13.9 \\ 12.6 \\ 9.6 \end{array}$ | $\begin{gathered} 13.1 \\ 11.11 \\ 10.10 \\ 8.3 \end{gathered}$ | $\begin{gathered} 10.8 \\ 9.8 \\ 8.10 \\ 6.8 \end{gathered}$ | $\begin{aligned} & 19-2 \\ & 18-1 \\ & 16-6 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 17.3 \\ & 15.8 \\ & 14.3 \\ & 10-10 \end{aligned}$ | $\begin{gathered} 14-1 \\ 12.9 \\ 11.8 \\ 8.10 \end{gathered}$ | $\begin{aligned} & 24-6 \\ & 23-1 \\ & 21 \cdot 1 \\ & 15-11 \end{aligned}$ | $\begin{aligned} & 22.0 \\ & 20-0 \\ & 18.3 \\ & 13-10 \end{aligned}$ | $\begin{aligned} & 17-11 \\ & 16-4 \\ & 14.11 \\ & 11-3 \end{aligned}$ |
| Western cedars (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8.4 \\ & 7.4 \\ & 5-6 \\ & 3-9 \end{aligned}$ | $\begin{aligned} & 7.7 \\ & 8.4 \\ & 4.9 \\ & 3.3 \end{aligned}$ | $\begin{aligned} & 6.8 \\ & 5 \cdot 2 \\ & 3.11 \\ & 2.8 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-4 \\ & 8-4 \\ & 8-1 \\ & 6-5 \end{aligned}$ | $\begin{aligned} & 7.7 \\ & 7.7 \\ & 7.4 \\ & 5.7 \end{aligned}$ | $\begin{aligned} & 6.8 \\ & 6-8 \\ & 6-2 \\ & 4-7 \end{aligned}$ | $\begin{array}{r} 13-1 \\ 13-1 \\ 12-6 \\ 9-8 \end{array}$ | $\begin{gathered} 11.11 \\ 11.11 \\ 10.10 \\ 8.5 \end{gathered}$ | $\begin{aligned} & 10-5 \\ & 9.11 \\ & 8-10 \\ & 6.10 \end{aligned}$ | $\begin{aligned} & 17.4 \\ & 17.4 \\ & 16.6 \\ & 12.9 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 15-9 \\ & 14-3 \\ & 11-1 \end{aligned}$ | $\begin{array}{r} 13.9 \\ 13.1 \\ 11-8 \\ 9.0 \end{array}$ | $\begin{aligned} & 22-1 \\ & 22-1 \\ & 21-1 \\ & 16-4 \end{aligned}$ | $\begin{aligned} & 20-1 \\ & 20-1 \\ & 18-3 \\ & 14-1 \end{aligned}$ | $\begin{aligned} & 17-6 \\ & 16.8 \\ & 14.11 \\ & 11.6 \end{aligned}$ |
| Western white pine | Appearance Construction Standard Utility | $\begin{aligned} & 9-1 \\ & 7-0 \\ & 5-2 \\ & 3.7 \end{aligned}$ | $\begin{aligned} & 7-11 \\ & 6-1 \\ & 4-6 \\ & 3-1 \end{aligned}$ | $\begin{aligned} & 6-5 \\ & 4-11 \\ & 3-8 \\ & 2-6 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 9-1 \\ & 9-1 \\ & 8-2 \\ & 6-2 \end{aligned}$ | $\begin{aligned} & 8-3 \\ & 7-11 \\ & 7-1 \\ & 6-4 \end{aligned}$ | $\begin{aligned} & 7-0 \\ & 6-5 \\ & 5-9 \\ & 4-4 \end{aligned}$ | $\begin{array}{r} 14-3 \\ 13-5 \\ 12-0 \\ 9-3 \end{array}$ | $\begin{array}{r} 12.5 \\ 11.7 \\ 10.5 \\ 8.0 \end{array}$ | $\begin{array}{r} 10-1 \\ 9.6 \\ 8-6 \\ 6.7 \end{array}$ | $\begin{aligned} & 18.9 \\ & 17.8 \\ & 15.10 \\ & 12.3 \end{aligned}$ | $\begin{aligned} & 16-4 \\ & 15.4 \\ & 13.9 \\ & 10.7 \end{aligned}$ | $\begin{array}{r} 13.4 \\ 12-6 \\ 11-2 \\ 8-8 \end{array}$ | $\begin{aligned} & 23-11 \\ & 22.7 \\ & 20.3 \\ & 15-7 \end{aligned}$ | $\begin{aligned} & 20.10 \\ & 19.6 \\ & 17.6 \\ & 13.6 \end{aligned}$ | $\begin{aligned} & 17.0 \\ & 15-11 \\ & 14-4 \\ & 11-0 \end{aligned}$ |

$\underset{\sim}{\omega}$ Table 32. RAFTERS - High Slope (over 3 in 12) - With No Finished Ceiling - 40 psf live load +7 psf dead load - light roofing. (Spans shown in light face type are based on a deflection limitation of $l / 180$. Spans shown in bold face type are limited by allowable extreme fiber stress in bending and include a 7 psf dead load.)

| Species | Grade |  | $2 \times 4$ |  | Grade | $2 \times 4$ |  |  | $2 \times 6$ |  |  | $2 \times 8$ |  |  | $2 \times 10$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Joist Spacing (in.) |  |  |  | Joist Spacing ( inches) |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 12 | 16 | 24 |  | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 | 12 | 16 | 24 |
|  |  | Max. Span ( ft - in.) |  |  |  | Maximum Allowable Span (ft - in.) |  |  |  |  |  |  |  |  |  |  |  |
| Coast sitka spruce | Appearance Construction Standard Utility | $\begin{aligned} & 8.6 \\ & 6.7 \\ & 5.0 \\ & 3.4 \end{aligned}$ | $\begin{aligned} & 7-5 \\ & 5.9 \\ & 4-4 \\ & 2.11 \end{aligned}$ | $\begin{aligned} & 6-0 \\ & 4-8 \\ & 3-7 \\ & 2-5 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-9 \\ & 8.6 \\ & 7.9 \\ & 5.10 \end{aligned}$ | $\begin{aligned} & 8-0 \\ & 7.5 \\ & 6-8 \\ & 5.0 \end{aligned}$ | $\begin{aligned} & 6-6 \\ & 6-0 \\ & 5-6 \\ & 4-1 \end{aligned}$ | $\begin{array}{r} 13.7 \\ 12.5 \\ 11.5 \\ 8.7 \end{array}$ | $\begin{gathered} 11-10 \\ 10-9 \\ 9.10 \\ 7.5 \end{gathered}$ | $\begin{aligned} & 9-8 \\ & 8-9 \\ & 8-1 \\ & 6-1 \end{aligned}$ | $\begin{aligned} & 17.11 \\ & 16.5 \\ & 15.0 \\ & 11.4 \end{aligned}$ | $\begin{gathered} 15-7 \\ 14-2 \\ 13-0 \\ 9-10 \end{gathered}$ | $\begin{array}{r} 12.8 \\ 11.7 \\ 10.7 \\ 8.0 \end{array}$ | $\begin{aligned} & 22.11 \\ & 20-11 \\ & 19-2 \\ & 14.6 \end{aligned}$ | $\begin{aligned} & 19-10 \\ & 18-1 \\ & 16-7 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 16-2 \\ & 14-9 \\ & 13-7 \\ & 10-3 \end{aligned}$ |
| Douglas fir-Larch (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8-11 \\ & 7-9 \\ & 5-10 \\ & 4-0 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 6-8 \\ & 5-0 \\ & 3-6 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 5-6 \\ & 4-1 \\ & 2-10 \end{aligned}$ | Select Structural <br> No. $1 \&$ Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-11 \\ & 8-11 \\ & 8.9 \\ & 6.9 \end{aligned}$ | $\begin{aligned} & 8-1 \\ & 8-1 \\ & 7-10 \\ & 5-11 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 7-1 \\ & 6-5 \\ & 4-10 \end{aligned}$ | $\begin{aligned} & 14.1 \\ & 14.1 \\ & 13-5 \\ & 10.3 \end{aligned}$ | $\begin{array}{r} 12.9 \\ 12.9 \\ 11.7 \\ 8.11 \end{array}$ | $\begin{array}{r} 11-2 \\ 10.5 \\ 9.6 \\ 7.3 \end{array}$ | $\begin{aligned} & 18-6 \\ & 18-6 \\ & 17-8 \\ & 13-6 \end{aligned}$ | $\begin{aligned} & 16-10 \\ & 16.9 \\ & 15-3 \\ & 11.8 \end{aligned}$ | $\begin{array}{r} 14-8 \\ 13-8 \\ 126 \\ 9-7 \end{array}$ | $\begin{aligned} & 23.8 \\ & 23.8 \\ & 22.6 \\ & 17.3 \end{aligned}$ | $\begin{aligned} & 21-6 \\ & 21-5 \\ & 19-6 \\ & 14-11 \end{aligned}$ | $\begin{aligned} & 18.9 \\ & 17.6 \\ & 15-11 \\ & 12.2 \end{aligned}$ |
| Eastern hemlock <br> -Tamarack (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8.0 \\ & 7.3 \\ & 5.4 \\ & 3.9 \end{aligned}$ | $\begin{aligned} & 7.3 \\ & 6-3 \\ & 4.8 \\ & 3.3 \end{aligned}$ | $\begin{aligned} & 6-1 \\ & 5-2 \\ & 3-9 \\ & 2.8 \end{aligned}$ | Select Structural <br> No. 1 <br> No. 2 <br> No. 3 <br> Appearance | $\begin{aligned} & 8-0 \\ & 8-0 \\ & 7.7 \\ & 6.4 \\ & 8-0 \end{aligned}$ | $\begin{aligned} & 7.3 \\ & 7.3 \\ & 6-11 \\ & 5 \cdot 6 \\ & 7-3 \end{aligned}$ | $\begin{aligned} & 6-4 \\ & 6-4 \\ & 6-0 \\ & \mathbf{4 - 6} \\ & \mathbf{6 - 1} \end{aligned}$ | $\begin{gathered} 12.7 \\ 12.7 \\ 11.11 \\ 9.5 \\ 12.7 \end{gathered}$ | $\begin{array}{r} 11-5 \\ 11-5 \\ 10-6 \\ 8-2 \\ 11-5 \end{array}$ | $\begin{array}{r} 10-0 \\ 9-7 \\ 8-7 \\ 6-8 \\ 9-7 \end{array}$ | $\begin{aligned} & 16.7 \\ & 16.7 \\ & 15.9 \\ & 12.5 \\ & 16.7 \end{aligned}$ | $\begin{aligned} & 15-1 \\ & 15-1 \\ & 13-11 \\ & \mathbf{1 0 - 9} \\ & 15-1 \end{aligned}$ | $\begin{gathered} 13.2 \\ 12.8 \\ 11.4 \\ 8.10 \\ 12.8 \end{gathered}$ | $\begin{aligned} & \hline 21-2 \\ & 21-2 \\ & 20-1 \\ & 15-10 \\ & 21-2 \end{aligned}$ | $\begin{aligned} & 19.3 \\ & 19.3 \\ & \mathbf{1 7 - 9} \\ & \mathbf{1 3 - 9} \\ & 19-3 \end{aligned}$ | $\begin{aligned} & 16.10 \\ & 16.2 \\ & 14-6 \\ & 11-3 \\ & 16-2 \end{aligned}$ |
| Hem-Fir (North) | Appearance Construction Standard Utility | $\begin{aligned} & 8-5 \\ & 6-11 \\ & 5-1 \\ & 3-7 \end{aligned}$ | $\begin{aligned} & 7-8 \\ & 6-0 \\ & 4-5 \\ & 3-1 \end{aligned}$ | $\begin{aligned} & 6-4 \\ & 4-10 \\ & 3.7 \\ & 2.6 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8.5 \\ & 8.5 \\ & 8.1 \\ & 6.0 \end{aligned}$ | $\begin{array}{r} 7.8 \\ 7.8 \\ 7.0 \\ 5.2 \end{array}$ | $\begin{aligned} & 6-8 \\ & 6-4 \\ & 5-8 \\ & 4-3 \end{aligned}$ | $\begin{gathered} 13.3 \\ 13.2 \\ 11.11 \\ 9.2 \end{gathered}$ | $\begin{gathered} 12.0 \\ 11.5 \\ 10.4 \\ 7.11 \end{gathered}$ | $\begin{array}{r} 10-1 \\ 9-4 \\ 8-5 \\ 6-6 \end{array}$ | $\begin{aligned} & 17-5 \\ & 17-4 \\ & 15-8 \\ & 12-1 \end{aligned}$ | $\begin{aligned} & 15.10 \\ & 15.0 \\ & 13.7 \\ & 10-5 \end{aligned}$ | $\begin{array}{r} 13.4 \\ 12.3 \\ 11.1 \\ 8.6 \end{array}$ | $\begin{aligned} & 22-3 \\ & 22-1 \\ & 20-0 \\ & 15-5 \end{aligned}$ | $\begin{aligned} & 20-2 \\ & 19-2 \\ & 17-4 \\ & 13-4 \end{aligned}$ | $\begin{aligned} & \hline 17.0 \\ & 15.8 \\ & 14.2 \\ & 10.11 \end{aligned}$ |
| Ponderosa pine | Appearance Construction Standard Utility | $\begin{aligned} & 7-10 \\ & 6-5 \\ & 4-9 \\ & 3-4 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 5-7 \\ & 4-1 \\ & 2-11 \end{aligned}$ | $\begin{aligned} & 5-11 \\ & 4-7 \\ & 3.4 \\ & 2.5 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 7.10 \\ & 7-10 \\ & 7.7 \\ & 5.7 \end{aligned}$ | $\begin{aligned} & 7 \cdot 1 \\ & 7-1 \\ & 6-7 \\ & 4-10 \end{aligned}$ | $\begin{aligned} & 6-2 \\ & 5-11 \\ & 5-4 \\ & 3-11 \end{aligned}$ | $\begin{array}{r} 12-3 \\ 12-2 \\ 11-0 \\ 8-5 \end{array}$ | $\begin{array}{r} 11-2 \\ 10.6 \\ 9.6 \\ 7.3 \end{array}$ | $\begin{aligned} & 9.4 \\ & 8.7 \\ & 7.9 \\ & 5.11 \end{aligned}$ | $\begin{aligned} & 16.2 \\ & 16-0 \\ & 14.5 \\ & 11.1 \end{aligned}$ | $\begin{gathered} 14.8 \\ 13-11 \\ 12-6 \\ 9-7 \end{gathered}$ | $\begin{gathered} 12.3 \\ 11-4 \\ 10-3 \\ 7-10 \end{gathered}$ | $\begin{aligned} & 20-8 \\ & 20-6 \\ & 18-5 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 18.9 \\ & 17.9 \\ & 18.0 \\ & 12.3 \end{aligned}$ | $\begin{aligned} & 15-8 \\ & 14-6 \\ & 13-0 \\ & 10-0 \end{aligned}$ |
| Red pine | Appearance Construction Standard Utility | $\begin{aligned} & 8-0 \\ & 6-4 \\ & 4-9 \\ & 3-4 \end{aligned}$ | $\begin{aligned} & 7-1 \\ & 5-6 \\ & 4-1 \\ & 2-11 \end{aligned}$ | $\begin{aligned} & 5-10 \\ & 4-6 \\ & 3.4 \\ & 2.5 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-0 \\ & 8-0 \\ & 7.5 \\ & \mathbf{5 . 7} \end{aligned}$ | $\begin{aligned} & 7-3 \\ & 7-1 \\ & 6-5 \\ & 4-10 \end{aligned}$ | $\begin{aligned} & 6-4 \\ & 5-10 \\ & 5-3 \\ & 3-11 \end{aligned}$ | $\begin{gathered} 12.7 \\ 11.11 \\ 10-10 \\ 8.3 \end{gathered}$ | $\begin{array}{r} 11-2 \\ 10-4 \\ 9-4 \\ 7.1 \end{array}$ | $\begin{aligned} & 9-1 \\ & 8-5 \\ & 7-8 \\ & 5-10 \end{aligned}$ | $\begin{aligned} & 16-7 \\ & 15-8 \\ & 14.3 \\ & 10-10 \end{aligned}$ | $\begin{array}{r} 14-9 \\ 13-7 \\ 12-4 \\ 9-5 \end{array}$ | $\begin{array}{r} 12-0 \\ 11.1 \\ 10-1 \\ 7.8 \end{array}$ | $\begin{aligned} & 21-2 \\ & 20-0 \\ & 18-2 \\ & 13-10 \end{aligned}$ | $\begin{aligned} & 18-9 \\ & 17-4 \\ & 15-9 \\ & 12.0 \end{aligned}$ | $\begin{gathered} 15-4 \\ 14-2 \\ 12-10 \\ 9-9 \end{gathered}$ |
| Spruce-Pine-Fir | Appearance Construction Standard Utility | $\begin{aligned} & 8-4 \\ & 6-6 \\ & 4-11 \\ & 3-4 \\ & \hline \end{aligned}$ | $\begin{aligned} & 7.3 \\ & 5.8 \\ & 4.3 \\ & 2.11 \end{aligned}$ | $\begin{aligned} & 5-11 \\ & 4-7 \\ & 3-5 \\ & 2-5 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-5 \\ & 8-4 \\ & 7-7 \\ & 5-9 \end{aligned}$ | $\begin{aligned} & 7-8 \\ & 7-3 \\ & 6.7 \\ & 4-11 \end{aligned}$ | $\begin{aligned} & 6.5 \\ & 5 \cdot 11 \\ & 5-4 \\ & 4-0 \end{aligned}$ | $\begin{array}{r} 13-3 \\ 12-2 \\ 11-1 \\ 8-5 \end{array}$ | $\begin{array}{r} 11.7 \\ 10.6 \\ 9.7 \\ 7.3 \end{array}$ | $\begin{aligned} & 9-6 \\ & 8-7 \\ & 7-10 \\ & 5-11 \end{aligned}$ | $\begin{aligned} & 17-5 \\ & 16.0 \\ & 14-8 \\ & 11-1 \end{aligned}$ | $\begin{gathered} 15-3 \\ 13.11 \\ 12.8 \\ 9.7 \end{gathered}$ | $\begin{gathered} 12.6 \\ 11-4 \\ 10-4 \\ 7.10 \end{gathered}$ | $\begin{aligned} & 22-3 \\ & 20-6 \\ & 18-8 \\ & 14-2 \end{aligned}$ | $\begin{aligned} & 19.6 \\ & 17.9 \\ & 16.2 \\ & 12.3 \end{aligned}$ | $\begin{aligned} & 15.11 \\ & 14.6 \\ & 13.3 \\ & 10.0 \end{aligned}$ |
| Western cedars (North) | Appearance Construction Standard Utility | $\begin{aligned} & 7-7 \\ & 6.6 \\ & 4-11 \\ & 3-4 \end{aligned}$ | $\begin{aligned} & 6-11 \\ & 5-8 \\ & 4-3 \\ & 2-11 \end{aligned}$ | $\begin{aligned} & 6-0 \\ & 4.7 \\ & 3.5 \\ & 2.5 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 7.7 \\ & 7.7 \\ & 7.4 \\ & 5.9 \end{aligned}$ | $\begin{aligned} & 6.11 \\ & 6.11 \\ & 6.8 \\ & 4-11 \end{aligned}$ | $\begin{aligned} & 6.0 \\ & 6.0 \\ & 5.6 \\ & 4.0 \end{aligned}$ | $\begin{gathered} 11-11 \\ 11 \\ 11 \\ 11 \\ 8 \\ 8.1 \end{gathered}$ | $\begin{gathered} 10.10 \\ 10.9 \\ 9.7 \\ 7.5 \end{gathered}$ | $\begin{aligned} & 9.6 \\ & 8.9 \\ & 7-10 \\ & 6-1 \end{aligned}$ | $\begin{aligned} & 15-9 \\ & 15-9 \\ & \mathbf{1 4 - 8} \\ & 11-4 \end{aligned}$ | $\begin{gathered} 14-3 \\ 14.2 \\ 12.8 \\ 9.10 \end{gathered}$ | $\begin{array}{r} 12.6 \\ 11.7 \\ 10.4 \\ 8.0 \end{array}$ | $\begin{aligned} & 20-1 \\ & 20-1 \\ & 18-8 \\ & 14.6 \end{aligned}$ | $\begin{aligned} & 18-3 \\ & 18-1 \\ & 16-2 \\ & 12-6 \end{aligned}$ | $\begin{aligned} & 15-11 \\ & 14-9 \\ & 13-3 \\ & 10-3 \end{aligned}$ |
| Western white pine | Appearance Construction Standard Utility | $\begin{aligned} & 8-1 \\ & 6-3 \\ & 4.7 \\ & 3.2 \end{aligned}$ | $\begin{aligned} & 7.0 \\ & 5.5 \\ & 4.0 \\ & 2.9 \end{aligned}$ | $\begin{aligned} & 5.8 \\ & 4-5 \\ & 3.3 \\ & 2.3 \end{aligned}$ | Select Structural <br> No. 1 \& Appearance <br> No. 2 <br> No. 3 | $\begin{aligned} & 8-3 \\ & 8.1 \\ & 7.3 \\ & 5.6 \end{aligned}$ | $\begin{aligned} & 7-6 \\ & 7-0 \\ & 6-3 \\ & 4-9 \end{aligned}$ | $\begin{aligned} & 6-3 \\ & 5-8 \\ & 5-2 \\ & 3-10 \end{aligned}$ | $\begin{gathered} 12.8 \\ 11.11 \\ 10.8 \\ 8.3 \end{gathered}$ | $\begin{array}{r} 11-0 \\ 10-4 \\ 9-3 \\ 7-1 \end{array}$ | $\begin{aligned} & 9-0 \\ & 8-5 \\ & 7-6 \\ & 5-10 \end{aligned}$ | $\begin{aligned} & 16-9 \\ & 15-8 \\ & 14.1 \\ & 10-10 \end{aligned}$ | $\begin{array}{r} 14-6 \\ 13-7 \\ 12.2 \\ 9.5 \end{array}$ | $\begin{gathered} 11-10 \\ 11-1 \\ 9-11 \\ 7-8 \end{gathered}$ | $\begin{aligned} & 21-4 \\ & 200 \\ & 17.11 \\ & 13-10 \end{aligned}$ | $\begin{aligned} & 18-6 \\ & 17-4 \\ & 15-6 \\ & 12-0 \end{aligned}$ | $\begin{array}{r} 15-1 \\ 14-2 \\ 12-8 \\ 9-9 \end{array}$ |

## Grade Stamps

Facsimiles of typical grade stamps of lumber associations and grading agencies certified by the Canadian 1 umhor Standards Administrative Board to gradı Canada are shown on this page. Althoug varies between agencies, each grade stam
(or symbol or both) of the grading agency; the number (or name or both) of the mill; the species designation; the mman. .n-d :s ... ' ' hinner than 5' nominal, either 7), S-DRY (for surfaced dry) or

DATE DUE


14G-1975 Corydon Avenue Winnipeg, Manitoba R3P 0R1

Council of Forest Industries of British Columbia
1500-1055 West Hastings Street Vancouver, B.C. V6E 2H1

Quebec Lumber Manufacturers Association
Suite 540
580 Grande.Allée
Quebec, P.O. G1R 2K2


MacDonaid Inspection
125 East 4th Avenue Vancouver, B.C. V5T 1G4

Saskatchewan Forest Products Corporation
101 First Avenue East
Prince Albert, Sask. S6V 2A5
Maritime Lumber Bureau
P.O. Box 459

Amherst, Nova Scotia B4H 4A1

Ontario Lumber Manufacturers Association
159 Bay Street, Suite 414
Toronto, Ontario M5J 1J7
N.W.T. Grade Stamping Agency P.O. Box 2157

Yellowknite, N.W.T. X0E 1J7

##  100 № 3



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## CANADIAN WOOD COUNCIL

Alberta Forest Products Association, 204-11710 Kingsway Avenue, Edmonton, Alberta T5G 0X5

Canadian Hardwood Plywood Association, 27 Goulburn Ave., Ottawa, Ontario K1N 8C7

Canadian Institute of Timber Construction, 702-100 Bronson Avenue, Ottawa, Ontario K1P 6G8

Canadian Lumbermen's Association, 27 Goulburn Ave., Ottawa, Ontario K1N 8C7

Cariboo Lumber Manufacturers' Association, 301-197 Second Avenue North, Williams Lake, British Columbia V2G 1 Z5

Central Forest Products Association,
14G - 1975 Corydon Avenue, Winnipeg, Manitoba R3P OR1
Council of Forest Industries of British Columbia,
1500-1055 West Hastings St., Vancouver 1, British Columbia V6E 2H1
Interior Lumber Manufacturers' Association, 295-333 Martin Street, Penticton, British Columbia V2A 5K7

Laminated Timber Institute of Canada, 4916 Elliott Street, Delta, British Columbia V4K 2 Y1

Maritime Lumber Bureau,
Box 459, Amherst, Nova Scotia B4H 4A1
Ontario Lumber Manufacturers Association, 159 Bay Street, Suite 414, Toronto, Ontario M5J 1J7

Quebec Lumber Manufacturers Association, 580 Grande Allée East, Suite 540, Quebec, Quebec G1R 2K1

Saskatchewan Forest Products Corporation,
101 First Avenue East, Prince Albert, Saskatchewan S6V 2A6
The Truss Plate Institute of Canada,
P.O. Box 119, Concord, Ontario L4E 1B2

Wholesale Lumber Dealers Association,
2259 Bloor St., West, Toronto, Ontario M6S 1N8

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Ministère de l'Industrie et du Commerce, Ottawa, Canada


[^0]:    Pacific Lumber Inspection Bureau 1460-1055 West Hastings Street Vancoưver, B.C. V6E 2G8

